MÁV
MOTIVE POWER ALBUM

1868 – 1993

KÖZDOK

Preface

With establishing of the Hungarian Royal State Railways (MÁV) in 1868 a new chapter began in the history of the home Railways.

The very first mainline of the MÁV was the 126-km line Pest-Salgótarján, where the trains were hauled by 8 steam locomotives. The development is well demonstrated by the expansion of the network operated by MÁV to almost 15.000 km and by the increase of the locomotive stock up to 2.410 units at the turn of the century.

The locomotives, railcars and trainsets have had their definitive significance in the technical development of MÁV at all times. This collection describes and illustrates by photographs and drawings the main data as well as hauling duties of the characteristic motive power of the MÁV. It was not easy to select the types, because these vehicles – first of all the steam locomotives – up to now were characterized by the big variety of types. Description of some older types are incomplete because of the deficienty source material, in spite of this circumstance we have found necessary the introduction of these types, too. Among the reviewed types the narrow-gauge and broad-gauge ones have been marked separately.

As for designations, at the first place there were indicated the last type-designations, whereby the possible former (earlier) markings are in brackets.

The majority of the vehicles introduced are of Hungarian manifacture demonstrating the favourable influence of the development of the MÁV to that of the Hungarian railway rolling stock industry, too. This rolling stock industry worthily received appreciation to the creativeness of Hungarian engineers and workers all over the World.

We hope that by this selection a good view will be given for the persons showing an interest in the motive power of the Hungarian State Railways.

STEAM LOCOMOTIVES AND STEAM ENGINE POWERED RAILCARS

STEAM LOCOMOTIVES

TENDERS OF THE STEAM LOCOMOTIVES

MODERNIZATION OF STEAM LOCOMOTIVES

STEAM ENGINE POWERED RAILCARS

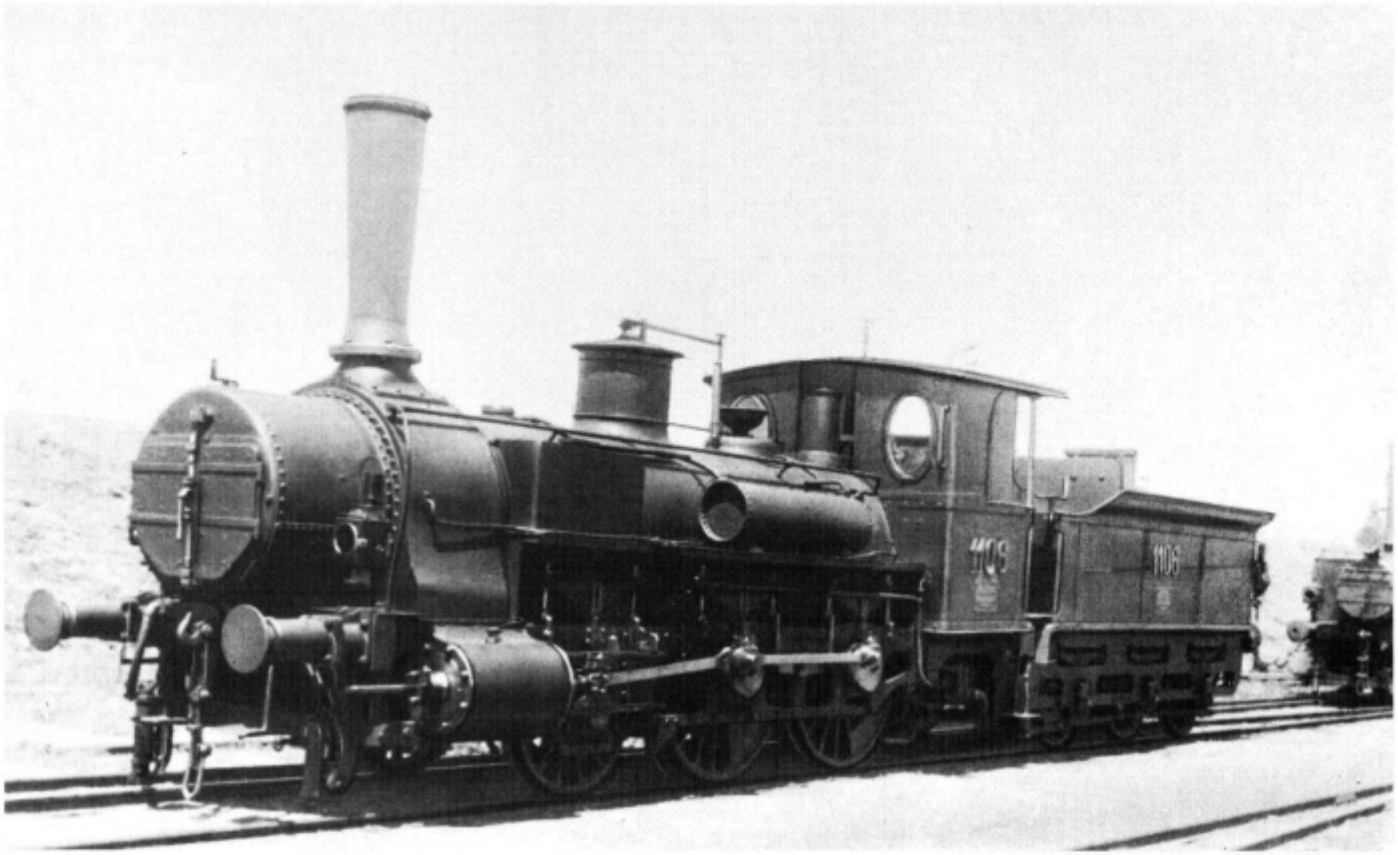
Class 236 (Former Class IIa)

Wheel arrangement
(British coding) 2-4-0
(American coding) –
Axle arrangement
(German coding) 1 B
Steam saturated
Cylinders 2
Expansion simple

Main Data

Coupled wheel dia	1.598	m
Running wheel dia	1.221	m
Total wheel base	3.320	m
Cylinder dia	0.395	m
Piston stroke	0.632	m
Grate area	1.29	sq.m
Heating surface, total	109.28	sq.m
Steam pressure	6.5	bar
Locomotive running order weight	34.12	t
Adhesion weight	23.77	t
Tender running order weight	27.00	t
Coal supply	7.0	t
Water supply	8.40	cu.m
Length over buffers*	14.48	m
Top speed	60	k.p.h.

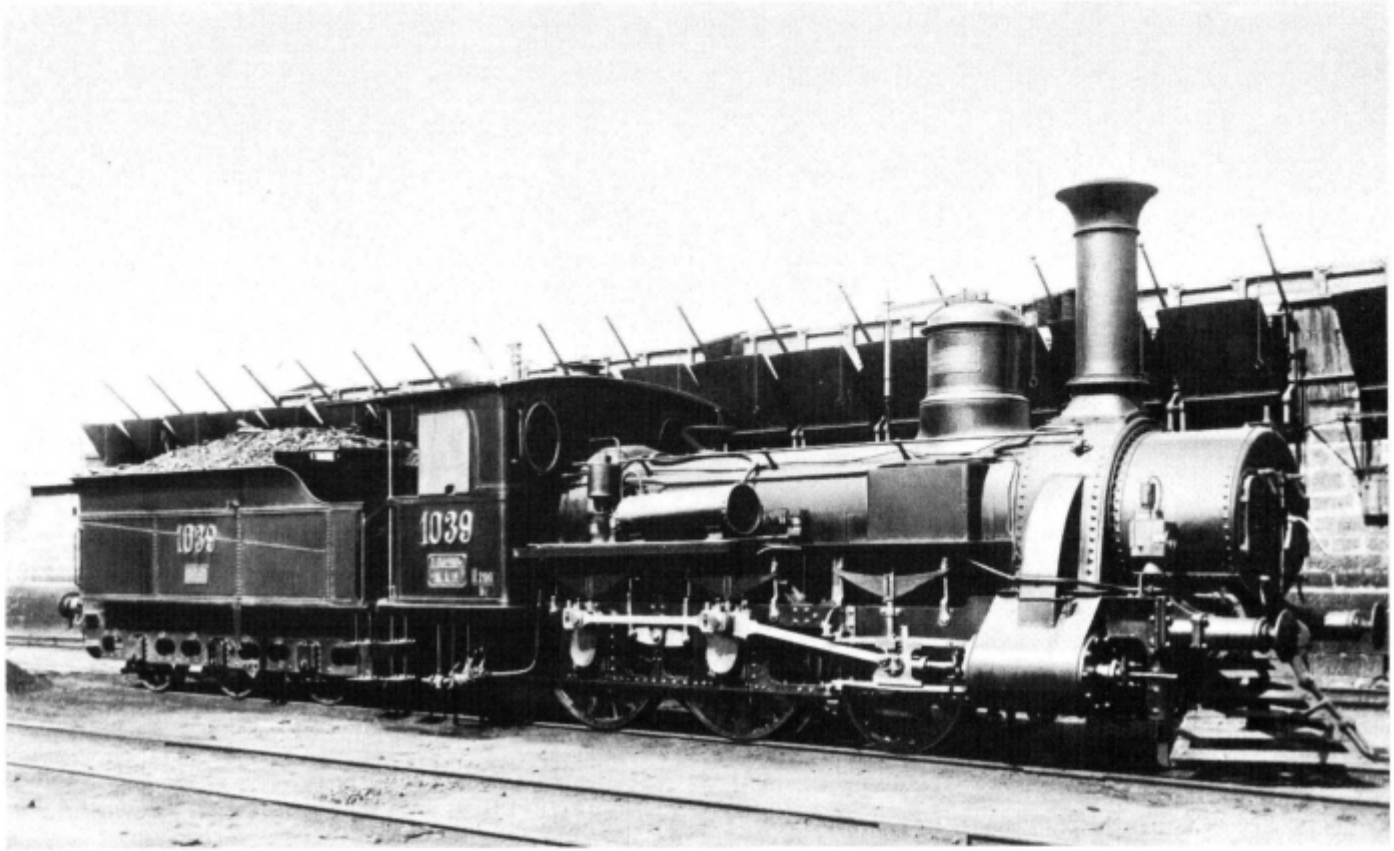
* with long smoke box: 15.98 m



In the first period after establishing of the Hungarian State Railways MÁV the passenger traffic was worked with 6 passenger locomotives taken over from the Northern Railways of Hungary. The locomotives, marked former as Class IIa and later as Class 236, were constructed by the Sigl Works of Wiener Neustadt in Austria in the period of 1866-1870. Because of the tight guidance of the axleboxes the designers of the locomotive made an effort to make a short wheel base in order to realize a good negotiation in sharp curves. As a result of this, the firebox was situated behind the rear axle while the steam cylinders and the smoke box in front of the front axle. The undesirable movements of the locomotive were increased by the overhung masses. With the original execution the locomotive had an open driver's stand. At the early 1880's the locomotive had been updated: the smoke-box was elonged and the driver's stand was provided with a shelter as usual in those times. At the beginning stopping trains were hauled by these locomotives on the line Budapest-Salgótarján. Later the hauling capacity of the locomotives turned out to be insufficient therefore they were used for hauling local stopping trains only. The locomotives were withdrawn after 45 years from service.

Class 238 (Former: Class II)

Wheel arrangement
(British coding) 2-4-0
(American coding) –
Axle arrangement
(German coding) 1 B
Steam saturated
Cylinders 2
Expansion simple



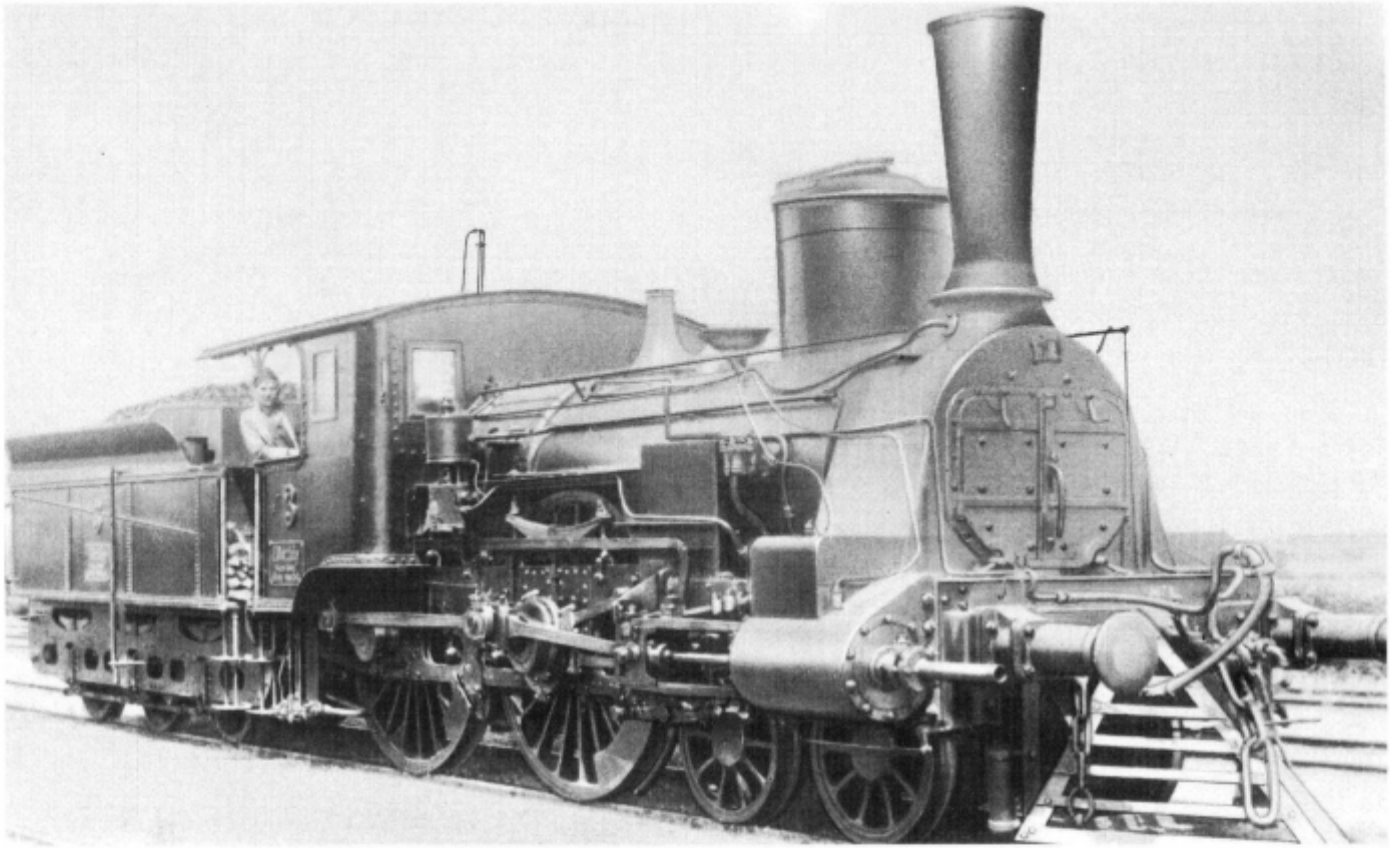
Main Data

Coupled wheel dia	1.510	m
Running wheel dia	1.221	m
Total wheel base	3.160	m
Cylinder dia	0.400	m
Piston stroke	0.632	m
Grate area	1.64	sq.m
Heating surface, total	129	sq.m
Steam pressure	8.5	bar
Locomotive running order weight	38.6	t
Adhesion weight	25.9	t
Tender running order weight	34	t
Coal supply	8	t
Water supply	12.5	cu.m
Length over buffers	14.624	m
Top speed	55	k.p.h.

The MÁV, established in 1868, needed further stopping train locomotives because of the extension of their network. The locomotives were ordered with Sigl Works in Austria and the first units got ready 1869. The general layout of the Class II, marked later as Class 238, locomotives corresponded to that of the locomotives of similar type constructed in the 60's of the past century at the Austrian locomotive factories. In the 1870's the locomotives hauled not only stopping but fast trains, too. At that time the fast trains were not characterized by the high speed but rather by passing the stations without stops reducing in such a way the travelling time of the stopping trains. 12 units of this locomotives have been manufactured for the MÁV within the interval of 1869 and 1877. The locomotives were delivered for some Hungarian private Railways, too, thus after their nationalization the fleet of MÁV contained 64 units of the Class 238 locomotives.

Class 259 (Former: Class I)

Wheel arrangement
(British coding) 4-4-0
(American coding) „American"
Axle arrangement
(German coding) 2'B
Steam saturated
Cylinders 2
Expansion simple



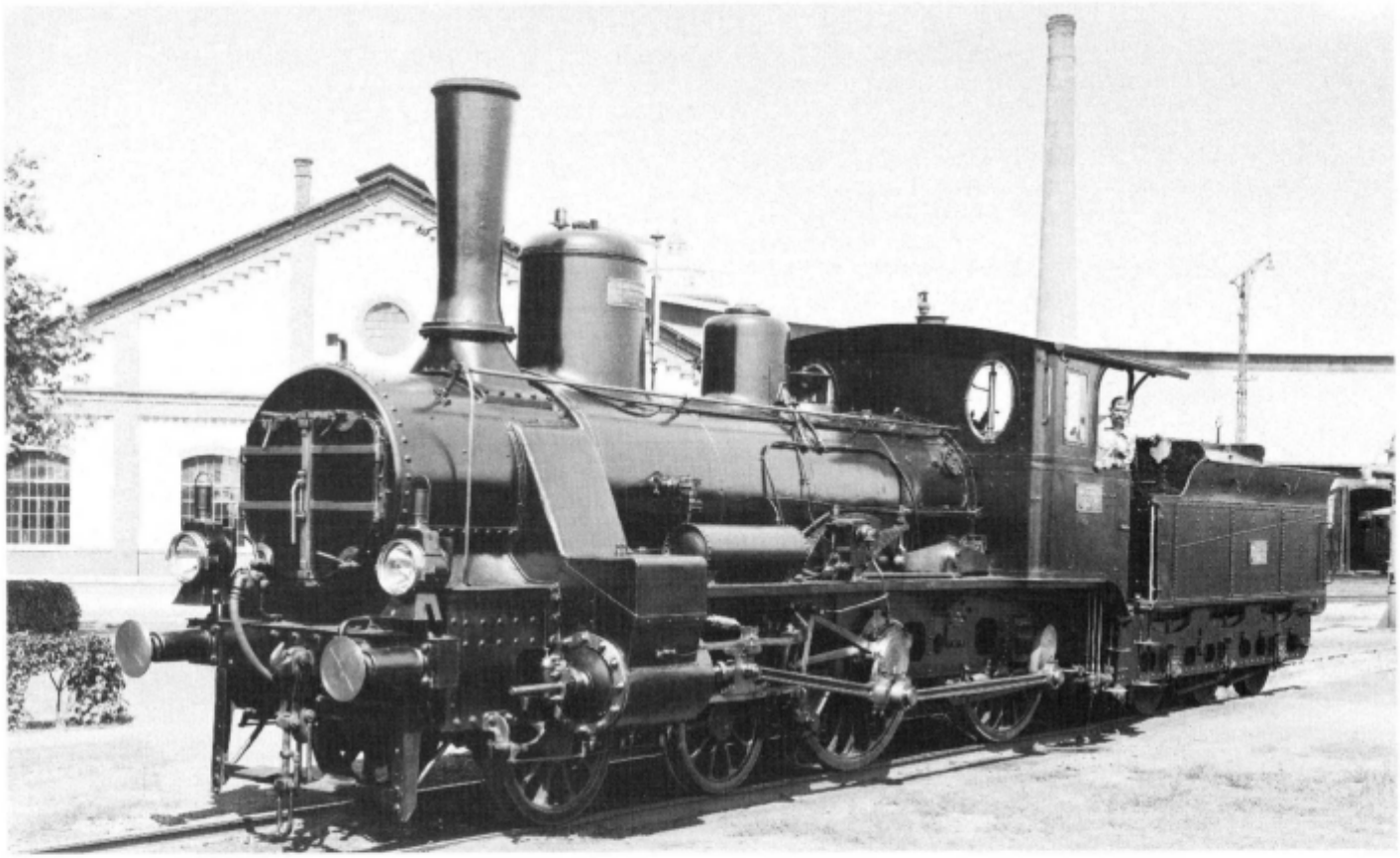
Main Data

Coupled wheel dia	1.922	m
Running wheel dia	0.972	m
Total wheel base	4.87	m
Cylinder dia	0.400	m
Piston stroke	0.632	m
Grate area	1.65	sq.m
Heating surface, total	96.7	sq.m
Steam pressure	10	bar
Locomotive running order weight	38.2	t
Adhesion weight	22.0	t
Tender running order weight	34.0	t
Coal supply	7.0	t
Water supply	12.5	cu.m
Length over buffers	14.576	m
Top speed	75	k.p.h.

In 1873 MÁV placed an order to the machine works to Vienna of the K.k.St.E.G. (= Kaiserlich und königlich privilegisierte Österreichische Staatseisenbahn Gesellschaft, in English translation: Austrian State Railway Company privileged by the Emperor and King) to construct a fast train locomotive with a 4-4-0 wheel arrangement with a hauling capability of fast trains at 70-75 k.p.h. on level tracks. This Class I, marked later as Class 259 locomotives were the first locomotive of the MÁV intended especially for hauling fast trains. Austrian designers placed the rear coupled wheelset below the firebox such the guided lenght of the locomotive increased and its running was quiet and smooth even at a speed of 75 k.p.h. In 1874 the Class 259 locomotives were manufactured in a total number of 6 units. In the first years of their service these locomotives hauled the fast trains and stopping trains on the Miskolc and Ruttka lines. Later because of their restricted hauling capacity they got insufficient for the fast train's service and they were used to haul stopping trains only.

Class 220 (Former: Class Ia)

Wheel arrangement
(British coding) 4-4-0
(American coding) „American"
Axle arrangement
(German coding) 2'B
Steam saturated
Cylinders 2
Expansion simple



Main Data

Coupled wheel dia	1.826	m
Running wheel dia	1.040	m
Total wheel base	5.900	m
Cylinder dia	0.450	m
Piston stroke	0.650	m
Grate area	2.1	sq.m
Heating surface, total	135.6	sq.m
Steam pressure	12	bar
Locomotive running order weight	47.1	t
Adhesion weight	28.3	t
Tender running order weight	34	t
Coal supply	8.0	t
Water supply	12.5	t
Length over buffers	15.750	m
Top speed	90	k.p.h.

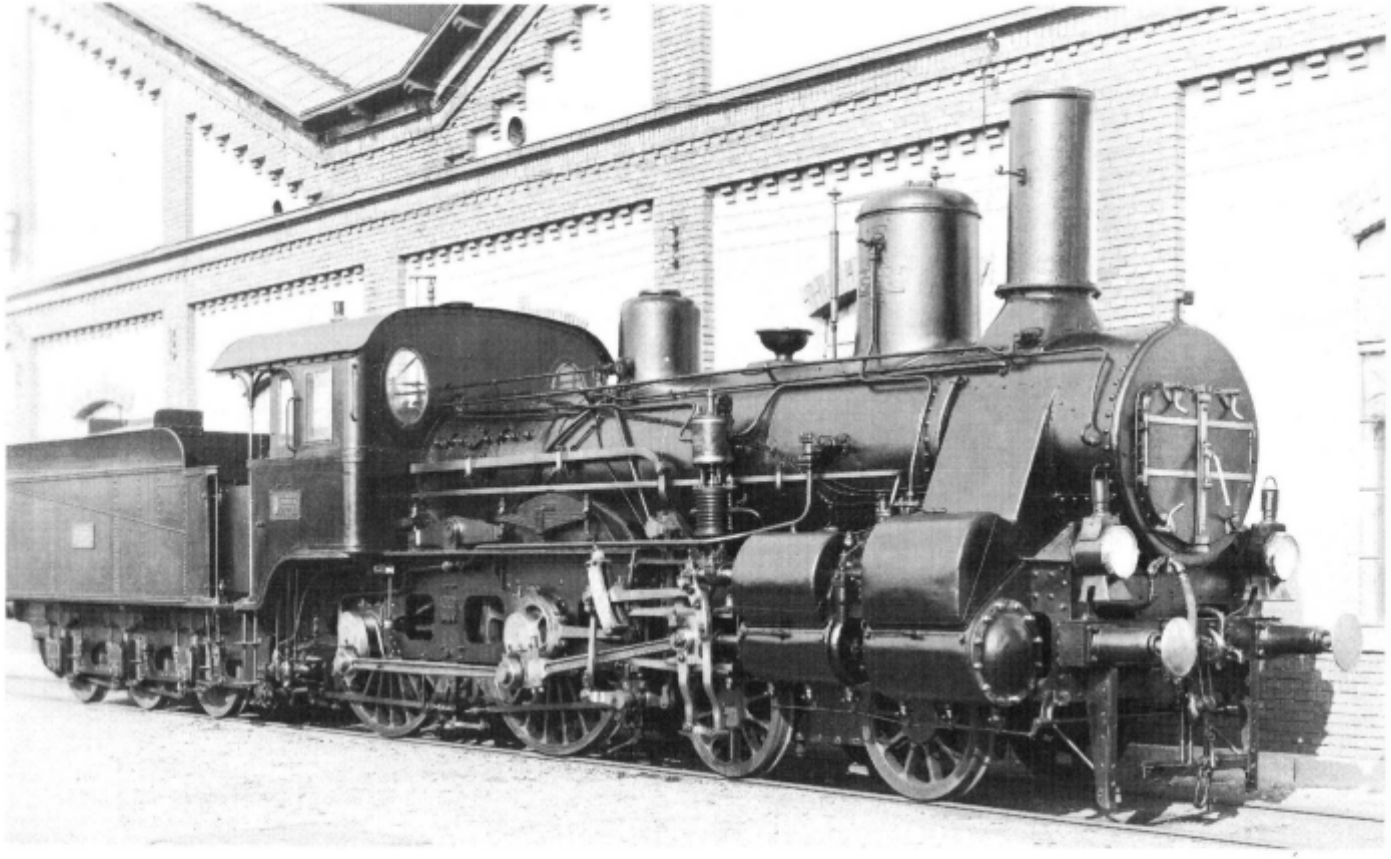
Because of their significantly extended network MÁV needed at the early eighteen-eighties a new advanced fast train locomotive. In 1881 the Machine Works of MÁV began the manufacture of the Class Ia (later marked as Class 220) locomotives. They were the very first locomotives of MÁV with a top speed of 90 k.p.h. At that time the locomotives had arisen a deserved attention with their mighty sizes as well as with their advanced construction. Thus, this locomotive was capable to haul a train of 115 t with a speed of 90 k.p.h. on level. The Class 220 locomotives worked well in service, verified by the fact this model had been manufactured in the period of 1881-1905 almost without structural modifications in spite of the rapid development of the railway engineering, and some units were 50 years long in service. MÁV owned in their stock 204 units of Class 220 locomotives as a total. Some units of the series were manufactured by Austrian locomotive builders, based on Hungarian documentation, too. One of the Class 220 locomotives, which originally wore the nameplate No. 204, was renewed in 1988 and since than occasionally „nostalgia-trains" are hauled by her.

Class 222 (Former: Class Ie)

Wheel arrangement
(British coding) 4-4-0
(American coding) „American"
Axle arrangement
(German coding) 2'B
Steam saturated
Cylinders 4
Expansion in Woolf
tandem-compound arrangement

Main Data

Coupled wheel dia	2.000	m
Running wheel dia	1.050	m
Total wheel base	6.300	m
Cylinder dia (high/low pressure)	0.32/0.49	m
Piston stroke	0.65	m
Grate area	2.98	sq.m
Heating surface, total	122.9	sq.m
Steam pressure	13	bar
Locomotive running order weight	54.7	t
Adhesion weight	28.0	t
Tender running order weight	40.5	t
Coal supply	8.3	t
Water supply	17.0	t
Length over buffers	16.640	m
Top speed	90	k.p.h.



In consequence of a new tariff system introduced by MÁV in the second half of the 1880s significantly increased the number of passengers on the fast trains. To haul the trains of considerably bigger loads than the loads of the earlier trains the existing express locomotives were not sufficient any more. To cope with these increased hauling demand was designed the Class Ie (later marked as Class 222) locomotive by Zsigmond KORDINA, the highly distinguished chief designer of the machine factory of MÁV. The peculiarity of the 4-cylinder compound machinery of the locomotive was the cylinder layout of System Woolf-Tandem, characterized by the situation of low- and high-pressure cylinders one of each on both sides of the locomotive frame. The front one was the low-pressure cylinder of bigger diameter while the rear one the high-pressure cylinder of smaller diameter. The pistons of both cylinders were fixed on a common piston rod. A locomotive of this Class was the looth completed locomotive of the machine factory of the MÁV, built in 1896. This locomotive was capable to haul train loads of having total masses bigger by 50 per cent than the normal loads of the Class 220 locomotives. In the time interval between 1890 and 1904 95 units were manufactured of this Class.

Class 224 (Former: Class 106)

Wheel arrangement
(British coding) 4-4-0
(American coding) „American"
Axle arrangement
(German coding) 2'B
Steam saturated
Cylinders 2
Expansion compound

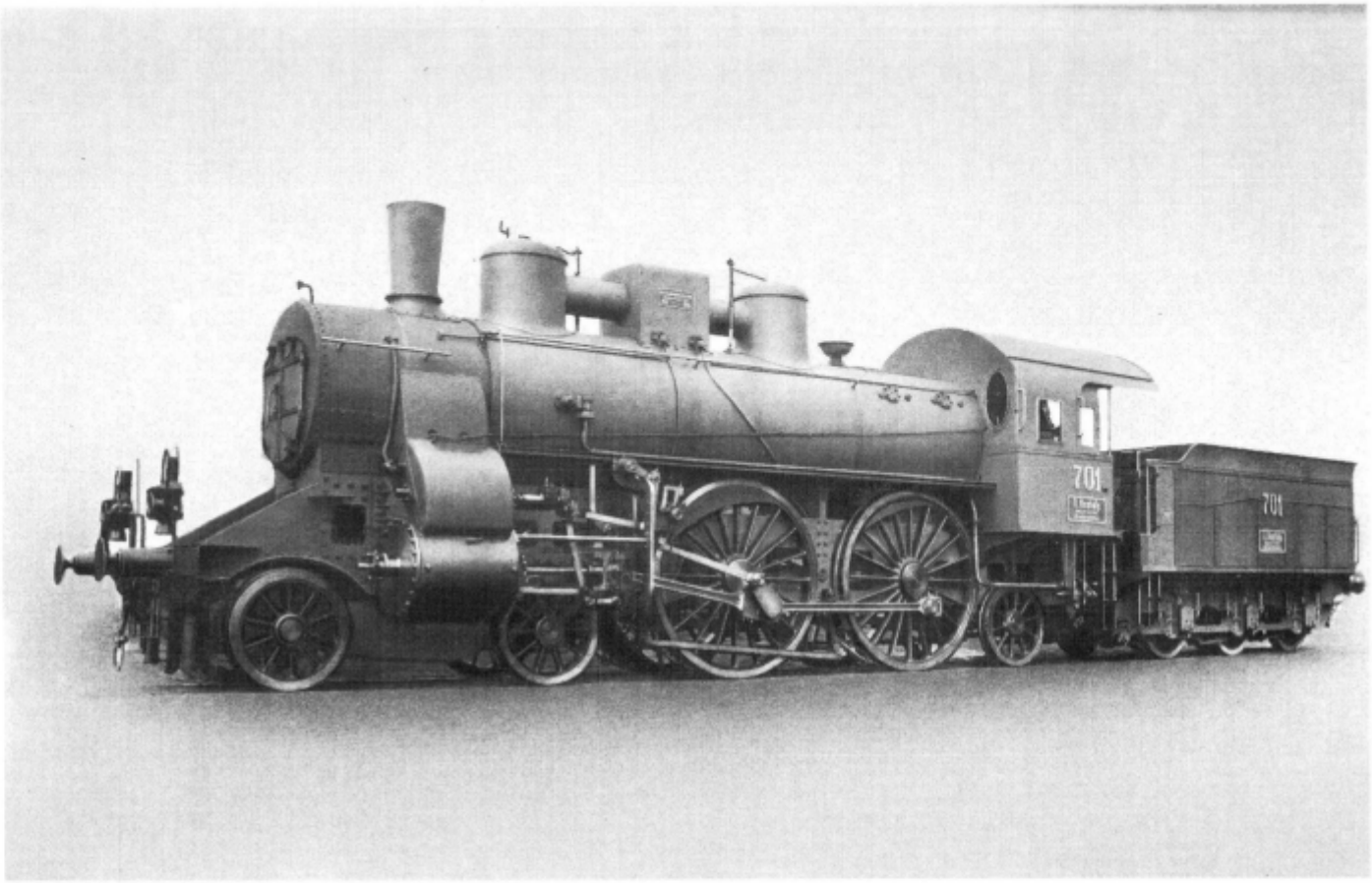
Main Data

Coupled wheel dia	2.140	m
Running wheel dia	1.034	m
Total wheel base	7.300	m
Cylinder dia (high/low pressure)	0.50/0.76	m
Piston stroke	0.680	m
Grate area	3.0	sq.m
Heating surface, total	153	sq.m
Steam pressure	13	bar
Locomotive running order weight	55.6	t
Adhesion weight	28.7	t
Tender running order weight	39.2	t
Coal supply	7.5	t
Water supply	16.7	cu.m
Length over buffers	16.430	m
Top speed	90	k.p.h.

The Class 224 express locomotive was put into service by the Southern Railways (Déli Vasút) in 1898. Originally this locomotive was marked as Class 106. Because of the increase of the traction demands the Class 224 was of higher performance than the locomotives built earlier for identical duties. The improvement of the performence was ensured by increasing the sizes of the boiler pressure as well as by applying a compound machinery. The hauling capacity of the locomotive is characterized by the fact that it was able to haul a 180 t train load on level track at a speed of 90 k.p.h. From this typical „Austrian" locomotive 4 units were built at the Vienna factory of StEG for the network of the Southern Railways in the years between 1898 and 1900. Further 5 units were manufactured in 1902- 1903 at the machine works of the MÁV. After World War I the lines of the Southern Railways in Hungary were maintained by the „Danube-Sava-Adriatic Railway Company" (Duna-Száva-Adria Vasúttársaság) established in these years. In 1932 this Railway Company had been nationalized and the locomotives became to the fleet of the MÁV.

Class 201 (Former: Class II)

Wheel arrangement
(British coding) 4-4-2
(American coding) „Atlantic"
Axle arrangement
(German coding) 2'B1
Steam saturated
Cylinders 2
Expansion compound



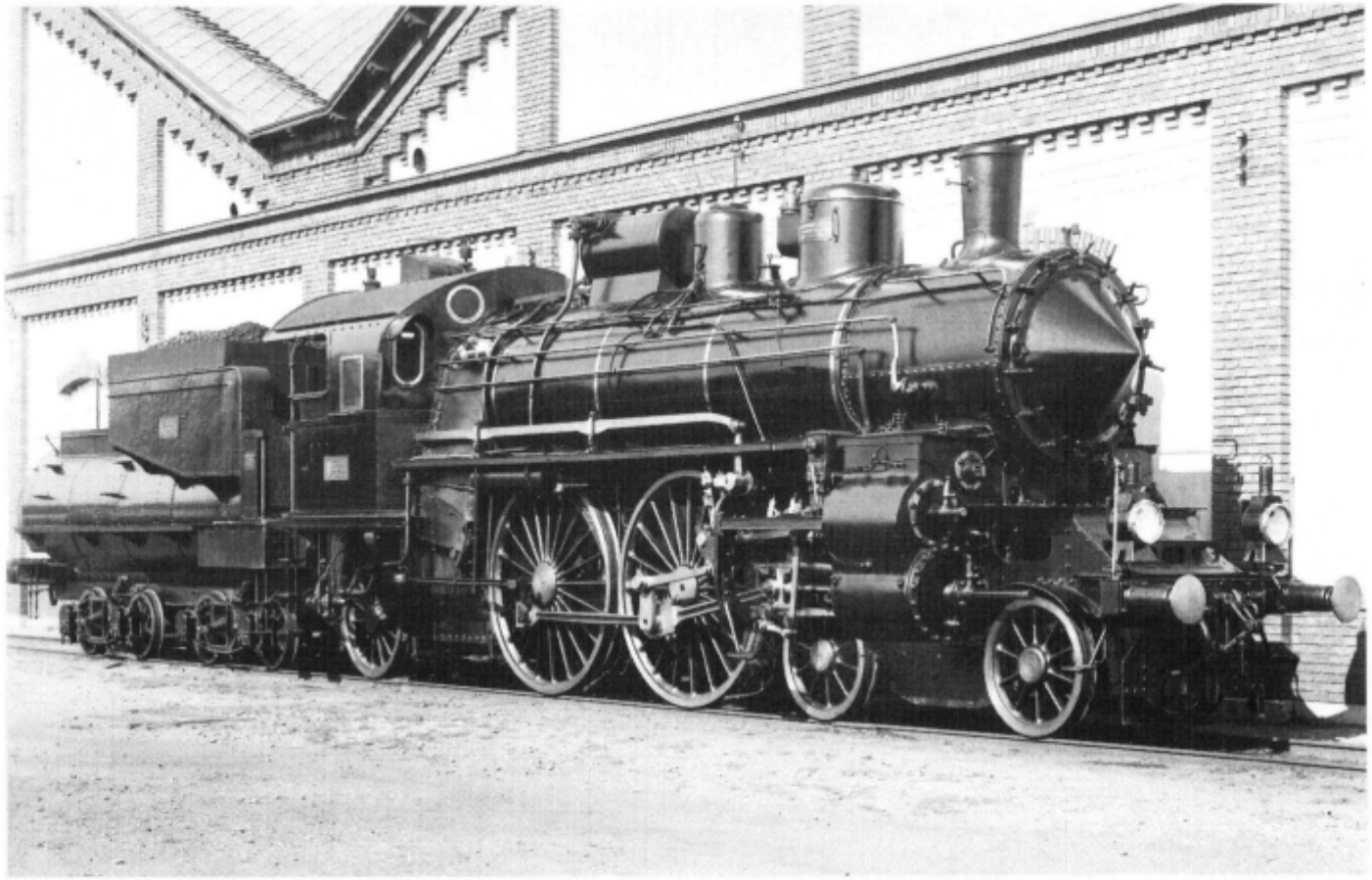
Main Data

Coupled wheel dia	2.100	m
Running wheel dia	1.040	m
Total wheel base	8.665	m
Cylinder dia (high/low pressure)	0.50/0.75	m
Piston stroke	0.680	m
Grate area	2.82	sq.m
Heating surface, total	189.0	sq.m
Steam pressure	13	bar
Locomotive running order weight	63.8	t
Adhesion weight	31.1	t
Tender running order weight	52.5	t
Coal supply	8.0	t
Water supply	17.7	cu.m
Length over buffers	18.379	m
Top speed	100	k.p.h.

At the end of the last century it had become necessary for MÁV to purchase locomotives of bigger capacity than the former ones, the reason was the increase of the speed and the loads of the fast trains. The machine works of the MÁV constructed in 1900 their Class II (later marked as Class 201) locomotive which has been exhibited at the World Exhibition in Paris organized in the same year; the locomotive caused a general sensation with her mighty dimensions and with centerline of her boiler lying as high as 2.7 m and obtained the „Grande Prix" (grand prize) of the exhibition. The coupled wheel diameter of 2.1 m was the very biggest ever applied by MÁV. The Class 201 locomotive was the very first on the network of MÁV which hauled fast trains at a schedule base speed of 100 k.p.h. The locomotive was capable to haul a train of 185 t load on level track at a speed of 90 k.p.h. One more unit was manufactured of this locomotive Class in 1901 but with twin cylinder machinery.

Class 203 (Former: Class In)

Wheel arrangement
(British coding) 4-4-2
(American coding) „Atlantic"
Axle arrangement
(German coding) 2'B1
Steam saturated
Cylinders 4
Expansion compound



Main Data

Coupled wheel dia	2.100	m
Running wheel dia	1.040	m
Total wheel base	9.780	m
Cylinder dia (high/low pressure)	0.36/0.62	m
Piston stroke	0.660	m
Grate area	3.9	sq.m
Heating surface, total	262.3	sq.m
Steam pressure	16	bar
Locomotive running order weight	74.4	t
Adhesion weight	31.68	t
Tender running order weight	52.5	t
Coal supply	8.0	t
Water supply	22	cu.m
Length over buffers	20.990	m
Top speed	100	k.p.h.

The trial runs performed with Class 201 express locomotives had proven the fact that with these engines could not be fulfilled the anticipated long-term performance demands. Therefore, in 1906 the machine works of the MÁV completed the first unit of the Class In (marked later as Class 203) express locomotive manufactured until 1908 and built a total of 24 units. The four- cylinder locomotives with compound machinery (whereby both of the high-pressure cylinders were arranged inside and both low- pressure cylinders outside of the main frame) were at the time of their construction the highest power 4-4-2 engines of the Continent. The locomotive showed a very quiet and smooth running even at the acceptance tests when attained a speed of 142 k.p.h. The tender of this locomotive of the Vanderbilt system equipped with a cylindrical water tank had the smoothest riding properties among the home-built tender-types. The capacity of this locomotive can be well demonstrated by the results of a test run when the distance of 215 km between Budapest and Pozsony (today: Bratislava in Slovakia) was covered in 2 hours and 22 minutes with one intermediate stop hauling a test express train totalling a load of 406 t.

Class 355 (Former: Class IIIb)

Wheel arrangement
(British coding) 0-6-0
(American coding) „6-wheel switcher"
Axle arrangement
(German coding) C
Steam saturated
Cylinders 2
Expansion simple

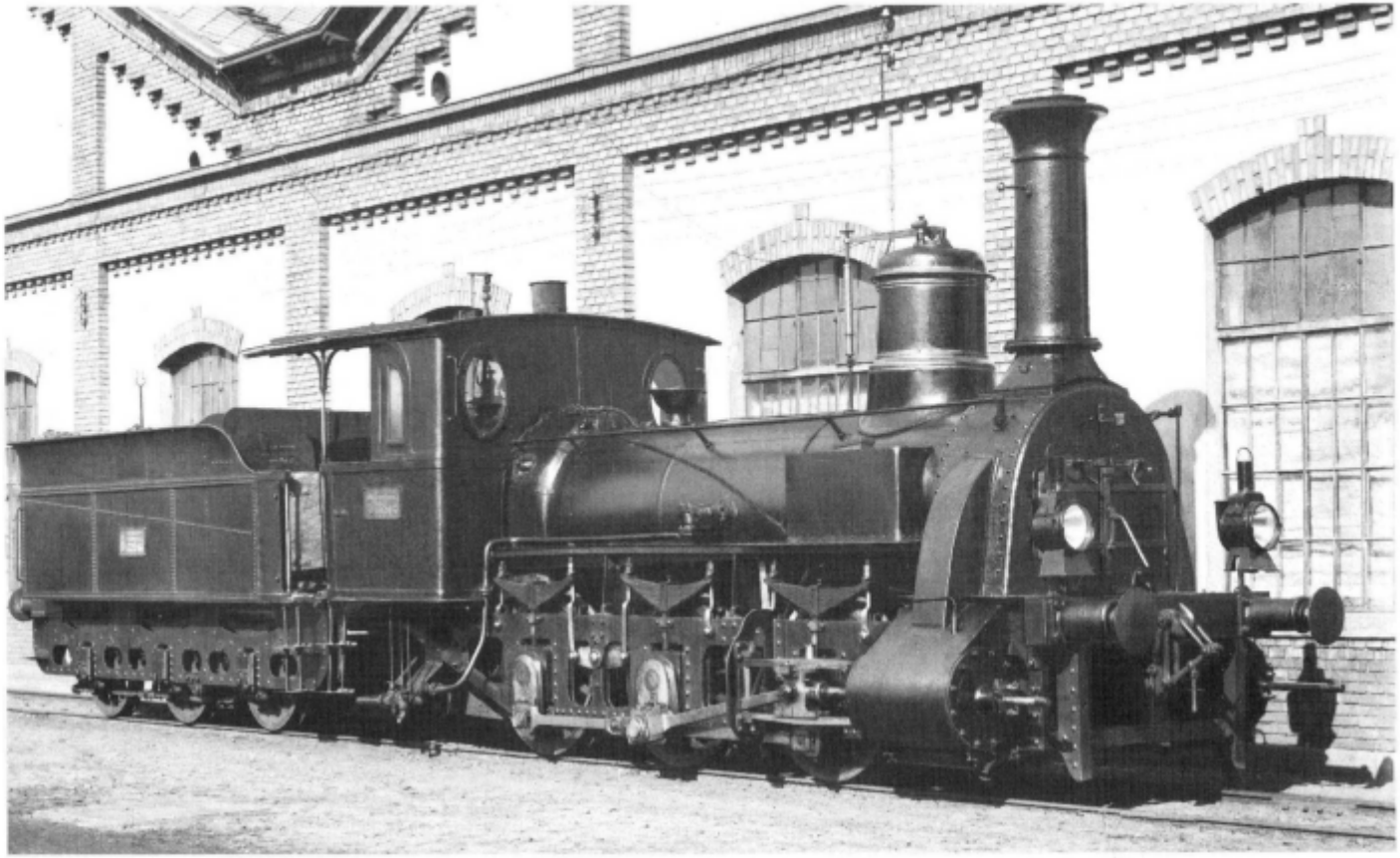
Main Data

Coupled wheel dia	1.285	m
Running wheel dia	–	
Total wheel base	3.320	m
Cylinder dia	0.421	m
Piston stroke	0.632	m
Grate area	1.45	sq.m
Heating surface, total	117.7	sq.m
Steam pressure	7	bar
Locomotive running order weight	35.35	t
Adhesion weight	35.35	t
Tender running order weight	34.12	t
Coal supply	7.0	t
Water supply	8.4	cu.m
Length over buffers	14.216	m
Top speed	45	k.p.h.

The goods train traffic on the line Budapest-Salgótarján of the MÁV was worked in 1868 with two units of Class IIIb (later marked as Class 355) goods train locomotives. These two locomotives, constructed at the Sigl Works at Wiener Neustadt, Austria, were taken over from the Northern Railways of Hungary (Magyar Északi Vasút). In the 1860s at the home Railways the goods trains were mostly hauled by locomotives equipped with two coupled wheels. The necessity of the three coupled wheels with the Class 355 locomotives was motivated by the fact that the line Budapest- Salgótarján includes a number of gradients of 0.5-0.6 per cent. The original and updated structural implementations of this locomotive were almost identical with that of the Class 236 locomotive. This engine hauled on level track a 300 t goods train at a speed of 45 k.p.h. and between 1866 and 1869 10 units were completed. Up to the end of 1869 the Class 355 was the only goods train locomotive of the MÁV.

Class 335 (Former: Class III)

Wheel arrangement
(British coding) 0-6-0
(American coding) 6-wheel switcher
Axle arrangement
(German coding) C
Steam saturated
Cylinders 2
Expansion simple



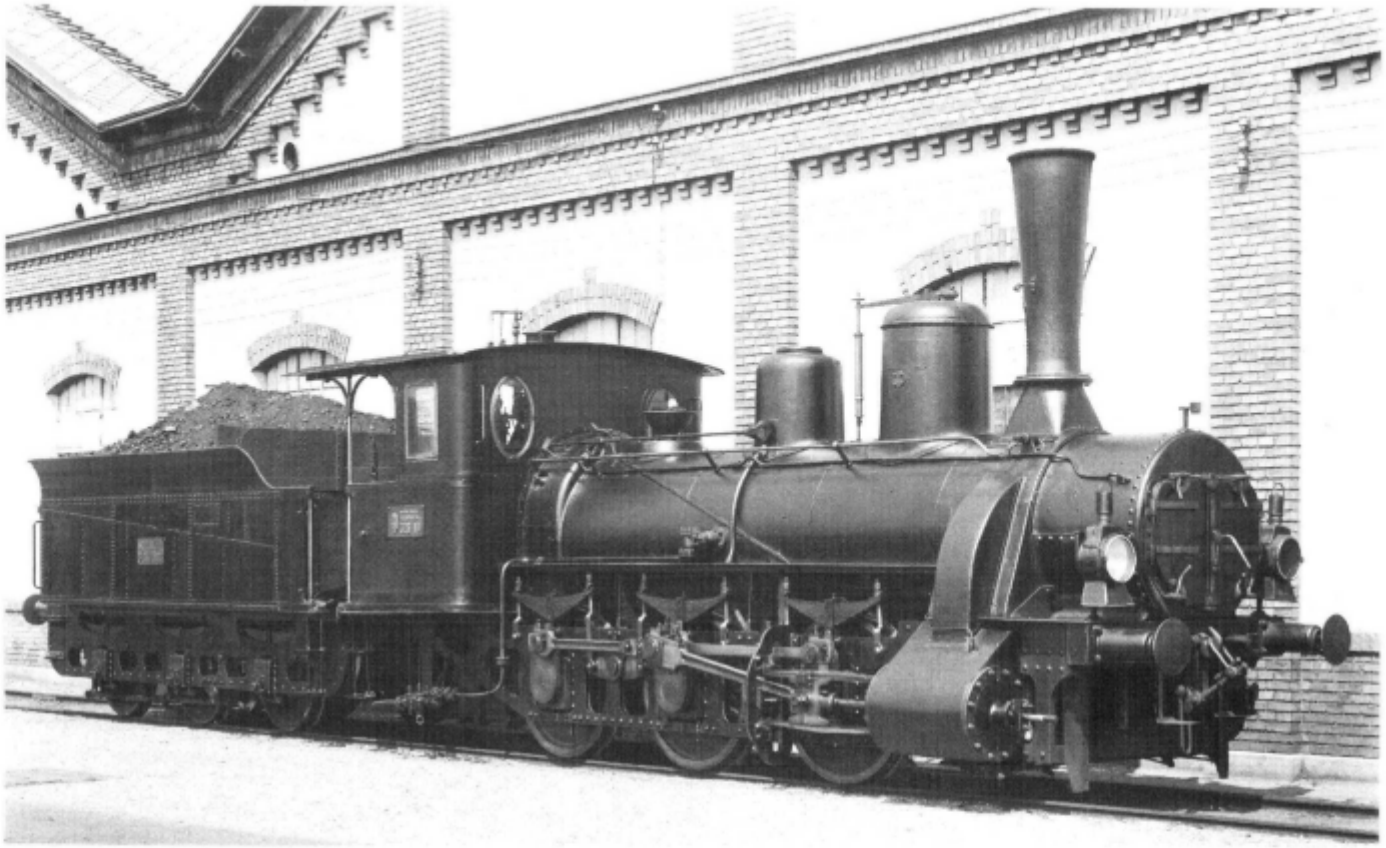
Main Data

Coupled wheel dia	1.221	m
Running wheel dia	–	
Total wheel base	3.160	m
Cylinder dia	0.460	m
Piston stroke	0.632	m
Grate area	1.65	sq.m
Heating surface, total	128	sq.m
Steam pressure	8.5	bar
Locomotive running order weight	38.6	t
Adhesion weight	38.6	t
Tender running order weight	34	t
Coal supply	8	t
Water supply	12.5	cu.m
Length over buffers	15.087	m
Top speed	45	k.p.h.

The manufacturing of steam locomotives began in Hungary in 1873 with building of the Class III, later marked as Class 335 goods train locomotives. This locomotive was not a home design model but in spite of that it represented the beginning of a new era in the history of Hungarian locomotives. The first units of the Class 335 locomotives for the MÁV were built by the Austrian Sigl Works in his workshops at Veina (Wien) and Wiener Neustadt, based on own design. Beside the earlier goods train locomotives with two coupled wheelsets the procurement of the locomotives with three coupled wheels proved to be necessary by the increasing goods traffic. The locomotives were intermittently used for hauling of stopping trains, too. The hauling capacity of these engines was a 385 t train on level track with 45 k.p.h. or a 85 t train on a gradient of 2.5 per cent at a speed of 22 k.p.h. From this Class 335 locomotive a total of 152 units had been manufactured in the period between 1869 and 1878 for the MÁV as well as for the private Railways joined later to MÁV. One unit of the Class 335 locomotives (Serial No. 269) was renewed in 1985. This locomotive, which was built in 1870 in the Austrian Sigl Works at Wiener Neustadt, is today one of the oldest working steam locomotives on the world ever built.

Class 326 (Former: Class IIIe)

Wheel arrangement
(British coding) 0-6-0
(American coding) 6-wheel switcher
Axle arrangement
(German coding) C
Steam saturated
Cylinders 2
Expansion simple



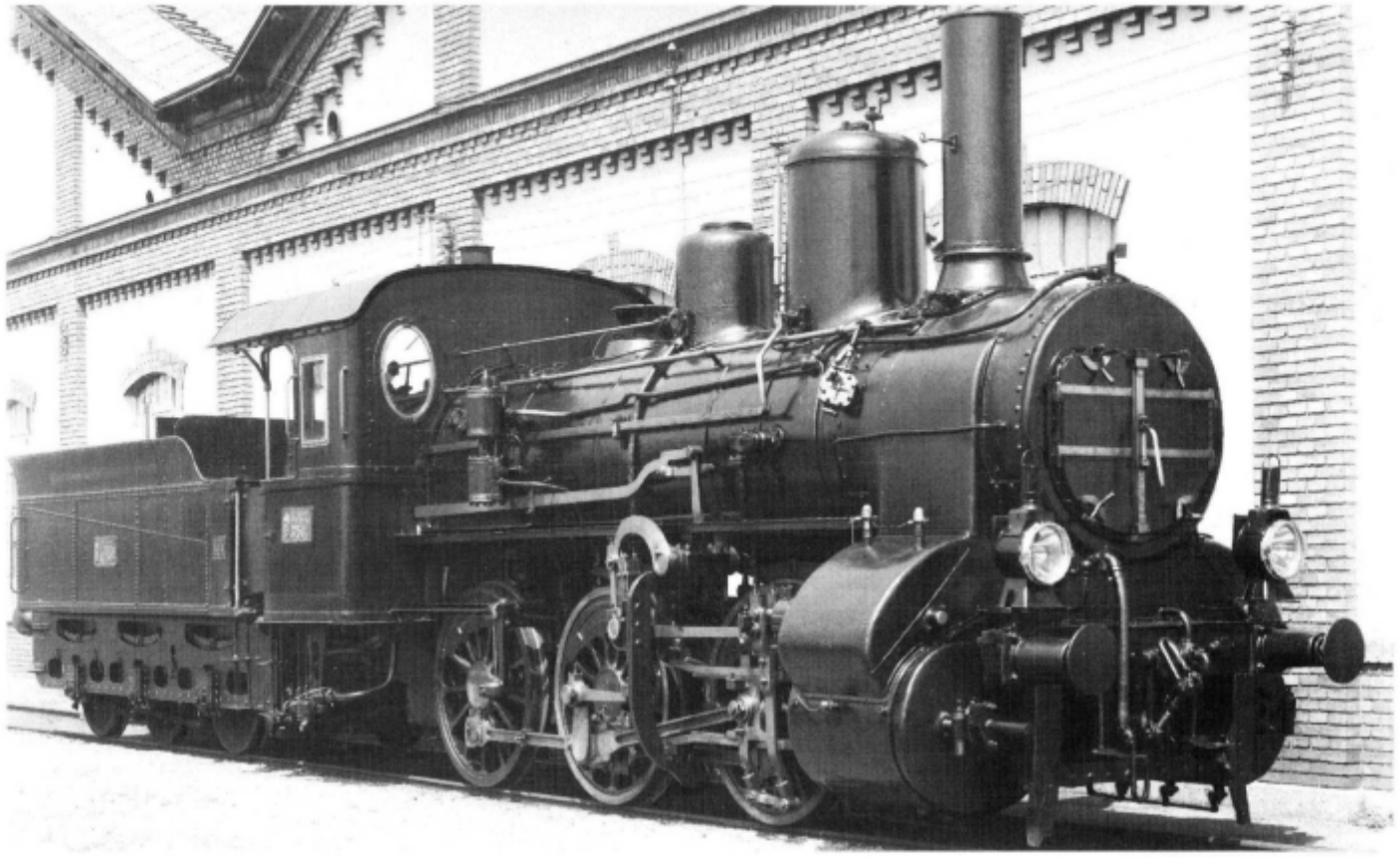
Main Data

Coupled wheel dia	1.221	m
Running wheel dia	–	
Total wheel base	3.160	m
Cylinder dia	0.460	m
Piston stroke	0.632	m
Grate area	1.65	sq.m
Heating surface, total	125.38	sq.m
Steam pressure	10	bar
Locomotive running order weight	39.6	t
Adhesion weight	39.6	t
Tender running order weight	34	t
Coal supply	8	t
Water supply	12.5	cu.m
Length over buffers	15.160	m
Top speed	45	k.p.h.

At the late 1880's MÁV needed newer goods train locomotives because of the increase of the goods traffic. The technical development occured since the purchase of the Class III and Class IV goods train locomotives were taken into account, too, when the new engines had been constructed. The design of the Class IIIe (later marked as Class 326) locomotives has been completed by the Design Department of the MÁV Headquarters. The manufacture of the locomotives began in 1882 at the machine works of MÁV, but the same models have been built by various Austrian and German locomotive factories for MÁV, too, thus 497 units of this locomotive were manufactured within the period between 1882 and 1898. The properties of the home coals have been also taken into account when the design of the boiler of the locomotive was made. The locomotive, which was intenden for goods train service, was used on mountain track sections with heavy gradients to haul stopping trains, too. Furthermore, from 1900 the switching and shunting service on the bigger stations was performed almost solely with the Class 326 locomotives.

Class 325 (Former: Class IIIq)

Wheel arrangement
(British coding) 0-6-0
(American coding) 6-wheel switcher
Axle arrangement
(German coding) C
Steam saturated
Cylinders 2
Expansion compound



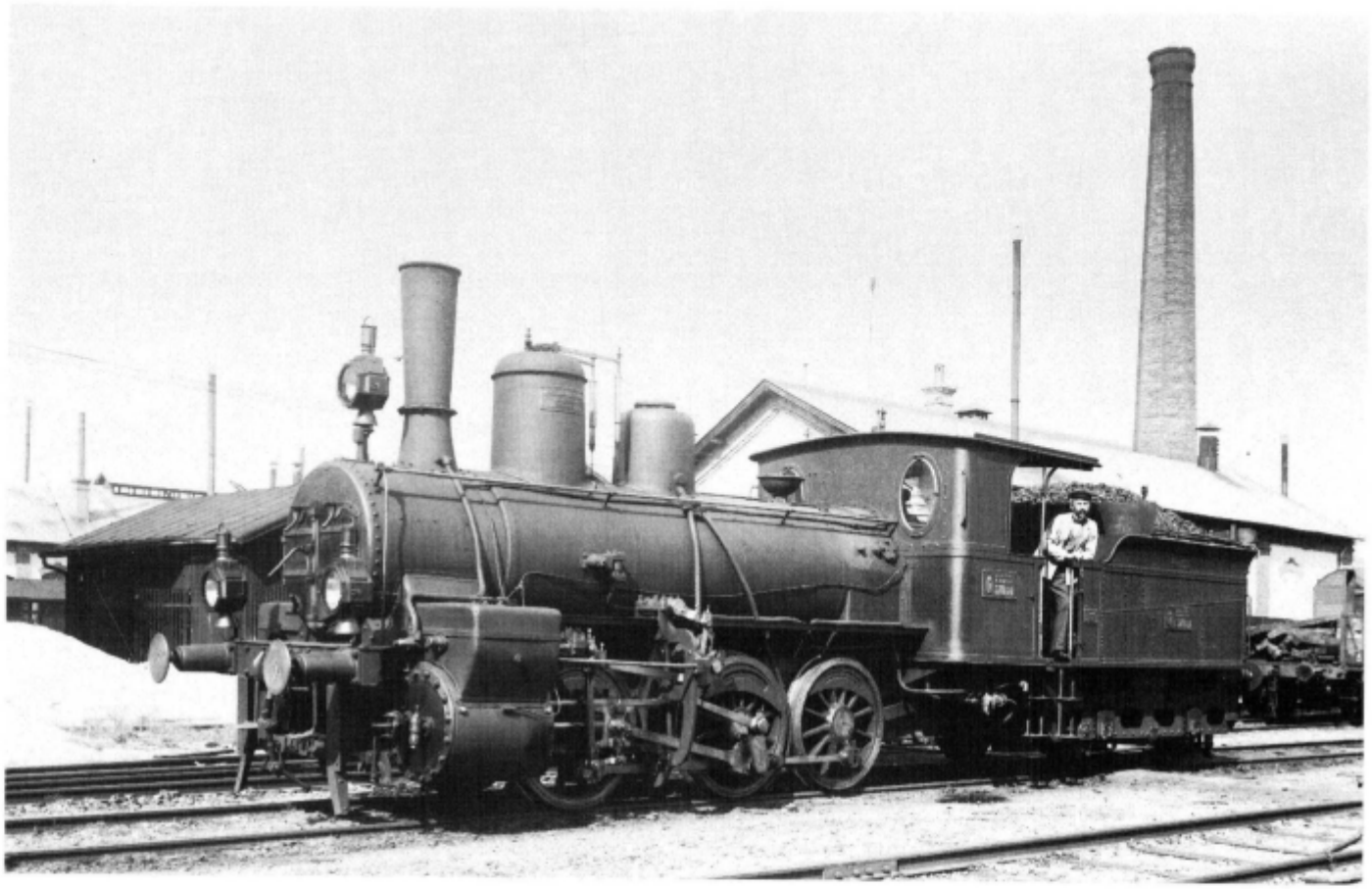
Main Data

Coupled wheel dia	1.440	m
Running wheel dia	–	
Total wheel base	3.500	m
Cylinder dia (high/low pressure)	0.485/0.7	m
Piston stroke	0.650	m
Grate area	2.1	sq.m
Heating surface, total	122.4	sq.m
Steam pressure	13	bar
Locomotive running order weight	42.5	t
Adhesion weight	42.5	t
Tender running order weight	34	t
Coal supply	8	t
Water supply	12.5	cu.m
Length over buffers	15.440	m
Top speed	60	k.p.h.

In the early 1890s MÁV needed a multi-purpose universal locomotive, too. In compliance with the requirements the Class IIIq locomotive (later marked as Class 325) was intended to haul stopping and goods trains on level as well as on mountain railway lines moreover to haul express trains in exceptional cases, too. The very first Class IIIq locomotive was constructed in 1893 by the machine works of MÁV. The locomotive was designed by the famous locomotive designer of the Works, Zsigmond Kordina. The loading capacity of the track permitted a maximum axle load of 14 t only, thus the weight of the 6-wheeled engine could be as much as 42 t. It was a big importance to utilize the whole locomotive weight for adhesion in goods train's service, therefore the engine was constructed without running wheels. Because of their short wheel-base and compound-type machinery the Class 325 locomotives had an uneven running within the speed range of 50-60 k.p.h. but they were well-proved in hauling of stop trains and fast trains of lower speed. The hauling capacity enables these locomotives to haul on level a 410 t train with 60 k.p.h. and a 975 t train at a speed of 30 k.p.h. The Class 325 locomotives had been built between the years 1893 and 1907 and the No. of units manufactured amounted to 247.

Class 370 (Former: Class Va)

Wheel arrangement
(British coding) 0-6-0
(American coding) 6-wheel switcher
Axle arrangement
(German coding) C
Steam saturated
Cylinders 2
Expansion compound



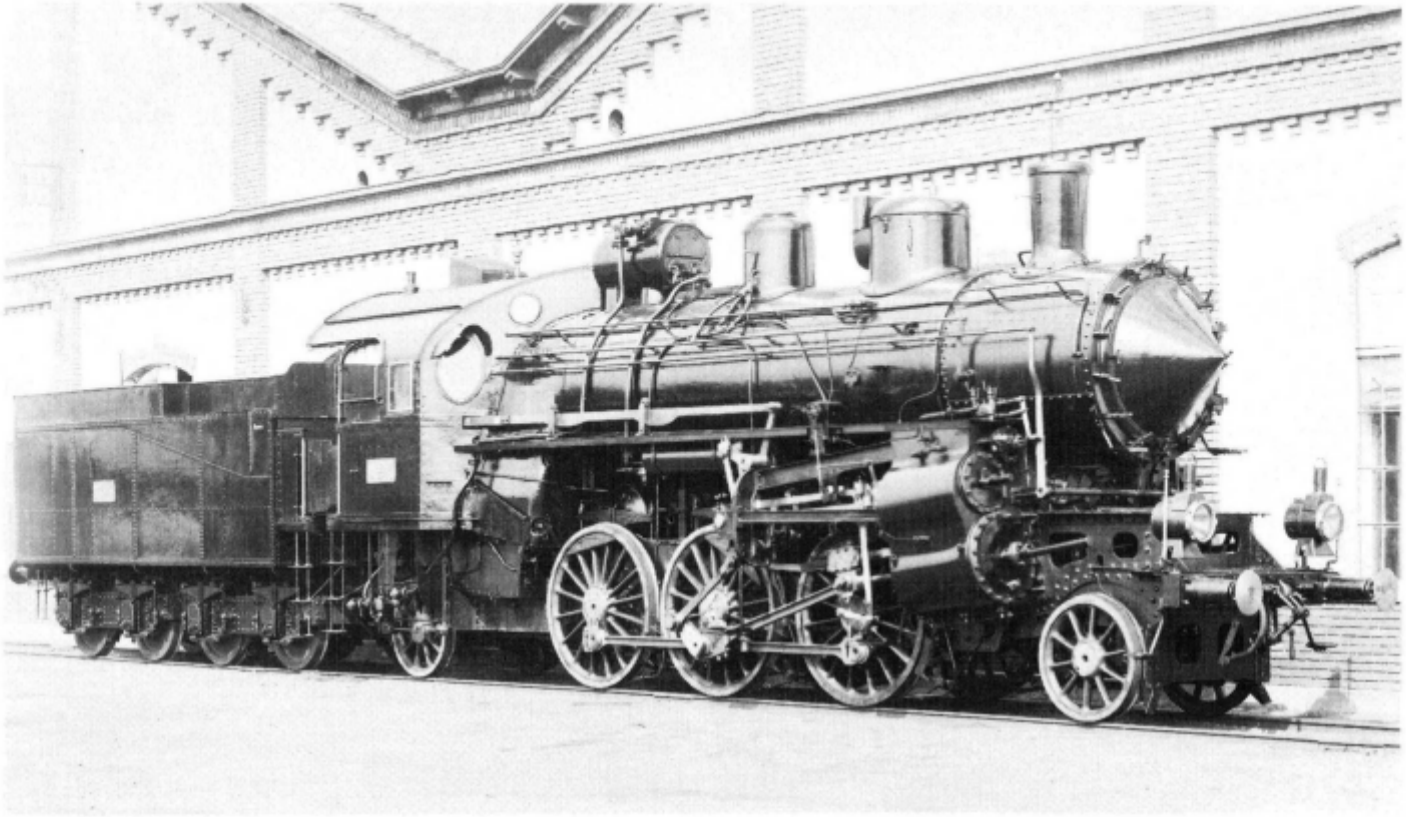
Main Data

Coupled wheel dia	1.180	m
Running wheel dia	–	
Total wheel base	2.950	m
Cylinder dia (high/low pressure)	0.41/0.62	m
Piston stroke	0.58	m
Grate area	1.141	sq.m
Heating surface, total	91.92	sq.m
Steam pressure	12	bar
Locomotive running order weight	30.6	t
Adhesion weight	30.6	t
Tender running order weight	21.1	t
Coal supply	4	t
Water supply	7	cu.m
Length over buffers	12.82	m
Top speed	50	k.p.h.

Because of the frequent traffic and the outdating of the earlier purchased locomotives MÁV needed in the late 1890s new branch- line locomotives. In 1898 had begun the commissioning of the new Class Va (marked later as Class 370) locomotives constructed at the machine works of MÁV. On account of sharp curves existing on the branch lines the short wheel base was a point of view of big importance when designing this engine. In compliance with this requirements the steam cylinders of the locomotive were situated in front of the leading wheelset. In spite of the compound machinery, the short wheel base as well as the situation of the steam cylinders in the front the permitted speed of this locomotive was fixed at 50 k.p.h. The locomotive hauled on level a 385 t train at a speed of 50 k.p.h. In the period between 1898 and 1908 139 units had been built of this model. A Class 370 locomotive built in 1911 and having the Serial No. of 7111 was completely renewed in 1988 and it haules Nostalgia Trains („Old Timer Specials").

Class 322 (Former: Class IIIs)

Wheel arrangement
(British coding) 2-6-2
(American coding) „Prairie"
Axle arrangement
(German coding) 1'C 1'
Steam saturated
Cylinders 4
Expansion compound



Main Data

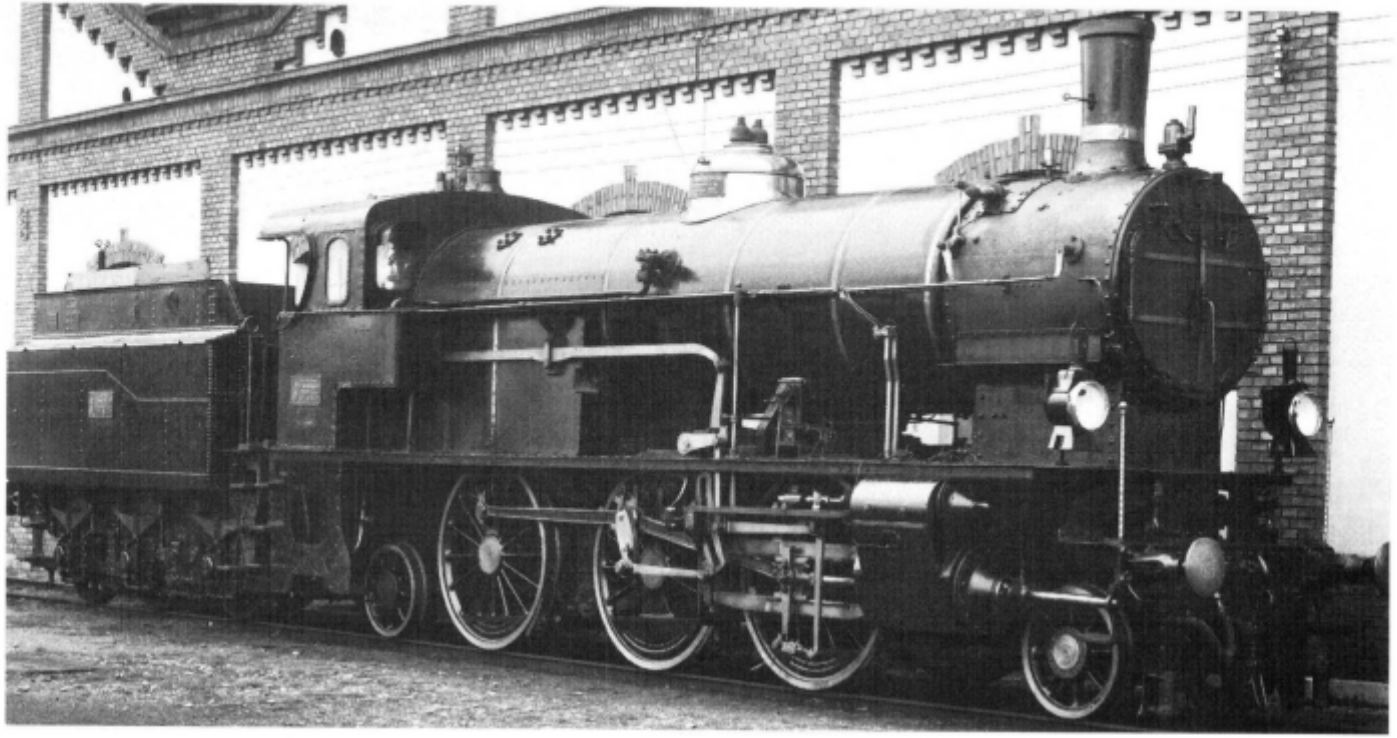
Coupled wheel dia	1.606	m
Running wheel dia	1040	m
Total wheel base	9.150	m
Cylinder dia (high/low pressure)	0.36/0.62	m
Piston stroke	0.66	m
Grate area	3.91	sq.m
Heating surface, total	256.8	sq.m
Steam pressure	16	bar
Locomotive running order weight	71.2	t
Adhesion weight	43.05	t
Tender running order weight	56.78	t
Coal supply	8	t
Water supply	26	cu.m
Length over buffers	19.670	m
Top speed	90	k.p.h.

In the middle 1900s MÁV needed a locomotive to haul a 450 t stopping train on level track and able to perform the fast train traffic on inclined tracks with gradients of 0.8-1.0 per cent with frequent stops. For this tasks the existing locomotives with two coupled wheels (two coupled axles) were not sufficient any more. Because of the frequent starts the increase of the adhesion weight became necessary and by this fact was given the reason to increase the number of the coupled wheels. MÁV ordered their heavy-duty stopping train's locomotive at the machine works of MÁV in 1907. The Class IIIs (later marked as Class 322) was manufactured in the years 1908-1909 in a series of 40 units.

A speciality of this locomotive is the inclined arrangement of both the inside and outside steam cylinders. This layout was chosen in order not to hinder the movement of the inside connecting rods by the front wheelset, namely all of the four steam cylinders drove the second coupled wheelset of the locomotive. Owing to the front and rear running wheelsets of the Adams-Webb-System as well as to the wellbalanced 4-cylinder machinery the locomotive had extremely smooth running properties,therefore its top speed was stated as high as 90 k.p.h. instead of the originally planned 80 k.p.h. On level the locomotive was capable to haul a 520 t train at a speed of 75 k.p.h.

Class 323 (Former: Class IIIt)

Wheel arrangement
(British coding) 2-6-2
(American coding) „Prairie"
Axle arrangement
(German coding) 1' C 1'
Steam saturated
Cylinders 2
Expansion compound



Main Data

Coupled wheel dia	1.614	m
Running wheel dia	0.870	m
Total wheel base	8.030	m
Cylinder dia (high/low pressure)	0.45/0.69	m
Piston stroke	0.720	m
Grate area	3.03	sq.m
Heating surface, total	121.8	sq.m
Steam pressure	15	bar
Locomotive running order weight	60.1	t
Adhesion weight	42.8	t
Tender running order weight	36	t
Coal supply	6.1	t
Water supply	14.2	cu.m
Length over buffers	16.930	m
Top speed	80	k.p.h.

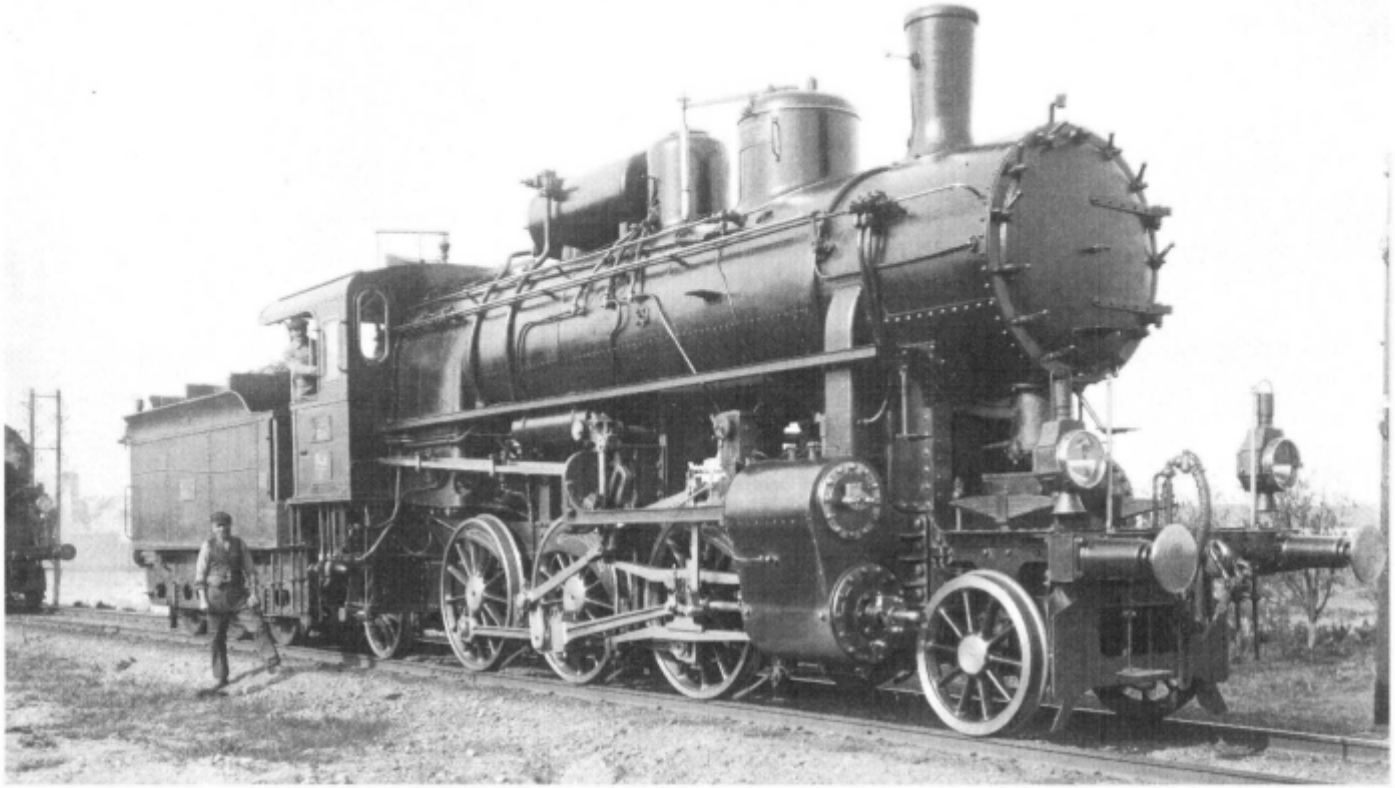
In 1908 there was a great need in locomotives capable to haul heavy goods trains as well as stopping trains on the mainlines of MÁV with a permitted axle load of 14 t. The time needed to construct and manufacture a new locomotive model was one and a half year as a minimum. In that years the machine works of MÁV was full of orders, therefore were unable to undertake a new one. The Chief Mechanical Engineer of MÁV by advise of the famous Austrian locomotive designer Gölsdorf turned to the Austrian locomotive factories for purchasing the new locomotive type. Because of the short term there was possible only the manufacturing of the well-proven Class 329 locomotive of the Austrian Railways complying with the requirements of MÁV, by the Austrian factories for the need of MÁV. For the luck of MÁV, – without having been ordered – this model was manufactured also for stock by the Austrian locomotive factories. Thank to this, delivery of the Class IIIt (later designated by Class 323) locomotives could begin within 3 months from order. In the first time fast trains and stopping trains, while later fast goods trains and ordinary goods trains were hauled by this locomotive. The hauling capability of these locomotives enabled them to haul 255 t trains at 80 k.p.h. as well as 655 t trains at a speed of 50 k.p.h. on level track sections. 65 units were delivered between 1908 and 1910 by the locomotive factories of Vienna, Wiener Neustadt, Floridsdorf and Prague. As a matter of curiosity should be mentioned that almost the same design was constructed by the machine works of MÁV in 1911-1912 for Déli Vasút (=Southern Railways) of Hungary (6 units of Class 323 locomotives) which engines later got to the stock of MÁV with a Class No. of 323^{9}.

Class 324 (Former: Class IIIu)

Wheel arrangement
(British coding) 2-6-2
(American coding) „Prairie"
Axle arrangement
(German coding) 1' C 1'
Steam superheated
Cylinders 2
Expansion simple

Main Data

Coupled wheel dia	1.440	m
Running wheel dia	0.950	m
Total wheel base	8.310	m
Cylinder dia	0.510	m
Piston stroke	0.650	m
Grate area	3.1	sq.m
Heating surface, total	213	sq.m
Superheated surface	37.9	sq.m
Steam pressure	12	bar
Locomotive running order weight	60.1	t
Adhesion weight	42.3	t
Tender running order weight	34.2	t
Coal supply	7	t
Water supply	12.5	cu.m
Length over buffers	17.530	m
Top speed	75	k.p.h.



The Class IIIu (later marked as Class 324) locomotive was one of the best of all proven multi-purpose steam locomotives. This locomotive intended for level tracks hauled on the lines with a permitted axle load of 14 t first of all goods trains, fast goods trains and stopping trains but it was used to haul fast trains of lower speeds, too. Between 1909 and 1923 905 units of this model were manufactured with several constructional execution (saturated steam with compound engine, superheated steam with twin engine, superheated steam with standard boiler, superheated steam with Brotan-Deffner type boiler). The hauling capacity of the superheated twin-engine locomotive can be characterized by the fact that this locomotive was capable to haul a goods train of 360 t on level track at a sped of 75 k.p.h. as well as a 1020 t goods train at a speed of 40 k.p.h. One of these locomotives, the 324,540 had been preserved in good condition and was in service till the end of 1961. Later on, in the course of a general overhaul the locomotive has got a new, welded boiler and her numberplate has been changed for 324,1564.

Class 321 (Former: Class Ih)

Wheel arrangement
(British coding) 4-6-0
(American coding) „Ten wheeler"
Axle arrangement
(German coding) 2' C
Steam saturated
Cylinders 2
Expansion compound

Main Data

Coupled wheel dia	1.606	m
Running wheel dia	1.040	m
Total wheel base	7.170	m
Cylinder dia (high/low pressure)	0.51/0.75	m
Piston stroke	0.65	m
Grate area	2.6	sq.m
Heating surface, total	163.64	sq.m
Steam pressure	13	bar
Locomotive running order weight	57.7	t
Adhesion weight	42.7	t
Tender running order weight	34	t
Coal supply	8	t
Water supply	12.5	cu.m
Length over buffers	17.47	m
Top speed	75	k.p.h.

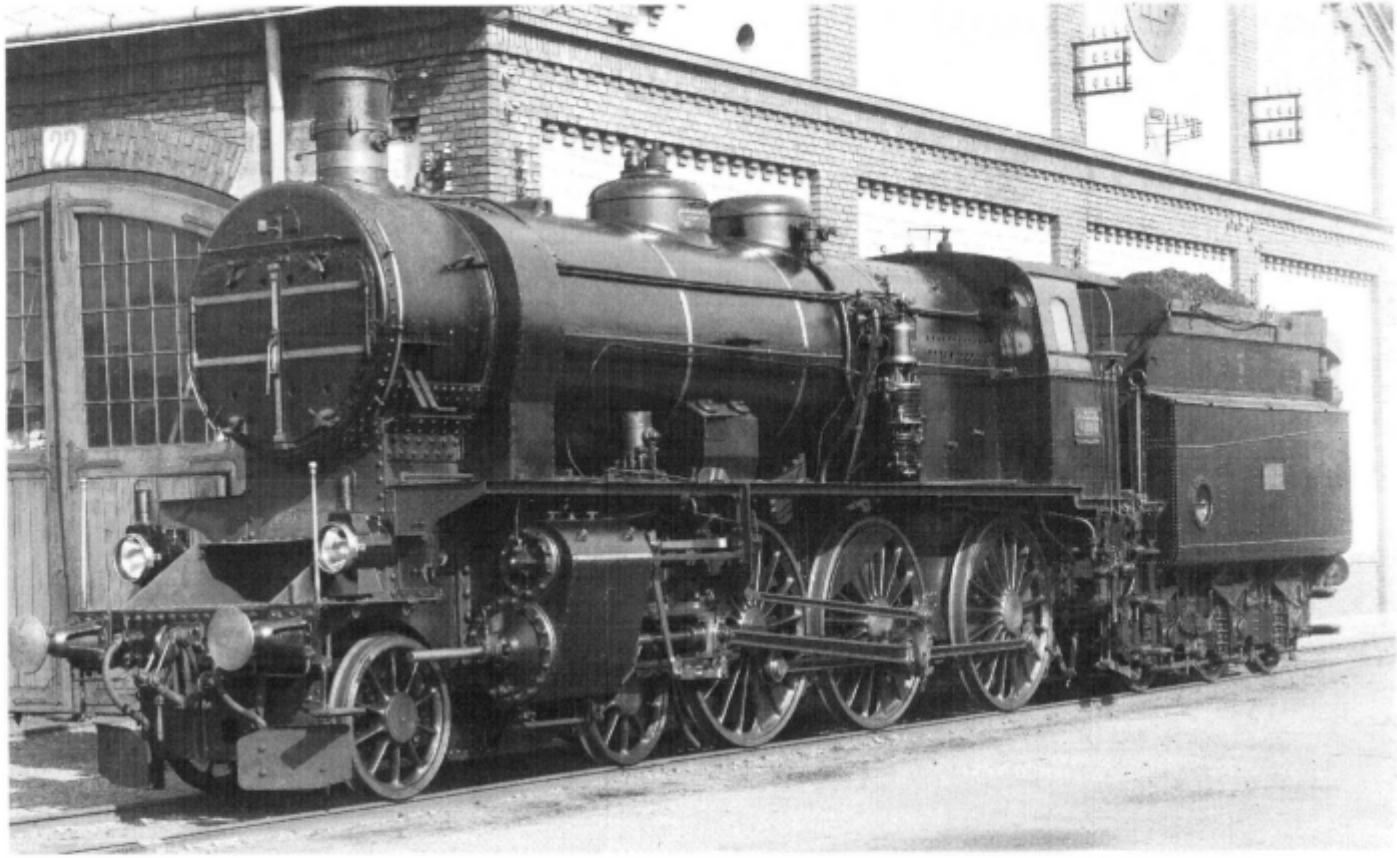
From the early 1890's the more and more bustling traffic made its effect felt in the seaside direction of transport, too. On the mountain sections with a gradient of 2.5 per cent of the Fiume line one locomotive could haul a fast train of 70-75 t total load only. The heavier trains had to be hauled by two locomotives, this kind of service was very uneconomical. The traction requirements were only temporarily solved by the Class Ih (later marked as Class 320) locomotives purchased in 1890 with wheel arrangement of 4-6-0 fast train engine intended for mountain track sections, namely the earlier similar locomotives were designed without running wheels. MÁV began with the purchase of the Class Ik (later marked as Class 321) locomotives manufactured at te machine works of MÁV in 1897, intended for economical hauling of the fast trains on mountain lines with heavy gradients. In comparison with the Class 320 locomotives, an approximately 10 per cent excess in horsepower could be observed according to the comparative tests, as a result of using the bigger boiler sizes and the compound machinery. The locomotive was capable to haul a 375-ton train on level with 75 k.p.h. as well as a 105-ton train on a gradient of 2.5 per cent at a speed of 35 k.p.h. The number of units manufactured of this locomotive over the years 1897-99 was 18.

Class 302 (Former: Class 109)

Wheel arrangement
(British coding) 4-6-0
(American coding) „Ten wheeler"
Axle arrangement
(German coding) 2' C
Steam superheated
Cylinders 2
Expansion simple

Main Data

Coupled wheel dia	1.750	m
Running wheel dia	1.034	m
Total wheel base	8.190	m
Cylinder dia	0.55	m
Piston stroke	0.66	m
Grate area	3.55	sq.m
Heating surface, total	185	sq.m
Superheated surface	53	sq.m
Steam pressure	13	bar
Locomotive running order weight	66.9	t
Adhesion weight	43.2	t
Tender running order weight	39.7	t
Coal supply	6.1	t
Water supply	17	cu.m
Length over buffers	17.55	m
Top speed	100	k.p.h.



In 1910 a new fast train locomotive intended to a plain level operation was put into service by the Southern Railways (i.e. Déli Vasút) having a Class No. 109. A matter of curiosity that this locomotive was the very first in Europe having a boiler centerline in a height above rail level reaching 3.0 m. The locomotive hauled a 270 t train on level track at a speed of 100 k.p.h. By the end of the World War I the Railways purchased for the network in Austria 44 whereby for the section in Hungary 9 units of the Class 109 locomotive from the Locomotive Works of Floridsdorf (near Vienna, Austria). 7 units of this Class were manufactured by the Machine Works of MÁV, based on Austrian documentation. The Hungarian legal successor of the Déli Vasút, the „Duna-Száva-Adria Vasúttársaság" (DSA Danube-Sava-Adriatic Railway Company) purchased 4 further Class 109 locomotives with increased weight and tractive effort in the years 1927-1930 from the Machine Works of the MÁV and from MÁVAG , respectively. In 1932 MÁV took over the DSA-Company and the locomotives were marked as Class 302. The locomotive with the number 302,610 (which was originally marked as 109,109) was withdrawn in 1967, and rebuilt against the 2nd April 1986, the 125th anniversary of inauguration of the mainline in Hungary of the Southern Railways.

Class 327

Wheel arrangement
(British coding) 4-6-0
(American coding) „Ten wheeler"
Axle arrangement
(German coding) 2' C
Steam superheated
Cylinders 2
Expansion simple

Main Data

Coupled wheel dia	1.826	m
Running wheel dia	1.040	m
Total wheel base	8.460	m
Cylinder dia	0.55	m
Piston stroke	0.65	m
Grate area	3.09	sq.m
Heating surface, total	186.8	sq.m
Superheated surface	34	sq.m
Steam pressure	12	bar
Locomotive running order weight	62.9	t
Adhesion weight	42.4	t
Tender running order weight	52.3	t
Coal supply	9	t
Water supply	20	cu.m
Length over buffers	19.77	m
Top speed	100	k.p.h.

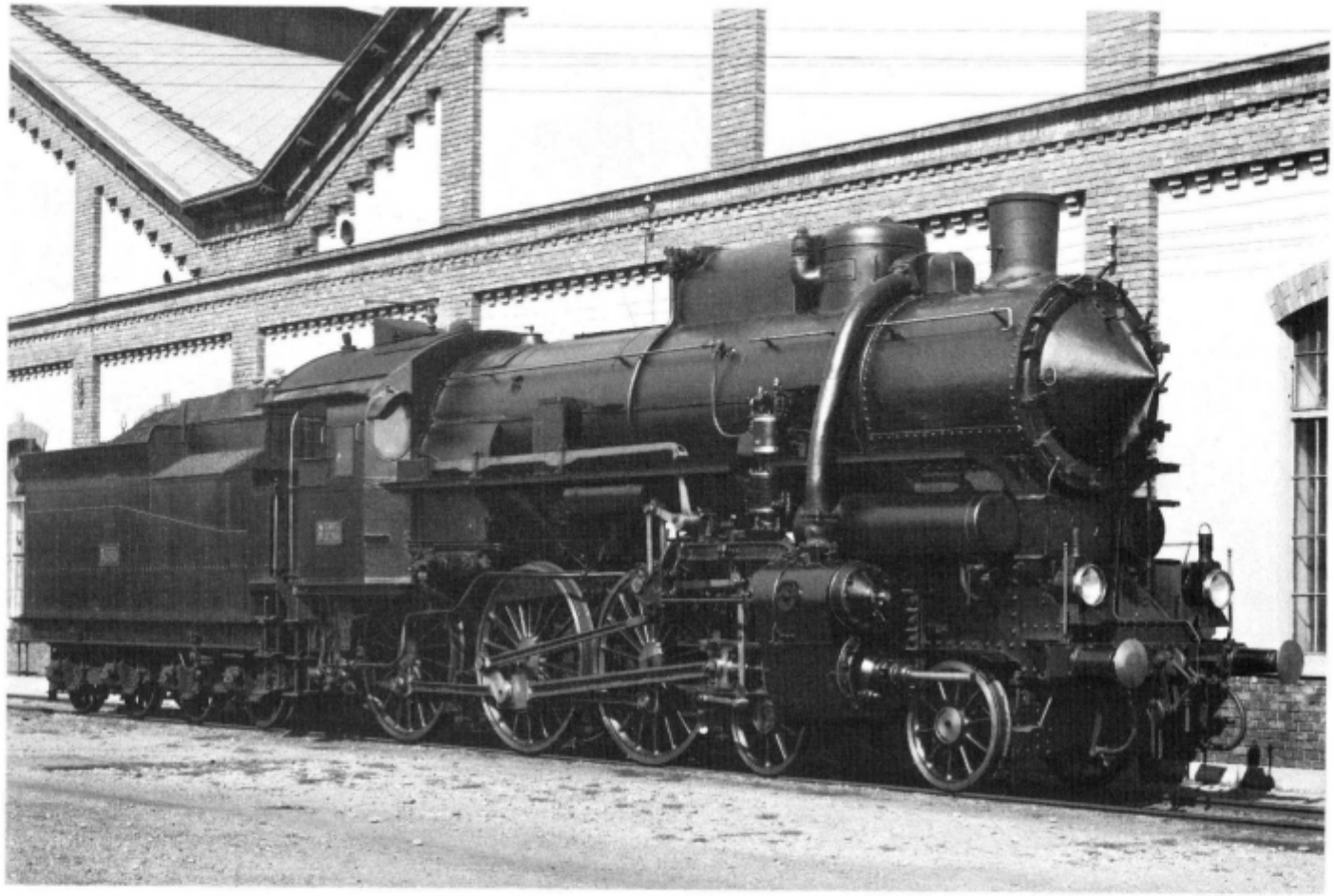
In the early 1910's MÁV were short of suitable locomotives for hauling fast trains on mainlines with permitted axle load of 14 t. The use of Class 323 and later the Class 324 locomotives for hauling fast trains was only a provisional solution. MÁV gave in 1909 an order to the Machine Works of MÁV to design a new express train locomotive for hauling the fast trains on level track at a speed of 100 k.p.h. and capable at 70-80 k.p.h. to haul a trainload exceeding by 20 per cent the capacity of the Class 324 locomotives. In 1912 were manufactured 4 units of Class 327 locomotives, two of them with superheating and 2-cylinder twin engine while the other two units with saturated steam and 2-cylinder compound engine. The comparative test runs verified the higher performance of the compound locomotives by appr. 10 per cent and the lower coal consumption by appr. 7 per cent of the compound locomotives compared to the twin locomotives under identical operational circumstances. Because of the higher investment and maintenance costs of the compound locomotives as well as the better capability for acceleration of the twin locomotives, the further units of the Class 327 locomotives were ordered by MÁV as twin engines. This locomotive could haul on level track a 210 t train at a speed of 100 k.p.h. 138 units of this locomotive were manufactured within the period 1912-1914.

Class 328

Wheel arrangement
(British coding) 4-6-0
(American coding) „Ten wheeler"
Axle arrangement
(German coding) 2' C
Steam superheated
Cylinders 2
Expansion simple

Main Data

Coupled wheel dia	1.825	m
Running wheel dia	1.040	m
Total wheel base	7.940	m
Cylinder dia	0.57	m
Piston stroke	0.65	m
Grate area	3.25	sq.m
Heating surface, total	164.7	sq.m
Superheated surface	45.2	sq.m
Steam pressure	12	bar
Locomotive running order weight	69	t
Adhesion weight	42.9	t
Tender running order weight	52.3	t
Coal supply	9	t
Water supply	20	cu.m
Length over buffers	19.35	m
Top speed	100	k.p.h.



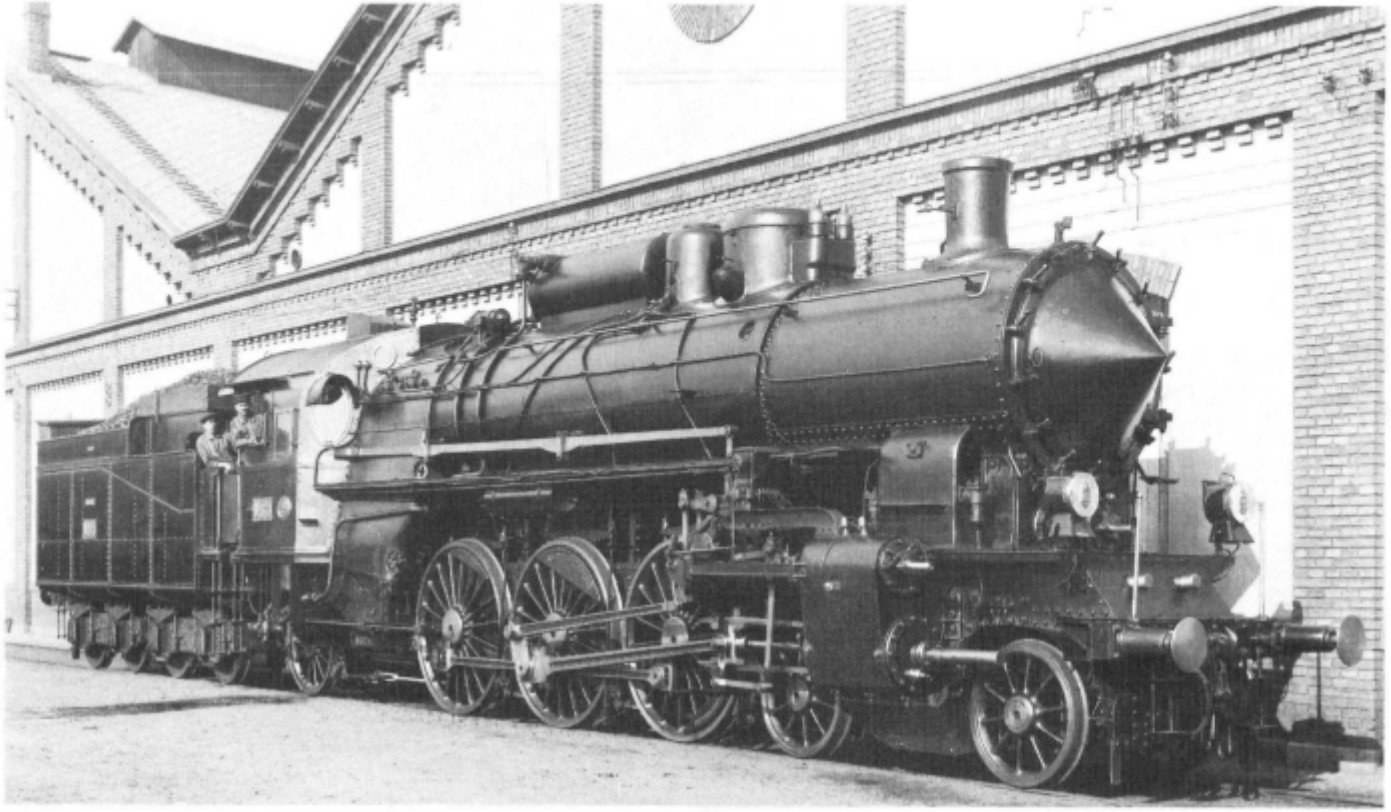
After the World War I MÁV were in short of the necessary number of mainline locomotives, particularly for hauling of stopping and fast trains. To cease this shortage MÁV purchased 139 units of Class 328 steam locomotives manufactured partly by the German Henschel Locomotive Works, partly by the Machine Works of MÁV. The machinery of this locomotive differs from that of the Class 327 ones; does not drive the front but the second coupled wheelset. This is a better solution in point of view the stresses of the framework. The locomotives manufactured within the period 1920-1922 were constructed with boilers of Brotan-Deffner system, because of the shortage on copper. The locomotive was well-proven for hauling of fast trains as well as of medium-load stopping trains. The hauling capacity of this locomotive can be characterized by the train load of 320 t which could be hauled at a speed of 90 k.p.h.

Class 301

Wheel arrangement
(British coding) 4-6-2
(American coding) „Pacific"
Axle arrangement
(German coding) 2' C 1'
Steam superheated
Cylinders 4
Expansion compound

Main Data

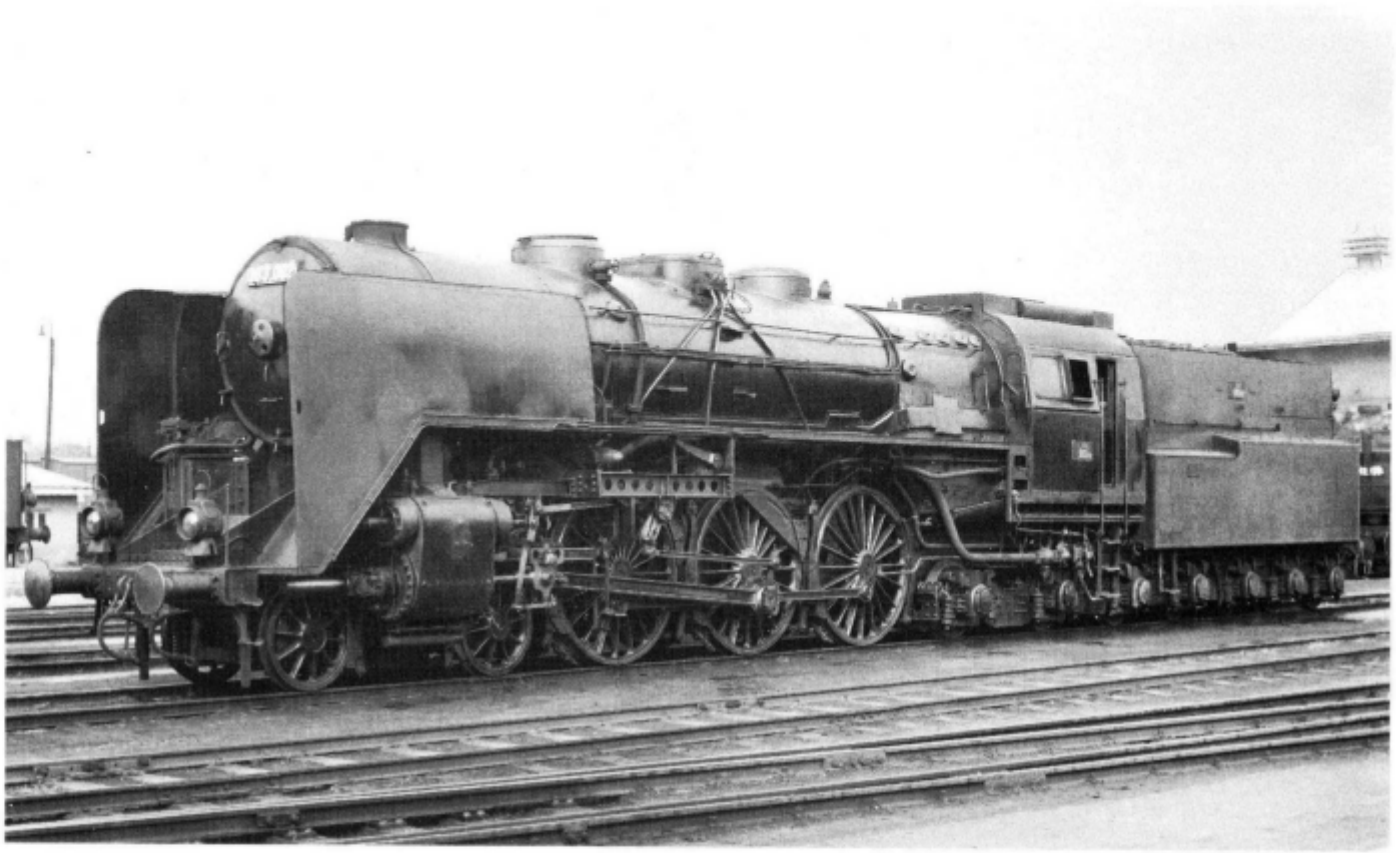
Coupled wheel dia	1.826	m
Running wheel dia (front/trailing)	1.04/1.22	m
Total wheel base	11.34	m
Cylinder dia (high/low pressure)	0.41/0.55	m
Piston stroke	0.66	m
Grate area	4.84	sq.m
Heating surface, total	245sq.m	
Superheated surface	53	sq.m
Steam pressure	16	bar
Locomotive running order weight	84.7	t
Adhesion weight	47.2	t
Tender running order weight	53.1	t
Coal supply	8	t
Water supply	23	cu.m
Length over buffers	21.8	m
Top speed	100	k.p.h.



Because of the increasing transportation demands on some mainlines of MÁV in the early 1910's the fast trains were composed of 10-11 double bogie coaches and ran at a speed of 90- 100 k.p.h. The hauling of these trains with locomotives having two coupled wheels caused increasing difficulties. To fulfil the abovementioned requirements MÁV ordered with the Machine Works of MÁV the Class 301 locomotive. The first unit of it was completed in 1911. In the time of its construction this locomotive was one of most beautiful express train locomotives among the highest power engines of Europe. The Class 301 locomotive was constructed with 4 steam cylinders. Two of the four cylinders were arranged inside the frame. The middle coupled wheelset was driven by the outside arranged cylinders while the inside arranged cylinders drove the first coupled wheelset. Thank to the four-cylinder design along with the advantageous running gear arrangement the locomotive had an extraordinary smooth run. In the time of ordering of the locomotive the competition had not been yet finished between the compound and the twin machinery systems, therefore two units of the Class 301 locomotives were ordered with compound machinery. Based on the results of the comparative tests the further units of these locomotives were all manufactured with twin machinery. The Class 301 locomotive hauled a 340 t fast train on level track at a speed of 100 k.p.h. 22 units were built in the years between 1911 and 1914.

Class 303

Wheel arrangement
(British coding) 4-6-4
(American coding) „Hudson"
Axle arrangement
(German coding) 2' C 2'
Steam superheated
Cylinders 2
Expansion simple



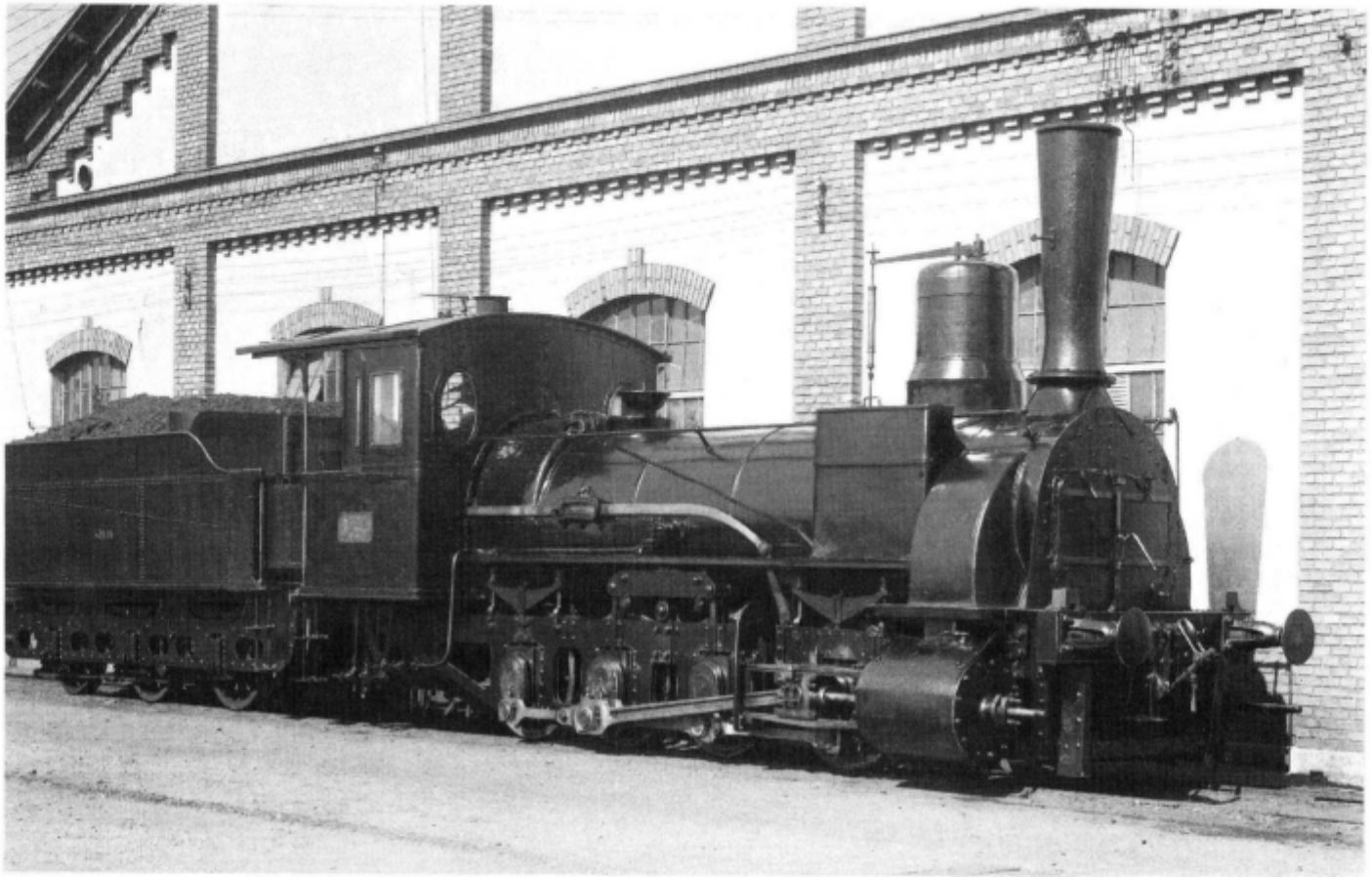
Main Data

Coupled wheel dia	2.000	m
Running wheel dia	1.040	m
Total wheel base	11.900	m
Cylinder dia	0.55	m
Piston stroke	0.70	m
Grate area	5.5	sq.m
Heating surface, total	260.0	sq.m
Superheated surface	78.0	sq.m
Steam pressure	18	bar
Locomotive running order weight	116.5	t
Adhesion weight	49.5	t
Tender running order weight	75	t
Coal supply	13	t
Water supply	25	cu.m
Length over buffers	25.585	m
Top speed	120	k.p.h.

In 1940 MÁV ordered with MÁVAG 2 units of Class 303 locomotives for hauling heavy fast trains. According to the order spedifications, this locomotive had to haul on level a 430 t train at a speed of 120 k.p.h. and a 530 t train at 110 k.p.h., respectively. For getting a smooth run the 4-6-4 wheel arrangement had been chosen. With this running gear arrangement the running properties were advantageous even at a speed of 150 k.p.h. Originally the Class 303 locomotive was designed with a 3-cylinder machinery, having a streamlined cover, but because of the request for a simpler construction it was built in a 2-cylinder machinery layout without the streamlined cover. For the ease of the work of the fireman the locomotive was equipped with mechanical stoker firing means. Hindered by the World War II the first unit of this Class was completed in 1951 only. In spite of the fact that she was the most up-to-date express locomotive of the MÁV there were built altogether 2 units only, namely because of the dieselisation and the electrification of the home traction MÁV disregarded the purchase of further Class 303 locomotives.

Class 420 (Former: Class IVa)

Wheel arrangement
(British coding) 0-8-0
(American coding) „8-wheel switcher"
Axle arrangement
(German coding) D
Steam saturated
Cylinders 2
Expansion simple



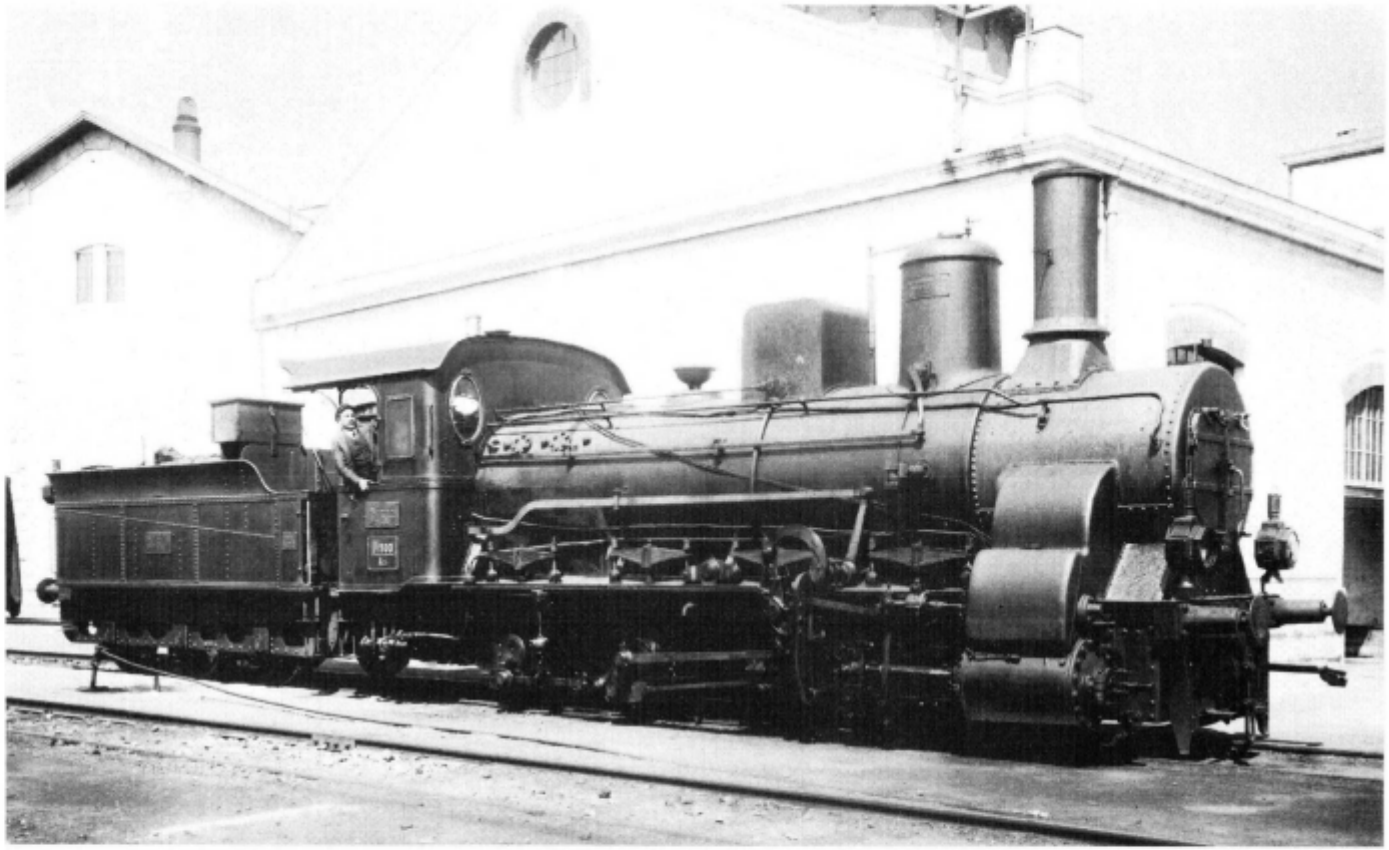
Main Data

Coupled wheel dia	1.085	m
Running wheel dia	–	
Total wheel base	3.600	m
Cylinder dia	0.520	m
Piston stroke	0.610	m
Grate area	2.0	sq.m
Heating surface, total	176.4	sq.m
Steam pressure	10	bar
Locomotive running order weight	47.1	t
Adhesion weight	47.1	t
Tender running order weight	34.0	t
Coal supply	7	t
Water supply	12.5	cu.m
Length over buffers	15.568	m
Top speed	30	k.p.h.

In 1882, MÁV ordered from the Sigl works of Wiener Neustadt (Austria) locomotives with four coupled wheels for hauling coal- transporting trains running on the Salgótarján-Ruttka line (in the North of Hungary). These locomotives were constructed based on the drawings of the Class IV (later marked as Class 441) locomotives but with a slight updating. For improving the performance of the locomotive the boiler pressure was increased to 10 bar. All of the four wheelsets of the Class 420 locomotive (former marked as Class IVa) support the boiler shell. Remarkable is the big cylinder diameter, namely the steam generated in the boiler could be utilized economically in the comparatively big dia steam cylinders with a low-speed steam locomotive. As this locomotive was constructed for a mountain track service it could be braked with back-steam, too. The performance of the Class 420 locomotive was characterized by the 625 t train load which could be hauled at a speed of 20 k.p.h. on mountain tracks with gradients of 1.0 per cent. The locomotive was built by the machine works of MÁV and the Locomotive Works of Floridsdorf, too, and 42 units as a total were manufactured within the period of 1882-1991.

Class 421 (Former: Class IVc)

Wheel arrangement
(British coding) 0-8-0
(American coding) „8-wheel switcher"
Axle arrangement
(German coding) D
Steam saturated
Cylinders 2
Expansion simple



Main Data

Coupled wheel dia	1.220	m
Running wheel dia	–	
Total wheel base	4.600	m
Cylinder dia	0.520	m
Piston stroke	0.610	m
Grate area	2.9	sq.m
Heating surface, total	168.1	sq.m
Steam pressure	13	bar
Locomotive running order weight	56.1	t
Adhesion weight	56.1	t
Tender running order weight	34	t
Coal supply	8	t
Water supply	12.5	cu.m
Length over buffers	16.430	m
Top speed	40	k.p.h.

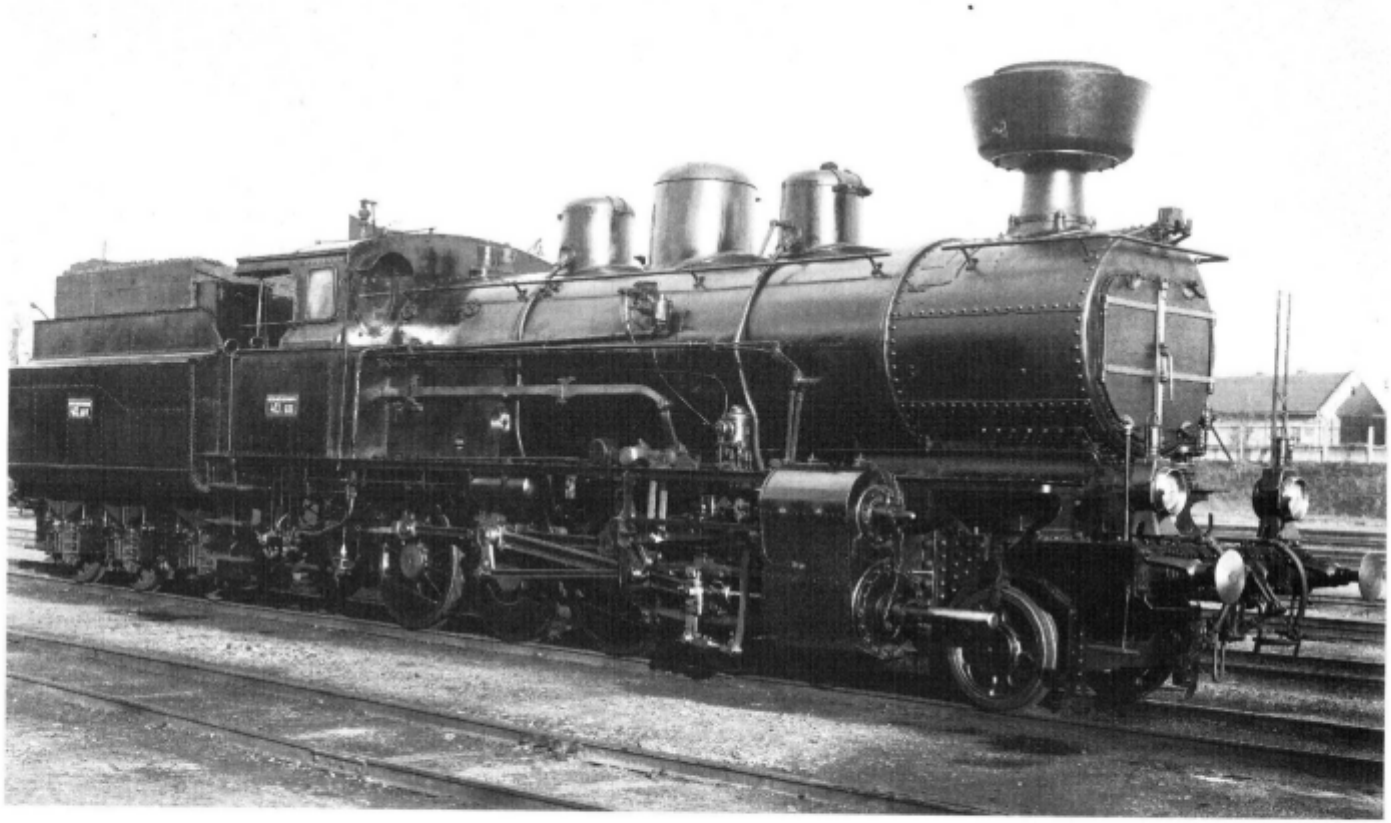
The goods traffic of the MÁV extraordinarily increased in the last decade of the past century because of the fast development of the home industry and trade. This increase touched first of all the Budapest-Fiume (now: Rijeka, Croatia) main line. On the track sections with 2.5 per cent gradients of this mainline the goods trains had to be double-leheaded and banked by altogether 3 locomotives in the 1890's, therefore in the middle of the 1890's arose the need for a mountain locomotive which enable to haul heavier trains in single traction. For this purpose were built the Class IVc (later marked as Class 421) locomotives in 1895 by the Machine Works of MÁV. This locomotive was capable to haul a 220 t train on a 2.5 per cent gradient and in double traction (one of the two locomotives was a banking engine) the hauling capacity amounts to 400 t. Although the hauling requirements were satisfied by this locomotives, the track curves got deformed, occured by the stiffness of the rigid frame as well as the running gear of them. This was the reason of disregarding the purchase of further units by MÁV following the commissioning of 35 Class IVc locomotives in 1896.

Class 403 (Former: Class 140)

Wheel arrangement
(British coding) 2-8-0
(American coding) „Consolidation"
Axle arrangement
(German coding) 1' D
Steam superheated
Cylinders 2
Expansion simple

Main Data

Coupled wheel dia	1.300	m
Running wheel dia	0.870	m
Total wheel base	6.800	m
Cylinder dia	0.570	m
Piston stroke	0.632	m
Grate area	3.87	sq.m
Heating surface, total	183	sq.m
Superheated surface	38	sq.m
Steam pressure	13	bar
Locomotive running order weight	70	t
Adhesion weight	60	t
Tender running order weight	39	t
Coal supply	5.6	t
Water supply	16	cu.m
Length over buffers	17.446	m
Top speed	60	k.p.h.



After World War I the Austrian and Hungarian regions of Déli Vasút (i.e. Southern Railways) have been separated and the lines existing in Hungary were directed by the name Duna-Száva-Adria Vasúttársaság (DSA; i.e. Danube-Sava-Adriatic Railway Company). DSA purchased the Class 140 locomotives to haul fast goods trains, these locomotives got to the stock of MÁV under Class No. 403 in 1932 along with the secularization of the Railways. This locomotive was built by MÁVAG based on the designs of the Class Class 270 locomotives of the Austrian Railways.

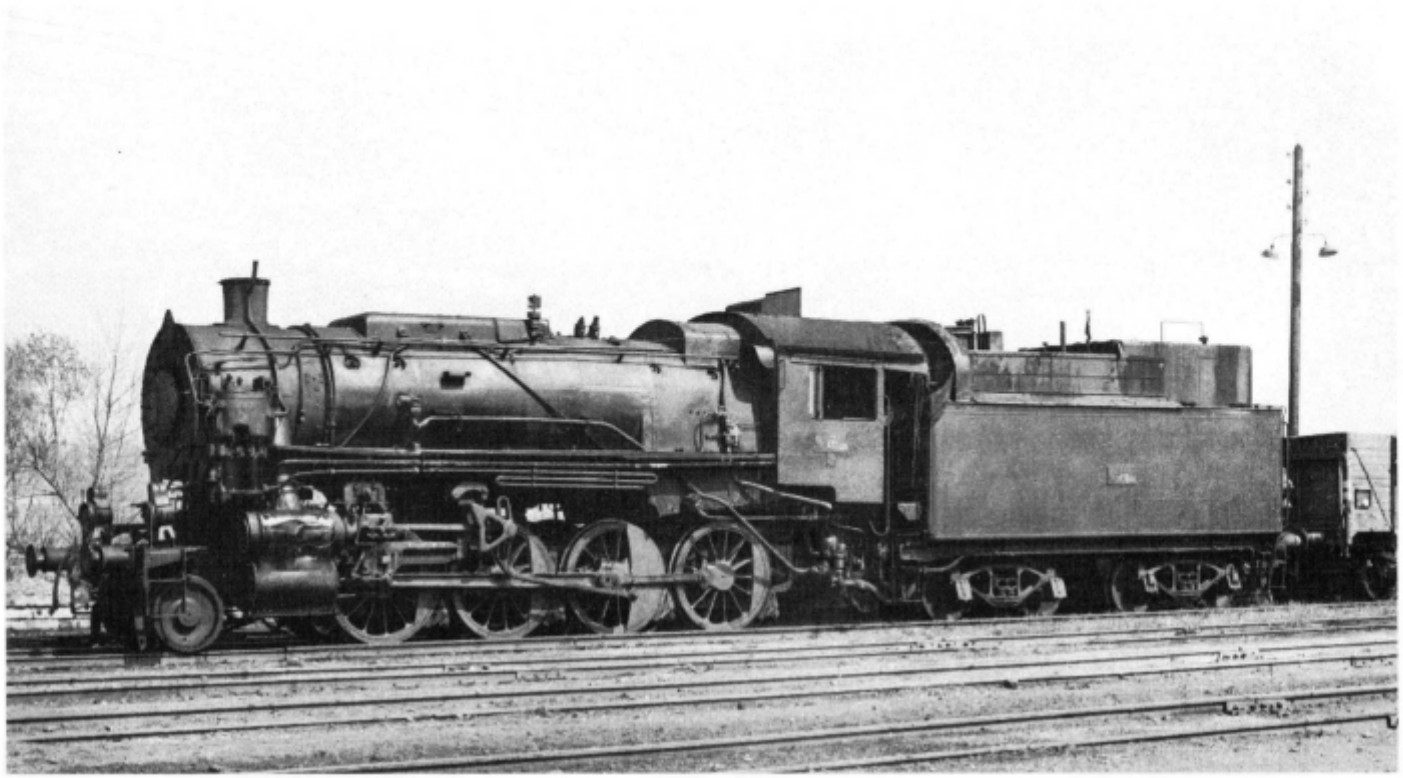
At designing the boiler the home coal sorts of medium calorific values were taken into consideration. The locomotive intended originally for hauling fast goods trains was used for hauling stopping trains, too. This locomotive was capable to haul a 840 t train on level with 60 k.p.h., a 1610 t train (also on level) with 30 k.p.h. and a 870 t train on a gradient of 0.7-0.8 per cent at a speed of 22 k.p.h. There were manufactured 8 units of this Class within the period of 1928-1930.

Class 411

Wheel arrangement
(British coding) 2-8-0
(American coding) „Consolidation"
Axle arrangement
(German coding) 1' D
Steam superheated
Cylinders 2
Expansion simple

Main Data

Coupled wheel dia	1.450	m
Running wheel dia	0.838	m
Total wheel base	7.087	m
Cylinder dia	0.482	m
Piston stroke	0.660	m
Grate area	3.78	sq.m
Heating surface, total	163	sq.m
Superheated surface	43	sq.m
Steam pressure	16	bar
Locomotive running order weight	73.5	t
Adhesion weight	64	t
Tender running order weight	58.5	t
Coal supply	10	t
Water supply	24	cu.m
Length over buffers	18.473	m
Top speed	75	k.p.h.



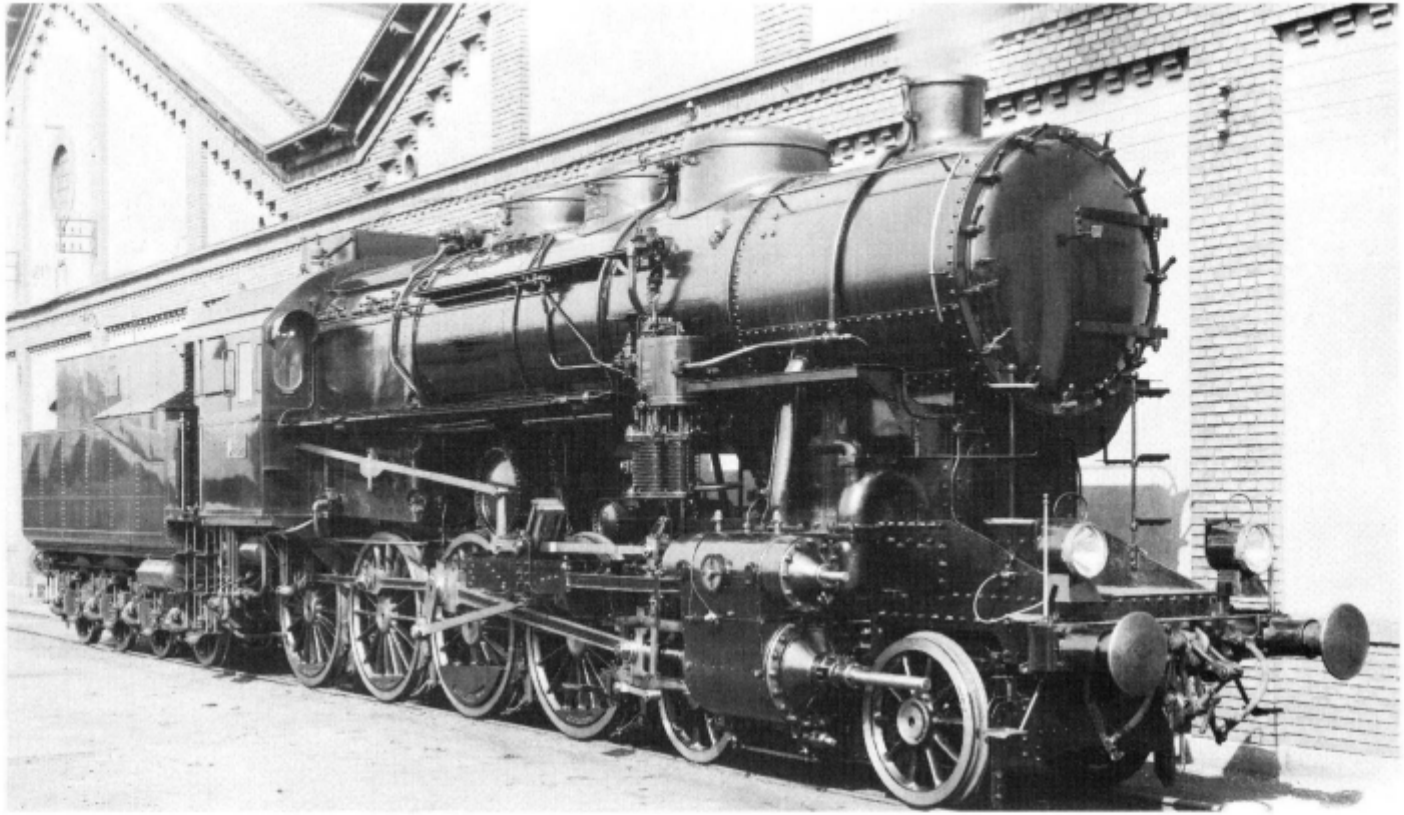
At the end of the World War II the steam locomotive stock of MÁV was mostly dragged away or destroyed. The shortage in locomotives caused significant problems in meeting transportation demands. The home steam locomotive industry was tied to a great extent by the war damage compensation's deliveries. In this hard situation it was very advantageous for MÁV that in 1947 presented itself an opportunity to purchase 510 units of US-made war locomotives (of the „Austerity" types). The Class 411 was the biggest locomotive series of foreign manufacture of the MÁV. These locomotives were built by various locomotive manufacturers of the USA for maintaining the postwar railway traffic in Europe. Complying with the requirements of the war traffic these locomotives were of simple design and built of good quality materials. MÁV performed constructional modification of bigger importance. This way the engines were fit to meet the demands of the home operation and the Class 411 locomotives - intended originally as a temporary solution - were for over two decades in service with MÁV. The duty of them was at first to haul goods trains but in some particular cases they were used to haul local stop trains, too. Their operation was restricted by their axle load amounting to 16 t. The Class 411 locomotives were well-proven in shunting service, too. The engines were capable to haul 1100 t trains on level track at a speed of 50 k.p.h.

Class 424

Wheel arrangement
(British coding) 4-8-0
(American coding) „Twelwe wheeler"
Axle arrangement
(German coding) 2' D
Steam superheated
Cylinders 2
Expansion simple

Main Data

Coupled wheel dia	1.606	m
Running wheel dia	1.040	m
Total wheel base	9.500	m
Cylinder dia	0.600	m
Piston stroke	0.660	m
Grate area	4.46	sq.m
Heating surface, total	217	sq.m
Superheated surface	58	sq.m
Steam pressure	14	bar
Locomotive running order weight	85.1	t
Adhesion weight	58.5	t
Tender running order weight	57.5	t
Coal supply	9	t
Water supply	21	cu.m
Length over buffers	21.000	m
Top speed	90	k.p.h.



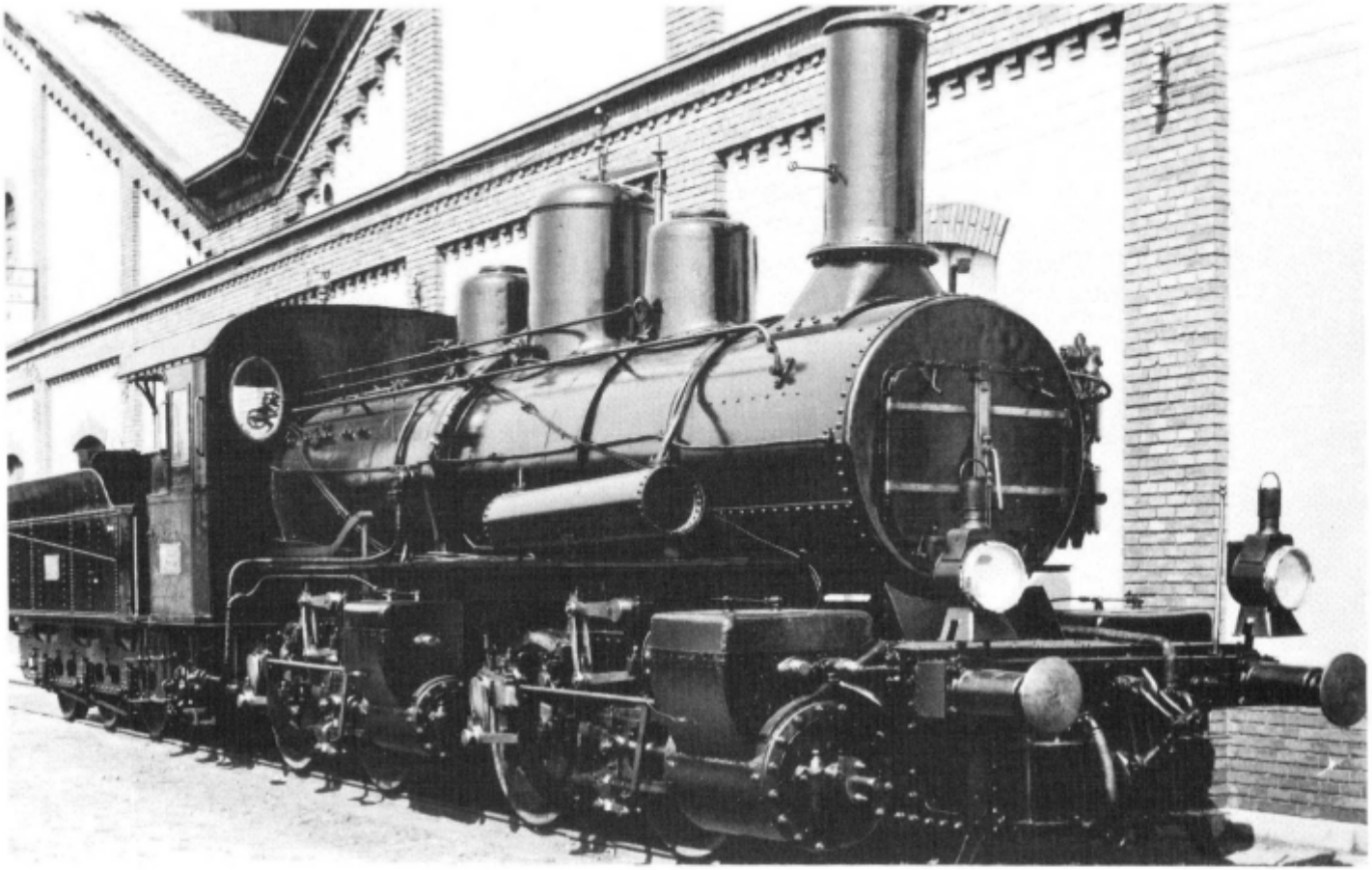
MÁV began during the World War I with the preparations to purchase a locomotive having four coupled wheels. The locomotives ought to have conveyed heavy freight and fast freight trains and (until the completion of the four coupled wheeled express- and passenger engine) also the fast passenger and stopping trains on the 1.2-1.6 per cent graded lines. For Class 424 a 14-ton axle load had been envisaged in the technical design specification. The scheme of the locomotive having originally a wheel arrangement of 2-8-0 were redesigned and the modified wheel arrangement of 4-8-0 made possible to increase the top speed of the locomotive to 90 k.p.h. The first unit of the Class 424 locomotives was completed in 1924. This locomotive became the best-of-all proven mainline locomotive of MÁV being equally utilizable for hauling fast trains, stopping trains and goods trains. During the decades the Class 424 locomotive was continuously updated. In the 1960's a part of these locomotives were made suitable for performing push-pull train traffic and some locomotives were rebuilt to oil-firing. The Class 424 locomotive was capable to haul a 450 t train on level track at a speed of 90 k.p.h. and a 1400 t train at 50 k.p.h. The unit No. of the Class 424 locomotives manufactured for the MÁV amounted to 365 units, but this model was supplied to Slovakia, Soviet Union, Yugoslavia and Korea, too.

Class 422 (Former: Class IVd)

Wheel arrangement
(British coding) 0-4-0 + 0-4-0
(American coding) –
Axle arrangement
(German coding) B' + B
Steam saturated
Cylinders 4
Expansion compound – Mallet

Main Data

Coupled wheel dia	1.220	m
Running wheel dia	–	
Total wheel base	5.800	m
Cylinder dia (high/low pressure)	0.385/0.580	m
Piston stroke	0.610	m
Grate area	2.6	sq.m
Heating surface, total	166.9	sq.m
Steam pressure	13	bar
Locomotive running order weight	56.9	t
Adhesion weight	56.9	t
Tender running order weight	34	t
Coal supply	8	t
Water supply	12.5	cu.m
Length over buffers	17.310	m
Top speed	50	k.p.h.



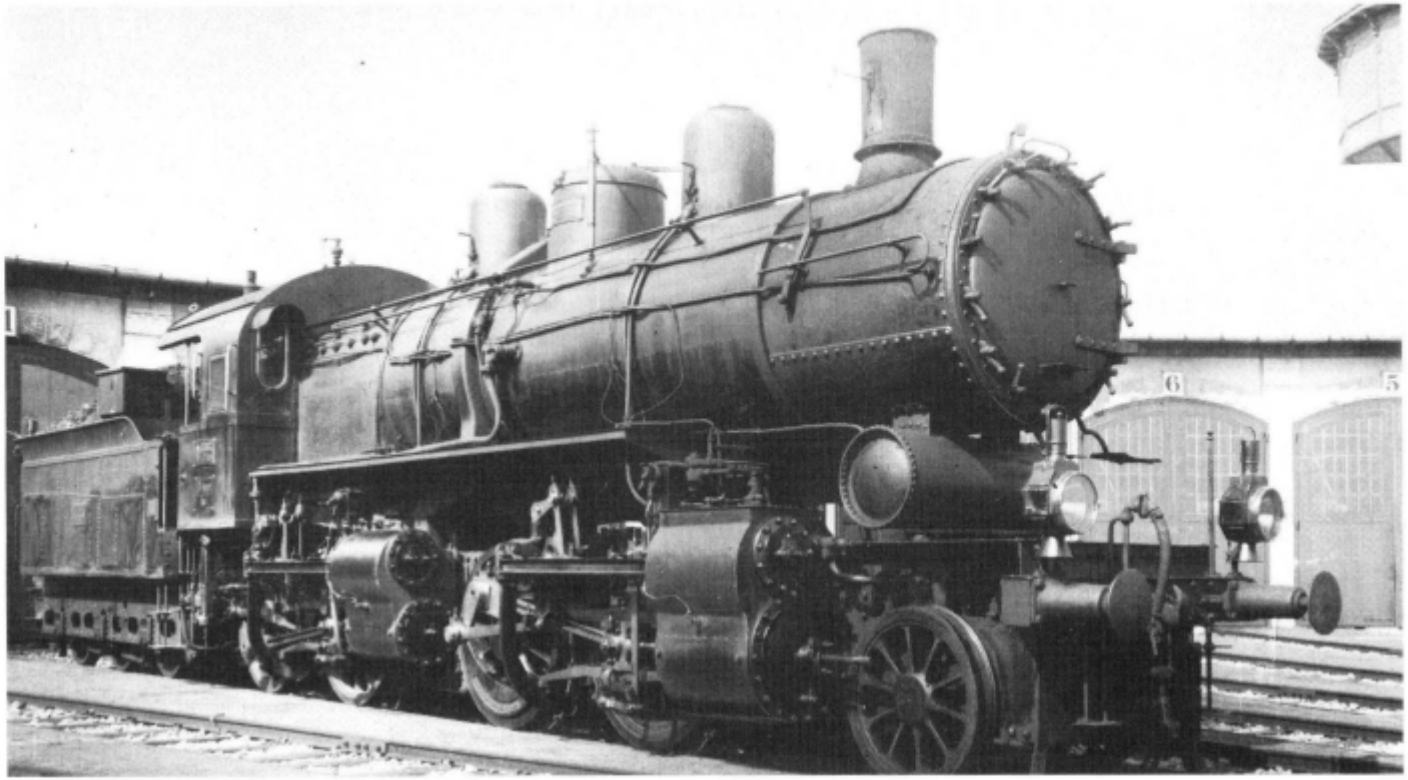
The mountaneous track sections of MÁV with heavy gradients were also characterized by sharp curves causing a lot of problems with the traditional locomotives having rigid frames when negotiating these curves. These problems could have been significantly minimized by applying the so-called Mallet-type articulated locomotives. To maintain the goods trains on mountaneous tracks MÁV had placed an order with the MÁV Gépgyár (Engineering and Machine Works of MÁV) to supply the Class IVd (later marked as Class 422) locomotives; the first unit of them was built in 1898. Two of the steam cylinders were fitted on the rigid rear main frame whereas two other steam cylinders were mounted on the front set of frames. Both high pressure cylinders (having the smaller diameter) of the compound machinery were put into the rigid rear mainframe and the two low pressure cylinders (having the bigger diameter) were mounted on the front set of frames. The locomotives were capable to haul 171 t trainloads in gradients of 2.5 per cent at a speed of 30 k.p.h. From this Class 422 locomotive a total of 30 units had been manufactured in the period between 1898 and 1902.

Class 401 (Former: Class IVe)

Wheel arrangement
(British coding) 2-4-0 + 0-4-0 Mallet
(American coding) –
Axle arrangement
(German coding) 1B' + B
Steam saturated
Cylinders 4
Expansion compound

Main Data

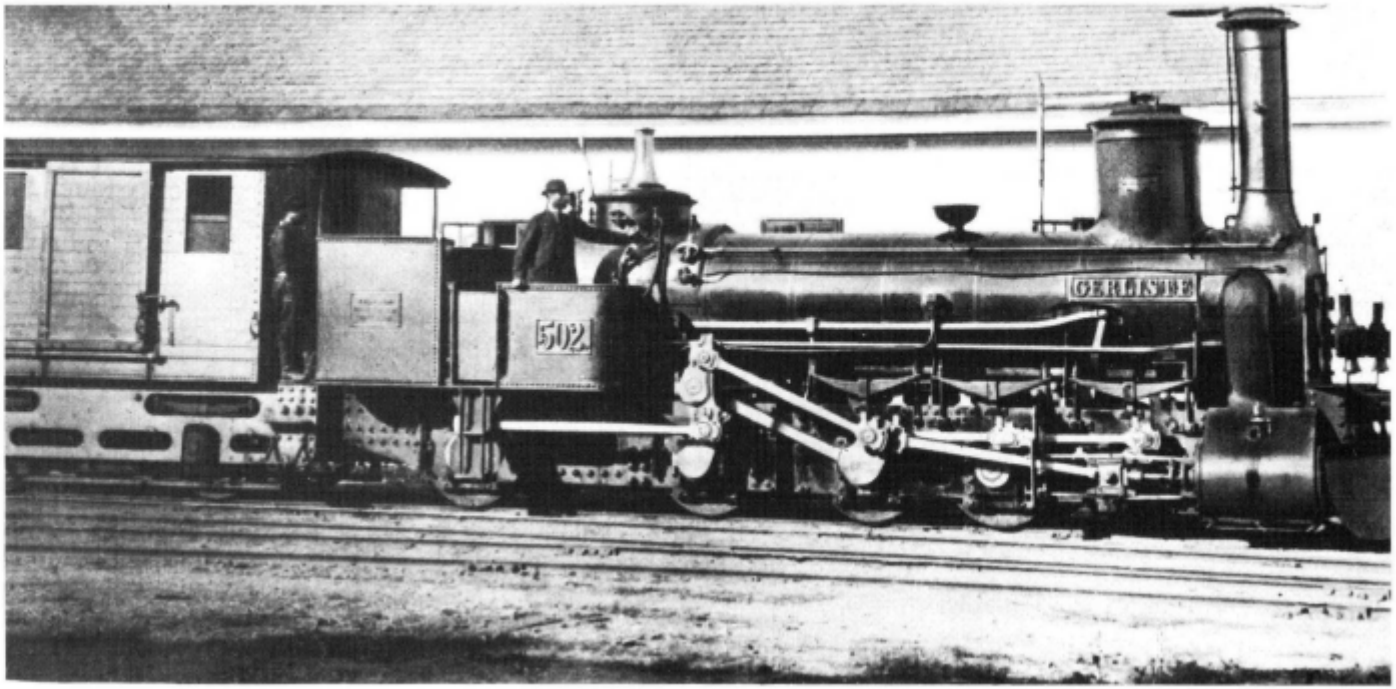
Coupled wheel dia	1.440	m
Running wheel dia	1.040	m
Total wheel base	8.710	m
Cylinder dia (high/low pressure)	0.39/0.635	m
Piston stroke	0.65	m
Grate area	3.55	sq.m
Heating surface, total	235.75	sq.m
Steam pressure	16	bar
Locomótive running order weight	73.3	t
Adhesion weight	65.32	t
Tender running order weight	36.5	t
Coal supply	6.5	t
Water supply	14.5	cu.m
Length over buffers	17.959	m
Top speed	60	k.p.h.



In the early 1900's there was a significant increase in passenger traffic on the mainline of Budapest-Fiume (the latter now Rijeka, Croatia). The former passenger trains had to be supplemented with a number of carriages, increasing thus their trainload from 130 t to 200 t. On the track sections with heavy gradients these trains were hauled double-headed, increased thus the operational costs. MÁV elaborated a number of designs concerning to high performance locomotives with 4 coupled wheels suitable for mountaneous service. Based on the advantageous experiences gained with the Class 422 locomotives of the Mallet system MÁV came to a decision to select this system again and placed an order with the Engineering and Machine Works of MÁV in 1904 to build 2 units of a fast train locomotive suitable for mountaneous service having a wheel arrangement of 2-4-0 + 0-4-0 Mallet. The Class IVe (later marked as Class 401) locomotives had been specified to haul a trainload of 230 t on a gradient of 2.5 per cent and in a track curve having a radius of 275 m at a speed 30 k.p.h. It was advantageous in point of view of the designing of the locomotives that the track superstructure had been strenghtened even in the sections of heaviest gradients thus the axle-load could be choosen as high as 16 t instead of the previous 14 t. The higher loading capacity of the track offered the opportunity to apply a boiler of improved performence, too. The machinery arrangement of the Class 401 locomotive was identical with that of the Class 422 engines. The Class 401 locomotives worked well in service verified by the fact that 15 units had been manufactured in the interval between 1905-1908.

Class TIVa

Wheel arrangement
(British coding) 0-6-0 + 0-4-0 articulated
(American coding) –
Axle arrangement
(German coding) CB articulated
Steam saturated
Cylinders 2



Main Data

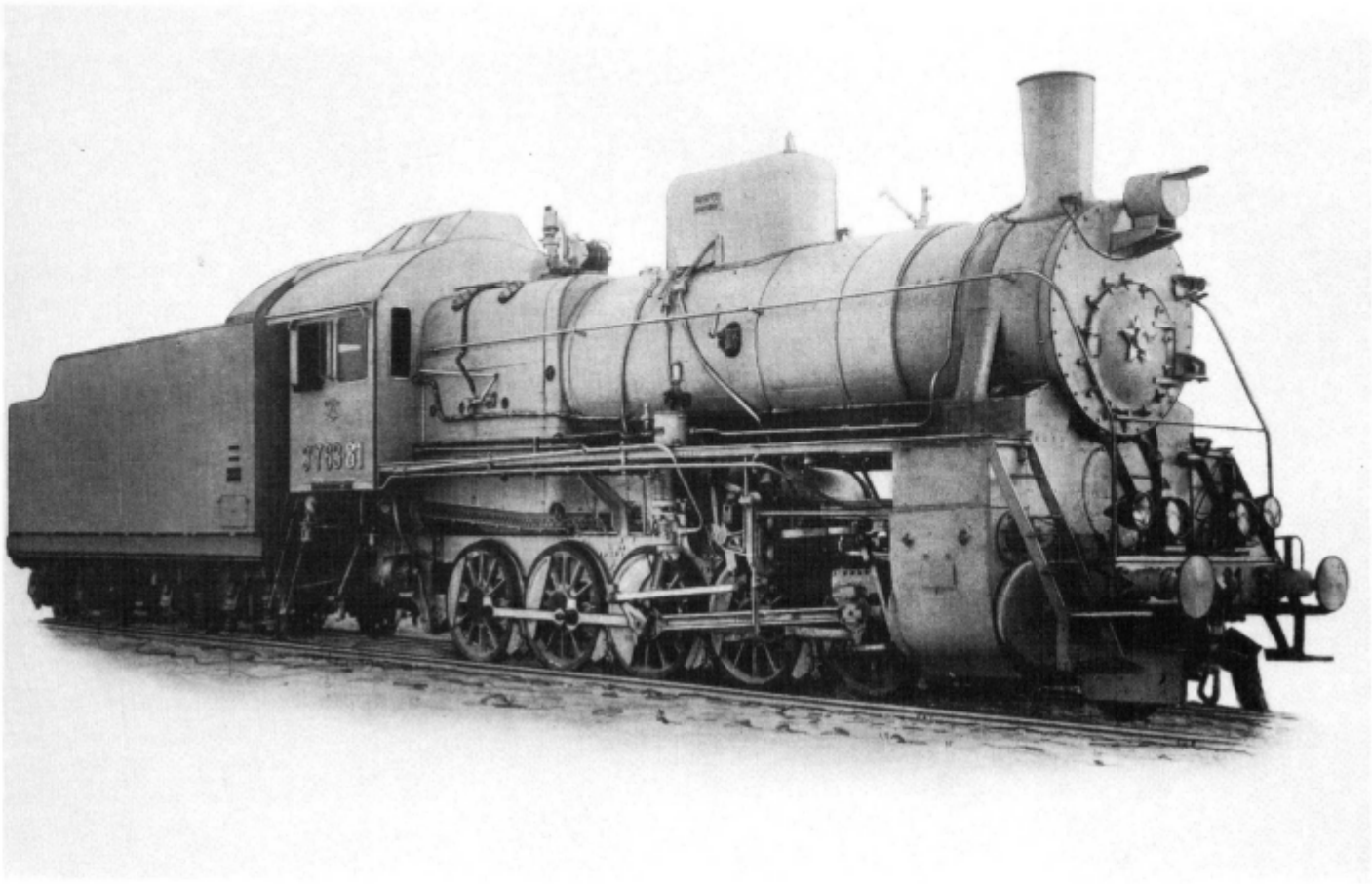
Coupled wheel dia	1.000	m
Running wheel dia	–	
Total wheel base	5.873	m
Cylinder dia	0.461	m
Piston stroke	0.632	m
Grate area	1.44	sq.m
Heating surface, total	121.5	sq.m
Steam pressure	9	bar
Locomotive running order weight	42.5	t
Adhesion weight	42.5	t
Tender running order weight	15.16	t
Coal supply*	1.9	cu.m
Water supply	5.36	cu.m
Length over buffers	10.233	m
Top speed	25	k.p.h.

* capacity of coal tank

The problem of locomotives to negotiate sharp curves had been relatively well solved with the locomotives of System Engerth, but there was a further problem, too: to improve the tractive effort of the locomotives without increasing the number of the wheels. Engerth made an attempt at driving the wheels of the tender bogie from the rear coupled wheels by means of a chain drive by coupling rods. Both wheels of the tender were coupled. Thus the load of the tender-bogie was utilized to effect tractive effort by adhesion. This solution did not work in the practice. The colleauge of Engerth, Pius Fink constructed an Engerth-system locomotive that drove the side-rod coupled axles of the tender-bogie by a special linkage from the main machinery. As a whole, 4 units had been manufactured within the period of 1862-1867 with the Vienna machine works of the Österreich-Ungarische Staatseisenbahn Gesellschaft (Austro-Hungarian State Railway Company). The locomotive aroused significant attention with her ingenieous machinery and was displayed at the World Exhibitions in Paris and London. The capacity of this locomotive can be characterized by the trainload of 180 t hauled on gradients of 2.0-2.2 per cent. Whereas the rear wheels of the tender were overloaded by the water and coal supplies the „tender" had been shortened and the locomotive was supplemented with a separate wagon, carrying water supply and luggage. Thus the total lenght of the locomotive had been increased to 14.5 m but the so-called rigid wheel base having a big importance in point of view of negotiating track curves amounted to 2.212 m only. A Class TIVa locomotive of the system Pius Fink wore the nameplate 4270 came to the fleet of MÁV in 1891 with the nationalization of the Hungarian region of the Österreich-Ungarische Staatseisenbahn Gesellschaft.

Class 510

Wheel arrangement
(British coding) 0-10-0
(American coding) „Ten wheel switcher"
Axle arrangement
(German coding) E
Steam superheated
Cylinders 2
Expansion simple



Main Data

Track gauge	1.524	m
Coupled wheel dia	1.320	m
Total wheel base	5.780	m
Cylinder dia	0.65	m
Piston stroke	0.70	m
Grate area	5.09	sq.m
Heating surface, total	188	sq.m
Superheated surface	48	sq.m
Steam pressure	14	bar
Locomotive running order weight	86	t
Adhesion weight	86	t
Tender running order weight	80	t
Coal supply	18	t
Water supply	27.2	cu.m
Length over buffers	21.945	m
Top speed	60	k.p.h.

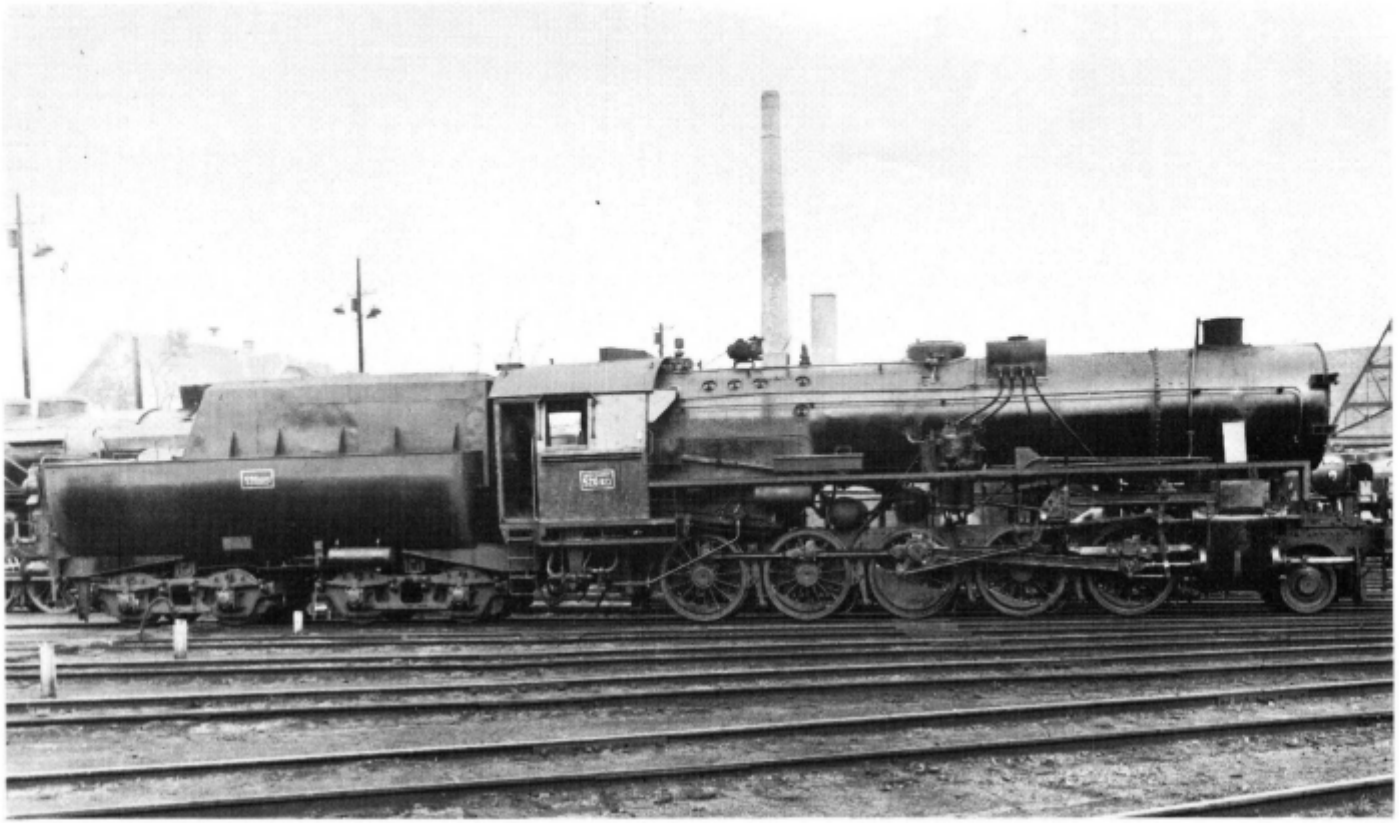
At the Záhony (town with railway transit terminal in the Eastern part of Hungary at the Ukrainian border) region MÁV maintain service on a broad gauge track section of 1.524 m (i.e. 5 feet) gauge extended in a lenght of appr. 35 km. The switching and shunting service on this section is worked by means of MÁVAG-made Class 510 locomotives. The 5 units of this type purchased in 1953 were the same model as the Class E locomotive manufactured for the Soviet Union from 1947 by MÁVAG. Approximately 14.000 units of this type were in service in the Soviet Union since 1921. The locomotives had been manufactured by MÁVAG according to Soviet drawings. The Class 510 locomotive had to negotiate a track curve of 125 m radius without stretching. For ease of the negotiating, the front and rear axles have a lateral gap of 4/5" and 1", respectively, the wheels of the 2nd and the 4th axles bore tyres with thinned flanges and the middle wheels had no flanges. The locomotives having closed driver's cab of the Soviet system were equipped with automatic central coupling gears.

Class 520 (Former: Class 52)

Wheel arrangement
(British coding) 2-10-0
(American coding) „Decapod"
Axle arrangement
(German coding) 1' E
Steam superheated
Cylinders 2
Expansion simple

Main Data

Coupled wheel dia	1.400	m
Running wheel dia	0.850	m
Total wheel base	9.200	m
Cylinder dia	0.60	m
Piston stroke	0.66	m
Grate area	3.9	sq.m
Heating surface, total	177	sq.m
Superheated surface	68	sq.m
Steam pressure	16	bar
Locomotive running order weight	84.5	t
Adhesion weight	75	t
Tender running order weight	58.7	t
Coal supply	10	t
Water supply	30	cu.m
Length over buffers	22.975	m
Top speed	60	k.p.h.



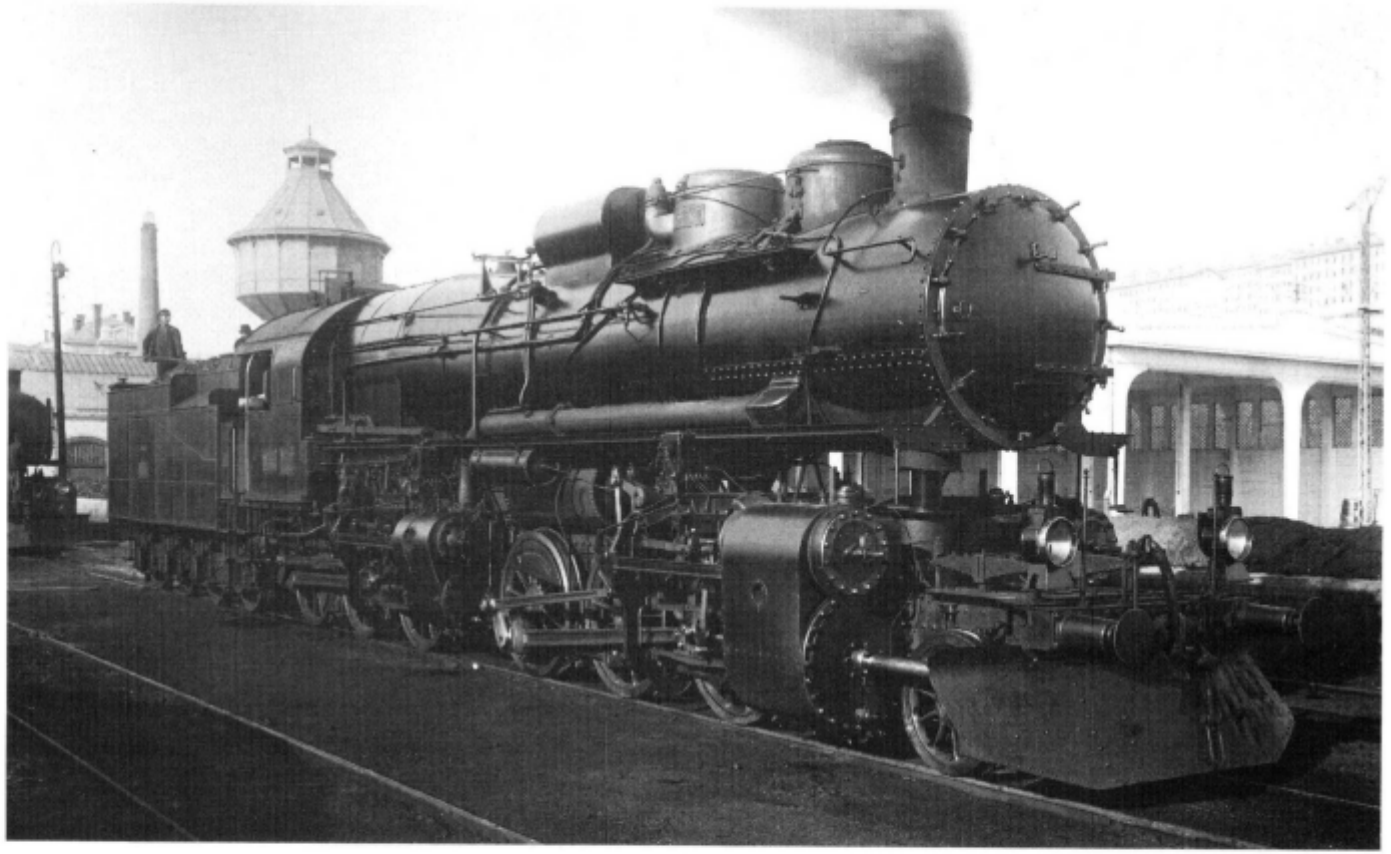
MÁV purchased the Class 520 locomotives from the Soviet Union in the early 1960's. The locomotive, marked originally as Class 52 of Deutsche Reichsbahn (i.e. Railways of the German (third) Empire during the World War II) was constructed for war service and had been manufactured by the locomotive works of other countries, too, besides the German works in the interval of 1942- 1945 and were delivered to the Soviet Union partly as war damage compensation. The first unit of this Class 52 locomotive was completed in Germany in 1942 and 15.000 units of them were required within 2 years by the German supreme command. Hindered by the events of the war 6161 units were completed only until the end of the war. 161 units had been manufactured as condensing steam engines for operation in badly watered regions. The transportation requirement was to haul a trainload of 1200 t on level track at a speed of 65 k.p.h. The locomotives had been designed for a few years operation only and partly therefore their mechanical construction was of simple design. The locomotives were built with a minimum using up non-ferrous metals, namely for one Class 52 locomotive 152 kg of colour metal was used. It means a decrease in comparison to the 2838 kg per locomotive with the Class 50 engines. A further point of interest is that the permitted speeds for these locomotives were identical in both travel directions. MÁV utilized the Class 52 locomotives to haul goods trains and to work the heavy shunting service on humpyards.

Class 601

Wheel arrangement
(British coding) 2-6-0-+ 0-6-0
(American coding) –
Axle arrangement
(German coding) 1'C + C
Steam superheated
Cylinders 4
Expansion compound – Mallet

Main Data

Coupled wheel dia	1.440	m
Running wheel dia	0.950	m
Total wheel base	11.900	m
Cylinder dia (high/low pressure)	0.52/0.80	m
Piston stroke	0.66	m
Grate area	5.2	sq.m
Heating surface, total	275	sq.m
Superheated surface	66	sq.m
Steam pressure	15	bar
Locomotive running order weight	109.4	t
Adhesion weight	97	t
Tender running order weight	53.1	t
Coal supply	8	t
Water supply	23	cu.m
Length over buffers	22.570	m
Top speed	60	k.p.h.



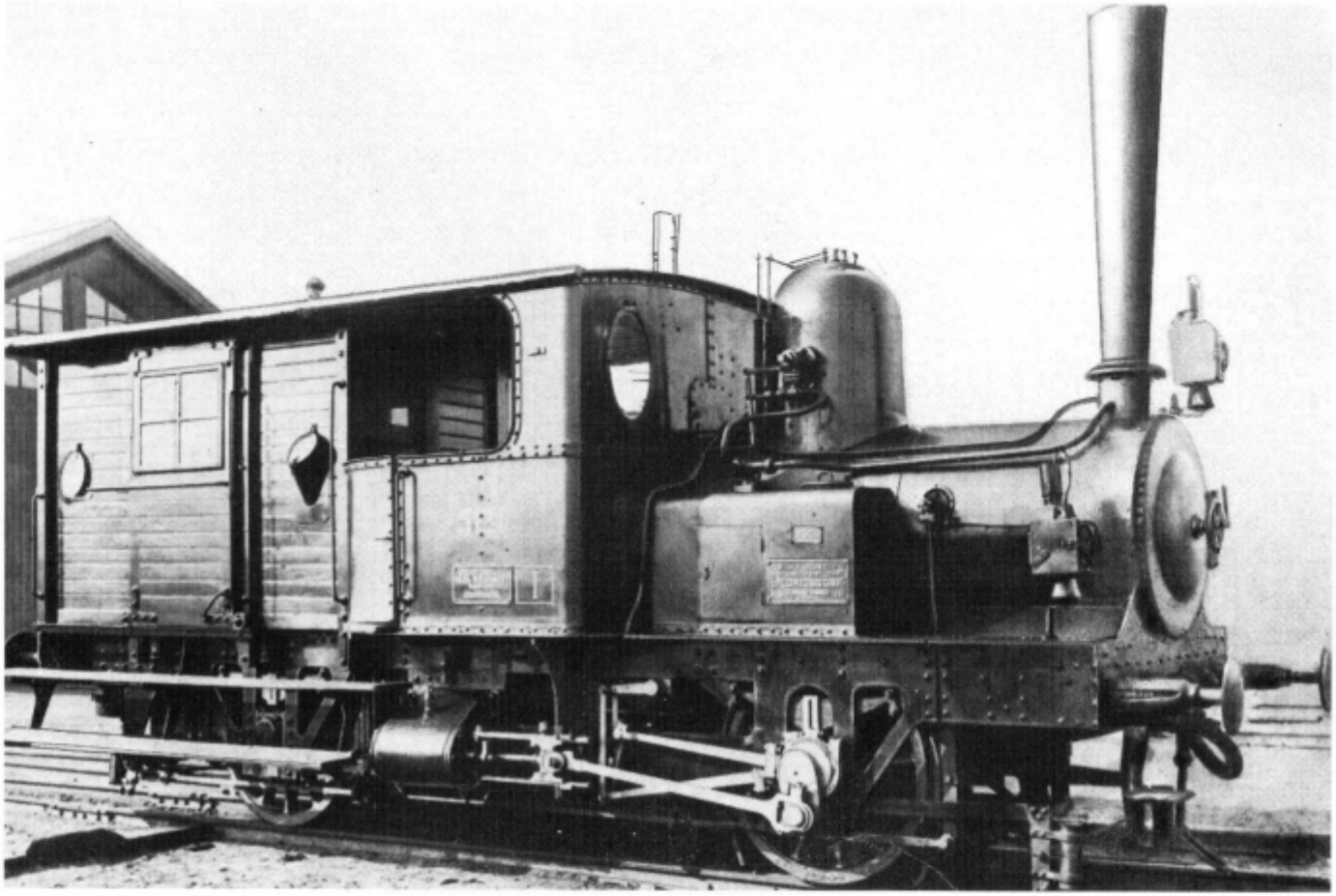
In the early 1910's the bustling traffic of goods trains required increasing of the loads of the goods trains on the single track mountaneous lines with heavy gradients of MÁV towards Fiume and Ruttka. Considering transportation economy there was a requirement to haul the trains with single heading and an additional banking engine on the heaviest sections. These transportation demands could not be met any more with the locomotives of restricted performance purchased earlier for working the mountain regions. MÁV placed an order with the Engineering and Machine Works of MÁV for the Class 601 locomotives of the Mallet system, the first unit of them was commissioned in 1914. In the time of her manufacture this locomotive was the highest powered tender-type steam engine not only at MÁV but of Europe, too. The 3 coupled wheels of the rear (main) frame were driven by the both high pressure (small dia) steam cylinders of the locomotive of compound machinery arrangement while the 3 coupled wheels of the front set of frames were driven by the both low-pressure (big dia) steam cylinders. The Class 601 locomotive hauled a trainload of 1400 t on a level track at 60 k.p.h. and a 385 t train on a gradient of 2.5 per cent at a speed of 15 k.p.h. 60 units of this locomotive had been manufactured for MÁV within the interval of 1914-1921.

Class 150 (Former: Class VIII)

Wheel arrangement
(British coding) 0-2-2
(American coding) –
Axle arrangement
(German coding) A 1
Steam saturated
Cylinders 2
Expansion simple

Main Data

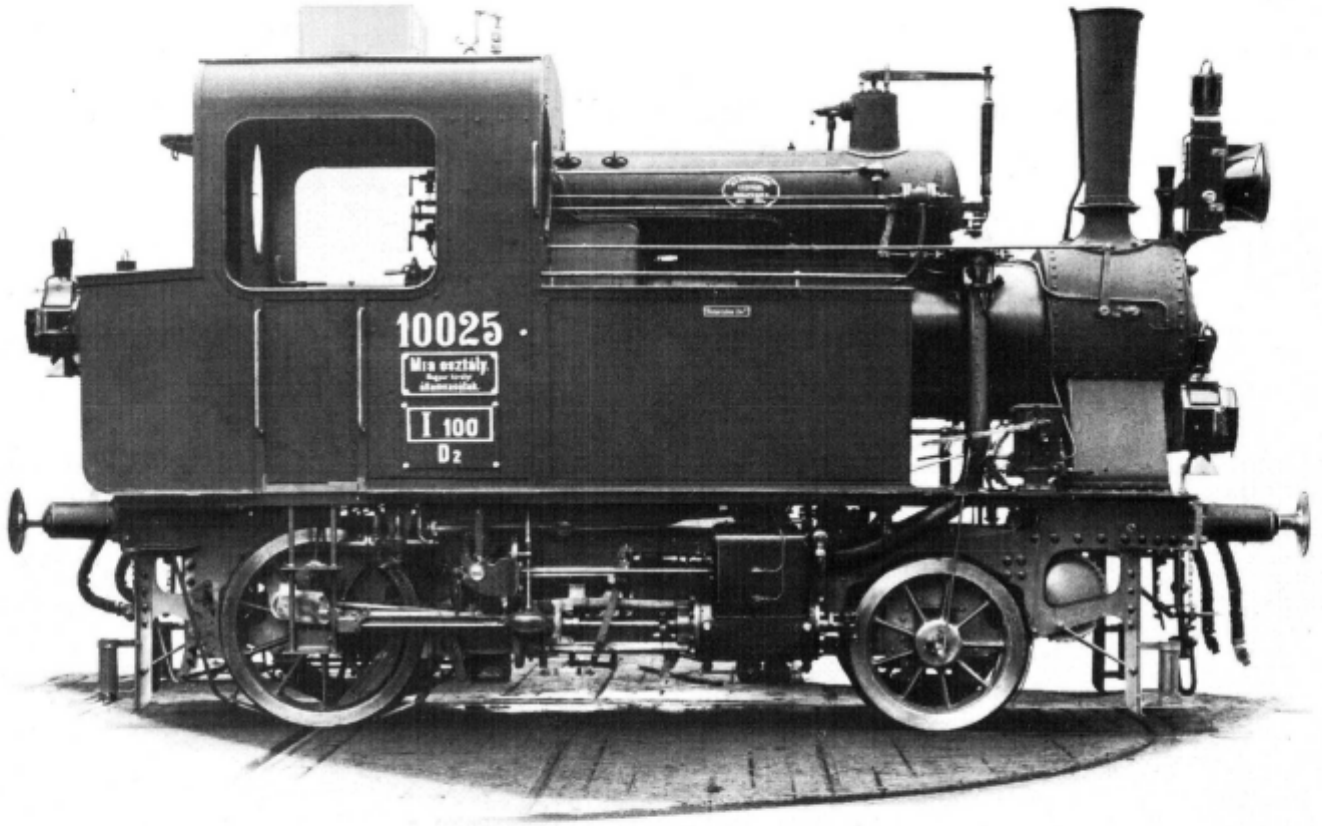
Coupled wheel dia	1.202	m
Running wheel dia	1.202	m
Total wheel base	3.870	m
Cylinder dia	0.25	m
Piston stroke	0.40	m
Grate area	0.7	sq.m
Heating surface, total	50	sq.m
Steam pressure	12	bar
Locomotive running order weight	23.7	t
Adhesion weight	11.3	t
Coal supply	0.9	cu.m
Water supply	3	cu.m
Length over buffers	8.663	m
Top speed	40	k.p.h.



The Austrian designer Elbel had developed a 4-wheeled tank type locomotive with uncoupled wheels incorporating a luggage room for the usually shortdistance branch lines with low permitted axle load of the suburban traffic. Starting from the fact that the stopping trains running on suburban lines were composed of a luggage van and two passenger coaches only. According to the original concept the locomotive driver should have done the firing, too, but because of an accident this idea was abandoned. MÁV placed an order with the Wiener Lokomotivfabrik AG (Locomotive Works of Vienna) at Floridsdorf, Austria to manufacture an Elbel-type locomotive. The Class VIII (later marked as Class 150) locomotives did not get work, however, in a large number with MÁV whereas their axle load proved to be too high for the low capacity permanent ways of the suburb lines and simultaneously their adhesion tractive effort was insufficient to work trains on mainlines. The Class 150 locomotives hauled a 263 t trainload on level track at a speed of 40 k.p.h. Six units of this model were manufactured in the interval between 1880 and 1885.

Class 11 (Former: Class MIa)

Wheel arrangement
(British coding) 2-2-0
(American coding) –
Axle arrangement
(German coding) 1 A
Steam saturated
Cylinders 2
Expansion compound



Main Data

Coupled wheel dia	1.040	m
Running wheel dia	0.875	m
Total wheel base	3.100	m
Cylinder dia (high/low pressure)	0.22/0.33	m
Piston stroke	0.40	m
Grate area	0.78	sq.m
Heating surface, total	31	sq.m
Steam pressure	16	bar
Locomotive running order weight	19.1	t
Adhesion weight	9.5	t
Coal supply	0.7	t
Water supply	2	cu.m
Length over buffers	6.42	m
Top speed	60	k.p.h.

At the early years of this century similarly to the practice of some foreign Railways MÁV had purchased some steam locomotives of lower performance with uncoupled wheels to haul their trains on the branch lines of light traffic. These locomotives were denominated as „railcar substituting locomotives" because they maintained a railway service to be identical with that of the contemporary railcars. A typical model of the home railcar substituting locomotives was the Class MIa (later marked as Class 11) steam engine.

31 units of them had been manufactured with the Engineering and Machine Works of MÁV within the period of 1910-1913. The Brotan-type boiler having a rated pressure of 16 bar was comparatively of a big capacity one. In compliance with the wheel arrangement of 2-2-0 the driving wheels were arranged in the rear. The rated capacity data of these locomotives: they were capable to haul a trainload of 100 t on level track at a speed of 55 k.p.h.

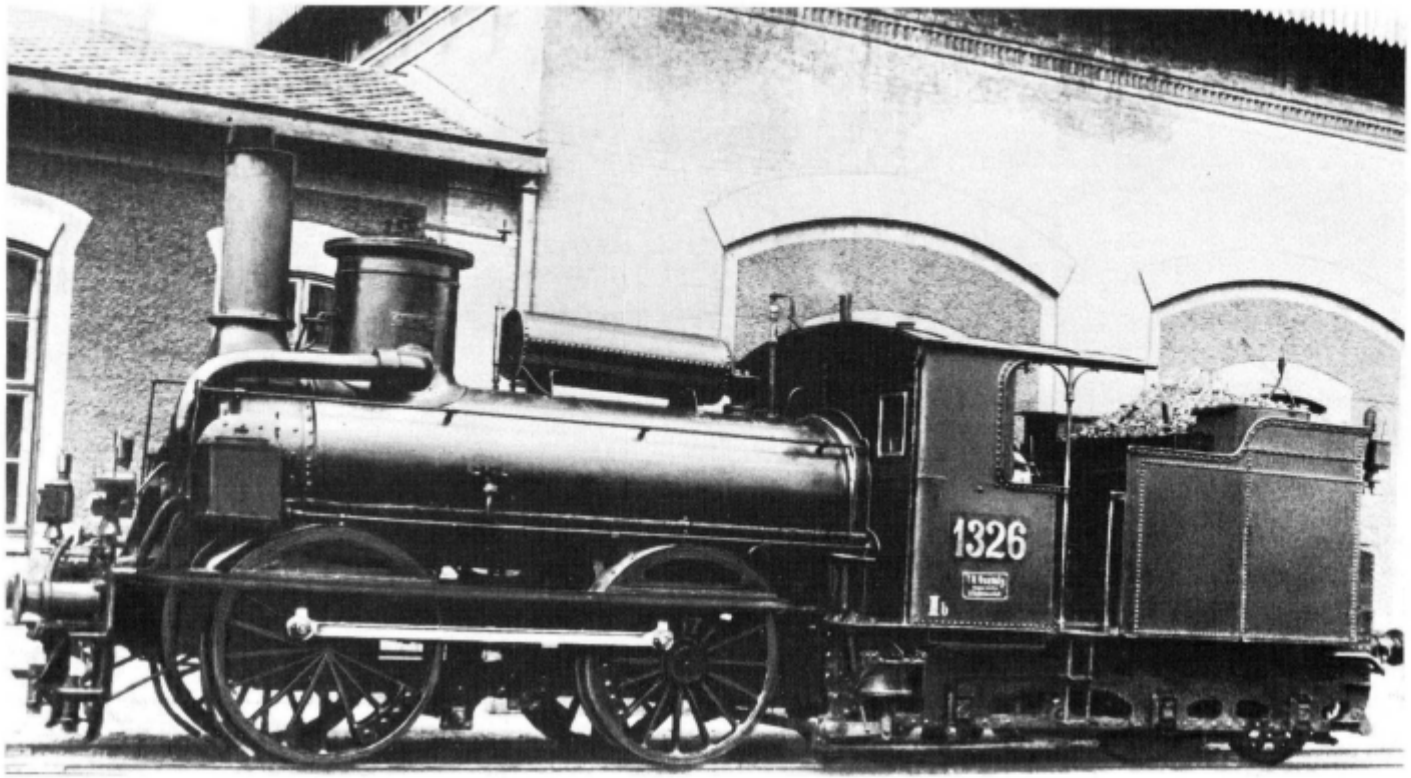
Class 250 (Former: Class TII)

Wheel arrangement
(British coding) 0-4-6 (type Engerth)
(American coding) –
Axle arrangement
(German coding) B 3
Steam saturated
Cylinders 2
Expansion simple

Main Data

Coupled wheel dia	1.598	m
Running wheel dia	0.954	m
Total wheel base	8.323	m
Cylinder dia	0.421	m
Piston stroke	0.579	m
Grate area	2.05	sq.m
Heating surface, total	121.9	sq.m
Steam pressure	9	bar
Locomotive running order weight	53.9	t
Adhesion weight	24.6	t
Coal supply*	3.95	cu.m
Water supply	7.9	cu.m
Length over buffers	11.721	m
Top speed	75	k.p.h.

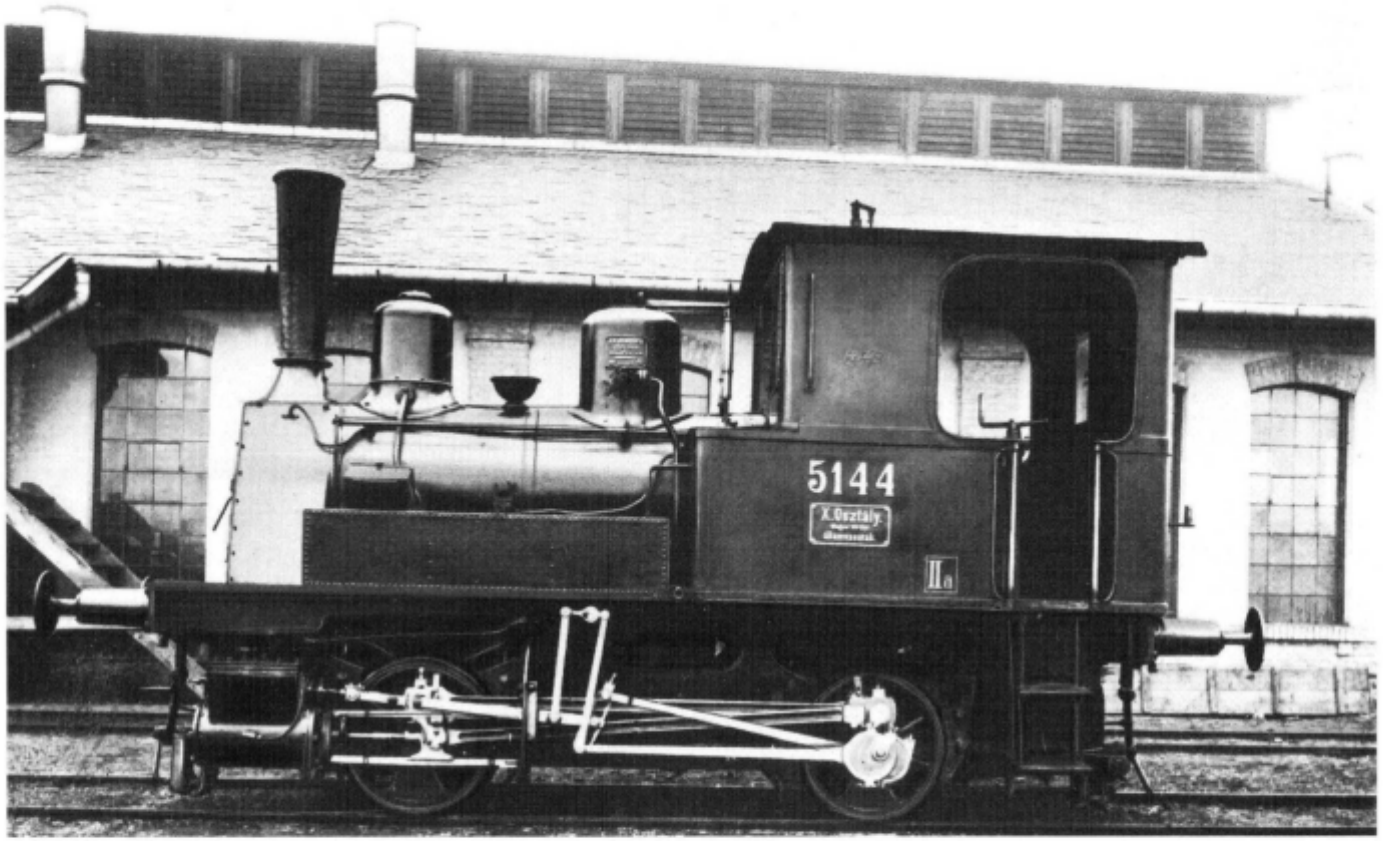
* capacity of the coal tank



Construction of steam locomotives intended for working on montaneous track sections having sharp curves and steep gradients cause always big problems for the designer. A number of steam locomotives with specifically arranged machinery and running gear had been designed over the years, the Engerth-type locomotives were among the oldest of them. With these locomotives the rear part of the boiler, the firebox was supported by means of a 2- axled so called tender-bogie. The frame of the tender-bogie and the locomotive frame were joined by a pin, enabling the radial displacement of both frames. By this solution was possible to reduce the base of the coupled wheels, therefore this solution was very advantageous to negotiate sharp curves correctly. When the Österreich-Ungarische Staatseisenbahn Gesellschaft (i.e. Austro-Hungarian State Railway Company) had been nationalized in 1891, 37 units of the Engerth-type locomotives having a wheel arrangement of 0-4-6 came to the fleet of MÁV. At this event the locomotives had been marked as Class TII, whereas later as Class 250. These locomotives had been built by the Vienna Works of StEG. The locomotives intended to work in passenger service were equipped by MÁV with continuous air brake equipment. The Class 250 locomotives were able to haul 255 t trainload on level track at a speed of 60 k.p.h. The steam cylinders were arranged inside of the locomotive frame therefore she had an extraordinary smooth running even at high speeds.

Class 20 (Former: Class X)

Wheel arrangement
(British coding) 0-4-0
(American coding) „4-wheel switcher"
Axle arrangement
(German coding) B
Steam saturated
Cylinders 2
Expansion simple



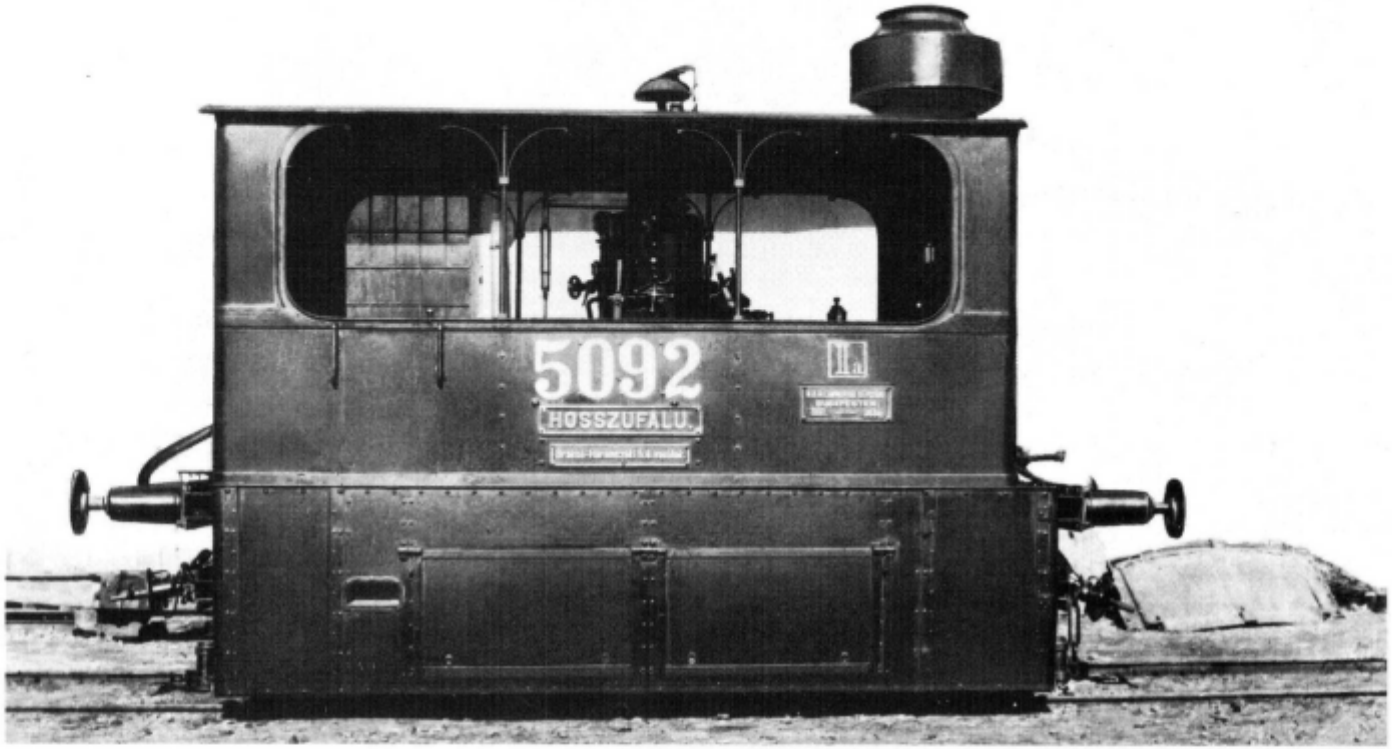
Main Data

Coupled wheel dia	0.850	m
Running wheel dia	–	
Total wheel base	2.400	m
Cylinder dia	0.22	m
Piston stroke	0.40	m
Grate area	0.69	sq.m
Heating surface, total	31.3	sq.m
Steam pressure	12	bar
Locomotive running order weight	18.36	t
Adhesion weight	18.36	t
Coal supply	0.7	t
Water supply	2.8	cu.m
Length over buffers	6.42	m
Top speed	30	k.p.h.

At the end of the past century the branch line network of the MÁV significantly extended, partly by the nationalization of the private Railways and partly by construction and inauguration of new lines, thus arose an urgent need to purchase new locomotives with low axle load. On short lines the tank-type locomotives were especially advantageous, because they were suitable for running in both travel directions at the same speed. The Class X (later marked as Class 20) locomotives had been manufactured between 1881 and 1884 by the MÁV Gépgyár (i.e. Engineering and Machine Works of MÁV), totalling 24 units of them. This locomotive could haul 354 t trainload on level track at a speed of 30 k.p.h. One of these locomotives was rebuilt to compound system in 1883. She was the very first locomotive of the MÁV of the compound system. The high pressure cylinder diameter was kept on 0.22 m while the low pressure one was selected to 0.33 m. Later, with one unit exception, all of the Class 20 locomotives were rebuilt to compound system.

Class 284 (Former: Class VII)

Wheel arrangement
(British coding) 0-4-0
(American coding) „4-wheel switcher"
Axle arrangement
(German coding) B
Steam saturated
Cylinders 2
Expansion simple



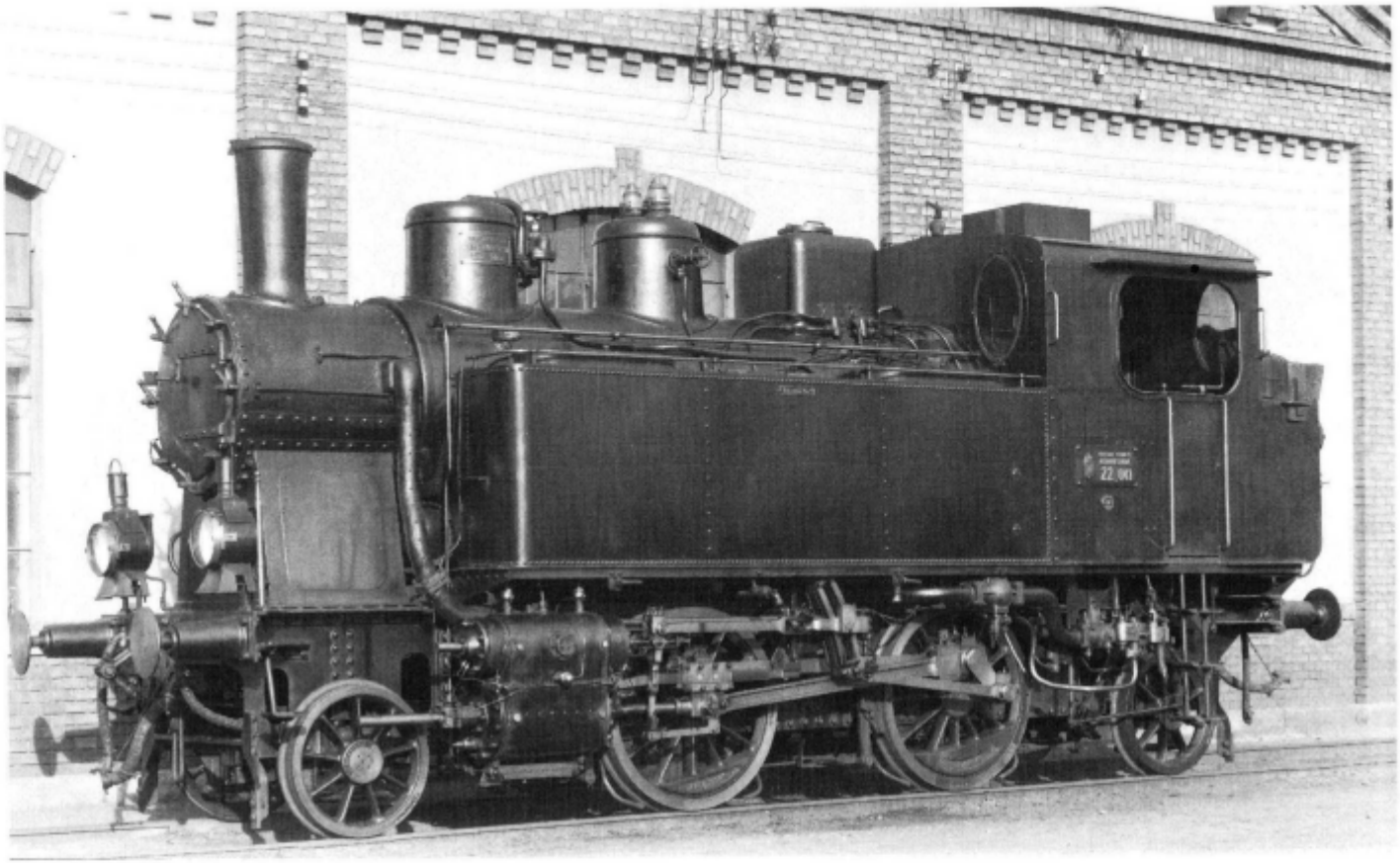
Main Data

Coupled wheel dia	0.800	m
Running wheel dia	–	
Total wheel base	1.450	m
Cylinder dia	0.20	m
Piston stroke	0.32	m
Grate area	0.46	sq.m
Heating surface, total	21.3	sq.m
Steam pressure	15	bar
Locomotive running order weight	16.1	t
Adhesion weight	16.1	t
Coal supply	0.6	cu.m
Water supply	2	cu.m
Length over buffers	5.272	m
Top speed	30	k.p.h.

An interesting type of the steam locomotives was the „road- railway" steam locomotive, the socalled steam tramway. The concept of the road railway was not quite identical with that of the recent city tramway or streetcar. The road railways maintained not only the passenger transport inside the city and in the suburban region but they had worked the tasks of the goods transportation, too. The steam tramways were characterized by the totally encapsuled machinery, the accomodation of the boiler as well as the driver's stands in a casing or a carbody, which was similar to the driver's cabs of the traditional steam locomotives. There was a very important requirement that the locomotive driver could watch well the track in both travel directions without the necessity of turning the steam tramway engine at the terminals. Some steam tramways manufactured by the MÁV Gépgyár (Engineering and Machine Works of MÁV) had been purchased by those public local Railways whose lines terminated inside the town area or had connected to the city railways. A number of local or suburban Railways had been taken over by MÁV and on that occasion came some steam tramway locomotives to the fleet of MÁV. 3 units of these locomotives had been manufactured in the years 1891-1892 at the MÁV Gépgyár (i.e. Engineering and Machine Works of MÁV), marked originally as Class VII and later as Class 284. These locomotives had maintained the traffic at the Local Railways between Keszthely and Balatonszentgyörgy (western part of Hungary).

Class 275 (Former: Class 22)

Wheel arrangement
(British coding) 2-4-2
(American coding) Columbia
Axle arrangement
(German coding) 1' B 1'
Steam superheated
Cylinders 2
Expansion simple



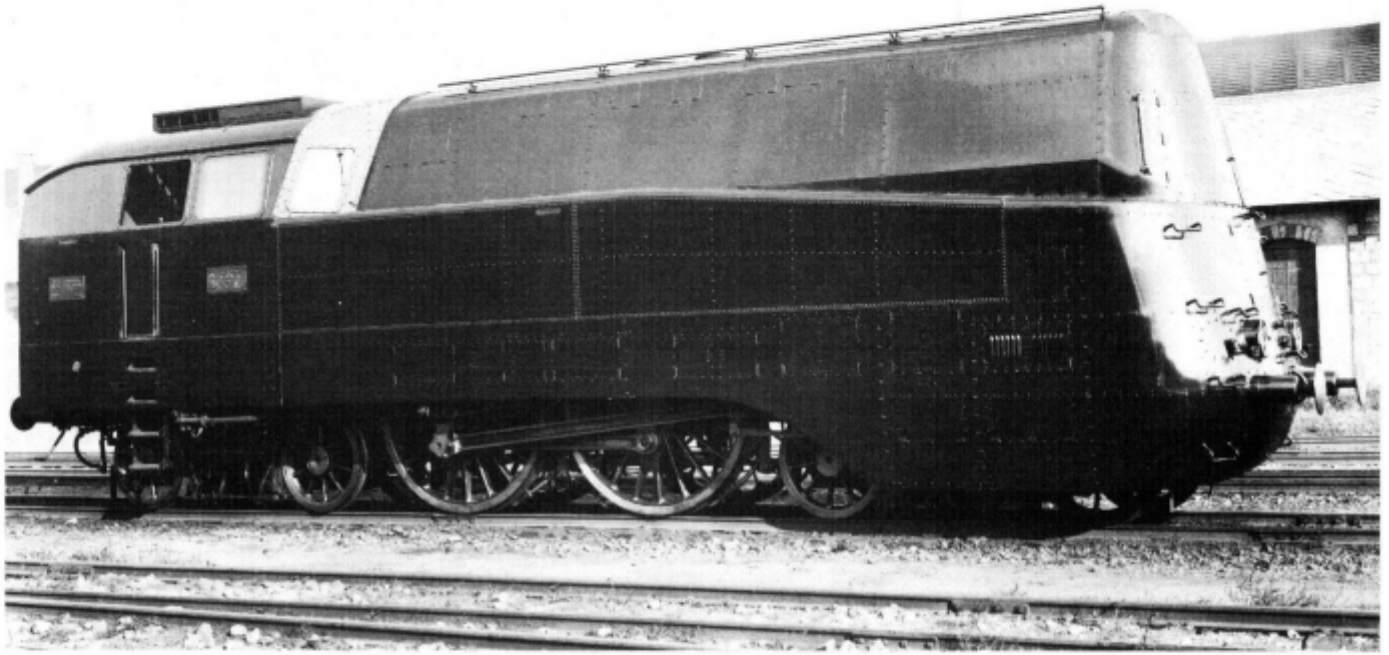
Main Data

Coupled wheel dia	1.220	m
Running wheel dia	0.875	m
Total wheel base	6.000	m
Cylinder dia	0.355	m
Piston stroke	0.460	m
Grate area	1.25	sq.m
Heating surface, total	65.9	sq.m
Superheated surface	16.7	sq.m
Steam pressure	14	bar
Locomotive running order weight	36.4	t
Adhesion weight	20.0	t
Coal supply	1.3	t
Water supply	4.0	cu.m
Length over buffers	8.670	m
Top speed	70	k.p.h.

The Class 275 (originally marked as Class 22) railcar replacing locomotives had been manufactured at first to maintain economically the passenger service on branch lines. In the late 1920's MÁV were in short of railcars intended for branch line service therefore the Class 22 steam locomotives ran to schedule of DMUs. The maximum permitted trainloads in this service enables the steam locomotives to accelerate the trains like a DMU. In addition, in the 1930's these locomotives hauled regularly light fast trains composed of 2-3 bogie-type (4-axled) coaches, too, for example between Budapest and Balatonfüred as well as on the line Budapest-Győr in the years previous to the electrification. The advantageous running properties of the Class 22 locomotives were ensured by the aligning running wheels, both the leading and trailing ones being of the system Adams-Webb. The locomotive was capable to haul a trainload of 120 t at a speed of 70 k.p.h. or a 120 t train at a speed of 60 k.p.h., respectively, on level track. 148 units had been manufactured within the interval of 1928 and 1940. These locomotives were very well proven either in respect of their capacity or from the aspect of their economic operation.

Class 242

Wheel arrangement
(British coding) 4-4-4
(American coding) Double Ender
Axle arrangement
(German coding) 2' B 2'
Steam superheated
Cylinders 2
Expansion simple



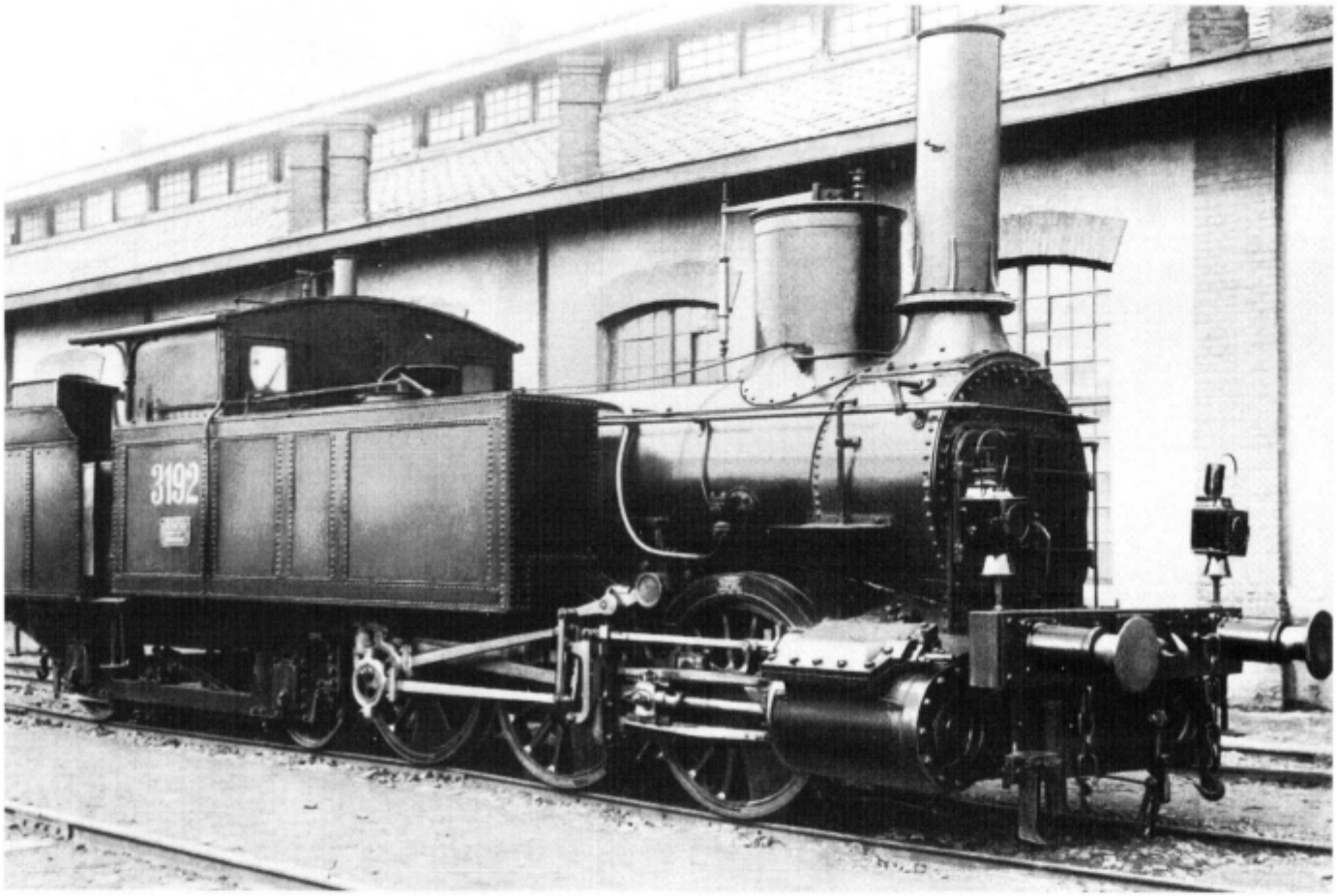
Main Data

Coupled wheel dia	2.000	m
Running wheel dia	1.040	m
Total wheel base	10.580	m
Cylinder dia	0.430	m
Piston stroke	0.650	m
Grate area	2.75	sq.m
Heating surface, total	155.4	sq.m
Superheated surface	35.2	sq.m
Steam pressure	18	bar
Locomotive running order weight	85.4	t
Adhesion weight	29.2	t
Coal supply	4	t
Water supply	10	cu.m
Length over buffers	10.580	m
Top speed	120	k.p.h.

The Class 242 streamlined tank-type steam locomotive was constructed originally to haul light fast trains composed of 3-4 bogie-type coaches. 4 units as a total had been manufactured at MÁVAG in the period of 1936-1940 of this locomotive which was the fastest locomotive type of MÁV. The extremely well proven running gear ensured an extraordinary smooth running for this locomotive. As a result of this, the permitted speed of the Class 242 locomotives were on some track sections by 20-30 k.p.h. higher than that of other types. With her relatively small coal supply the Class 242 locomotive covered a distance of 200-250 km without refuelling. She was the last streamlined steam locomotive in Europe which had worked in scheduled traffic. In the last time of their operation the heavy-loaded Balt-Orient Express train was regularly hauled by these locomotives in double heading on the line between Budapest and Biharkeresztes (at the Roumanian border). With her top speed of 161 k.p.h. reached at a coach test run the Class 242 locomotive was the speed record holder steam locomotive of Hungary.

Class 368 (Former: Class TIII)

Wheel arrangement
(British coding) 0-6-4
(American coding) –
Axle arrangement
(German coding) C 2
Steam saturated
Cylinders 2
Expansion simple



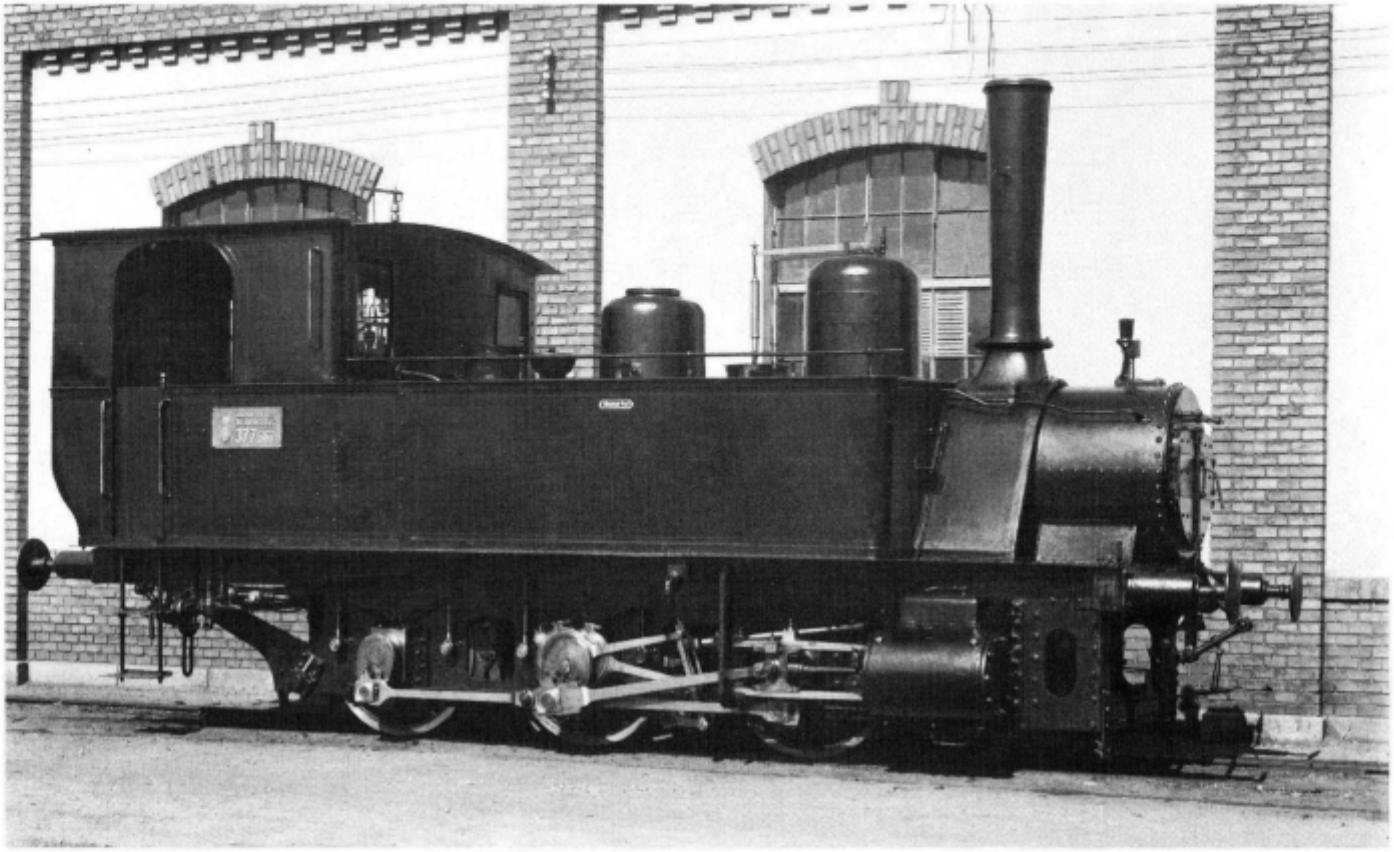
Main Data

Coupled wheel dia	1.275	m
Running wheel dia	0.941	m
Total wheel base	6.954	m
Cylinder dia	0.434	m
Piston stroke	0.632	m
Grate area	1.4	sq.m
Heating surface, total	136	sq.m
Steam pressure	8	bar
Locomotive running order weight	53.7	t
Adhesion weight	34.6	t
Coal supply	4.0	cu.m
Water supply	6.9	cu.m
Length over buffers	11.092	m
Top speed	40	k.p.h.

With the nationalization of the Hungarian region of the Österreich-Ungarische Staatseisenbahn-Gesellschaft (i.e. Austrian-Hungarian State Railways Company) 10 units of Engerth- type goods train locomotives with wheel arrangement of 0-6-0 came to the fleet of MÁV. The Class TIII (later marked as Class 368) locomotives had been manufactured in 1856 at the Maffei works in Munich, Germany. The Crampton-type boiler of these locomotives was made originally without steam dome and only later was equipped with a big size steam dome. The boiler was fixed at the front to the locomotive frame while at rear was supported by slideplates on the longitudinal beams of the bogie frame of the tender. The boiler was fed originally with piston-type pump but later with Giffard-type steam injector. The locomotives were delivered without protecting hoods. They were equipped with hand brakes only, the wheels of the tender bogies had been braked with them. On longer downhill runs the Class 368 locomotive could have been braked with back-steam, too.

Class 377 (Former: Class XII)

Wheel arrangement
(British coding) 0-6-0
(American coding) 6-wheel switcher
Axle arrangement
(German coding) C
Steam saturated
Cylinders 2
Expansion simple



Main Data

Coupled wheel dia	1.110	m
Running wheel dia	–	
Total wheel base	2.800	m
Cylinder dia	0.350	m
Piston stroke	0.480	m
Grate area	1.2	sq.m
Heating surface, total	52	sq.m
Steam pressure	10	bar
Locomotive running order weight	29.3	t
Adhesion weight	29.3	t
Coal supply	1.2	t
Water supply	4.3	cu.m
Length over buffers	8.100	m
Top speed	45	k.p.h.

MÁV gained very favourable experiences with the Class X later Class 20 locomotives in maintaining of the traffic of short distance branch lines. Therefore MÁV gave up the purchase of tender-type locomotives of the second rank and placed an order with MÁV Gépgyár (Engineering and Machine Works of MÁV) to deliver tank locomoitves of the second rank with 3 coupled wheels. The Class XII (later marked as Class 377) locomotives became a well-proven branch-line locomotive of MÁV, one of the greatest unit number used by MÁV. This fleet was increased by the locomotives which had been came to MÁV from the nationalized private Railways. With the aim to reduce her weight, the construction of the locomotive was selected to be the possible simplest. 493 units had been manufactured in the period of 1885- 1903 and the majority of them by the MÁV Gépgyár. The Class 377 locomotives hauled first of all the stopping and goods trains on branch-lines but they were used for maintaining the shunting service, too. In consequence of their short rigid wheel base these locomotives were sufficient to run on sharply curved sidings, but because of their unsmooth running their light running speed had to be limited to 30 k.p.h. The Class 377 locomotives hauled 280 t trainloads at a speed of 40 k.p.h. and a 375 t train at a speed of 30 k.p.h. on level track.

Class 399

Wheel arrangement
(British coding) 0-6-0
(American coding) 6-wheel switcher
Axle arrangement
(German coding) C
Steam saturated
Cylinders 2
Expansion simple

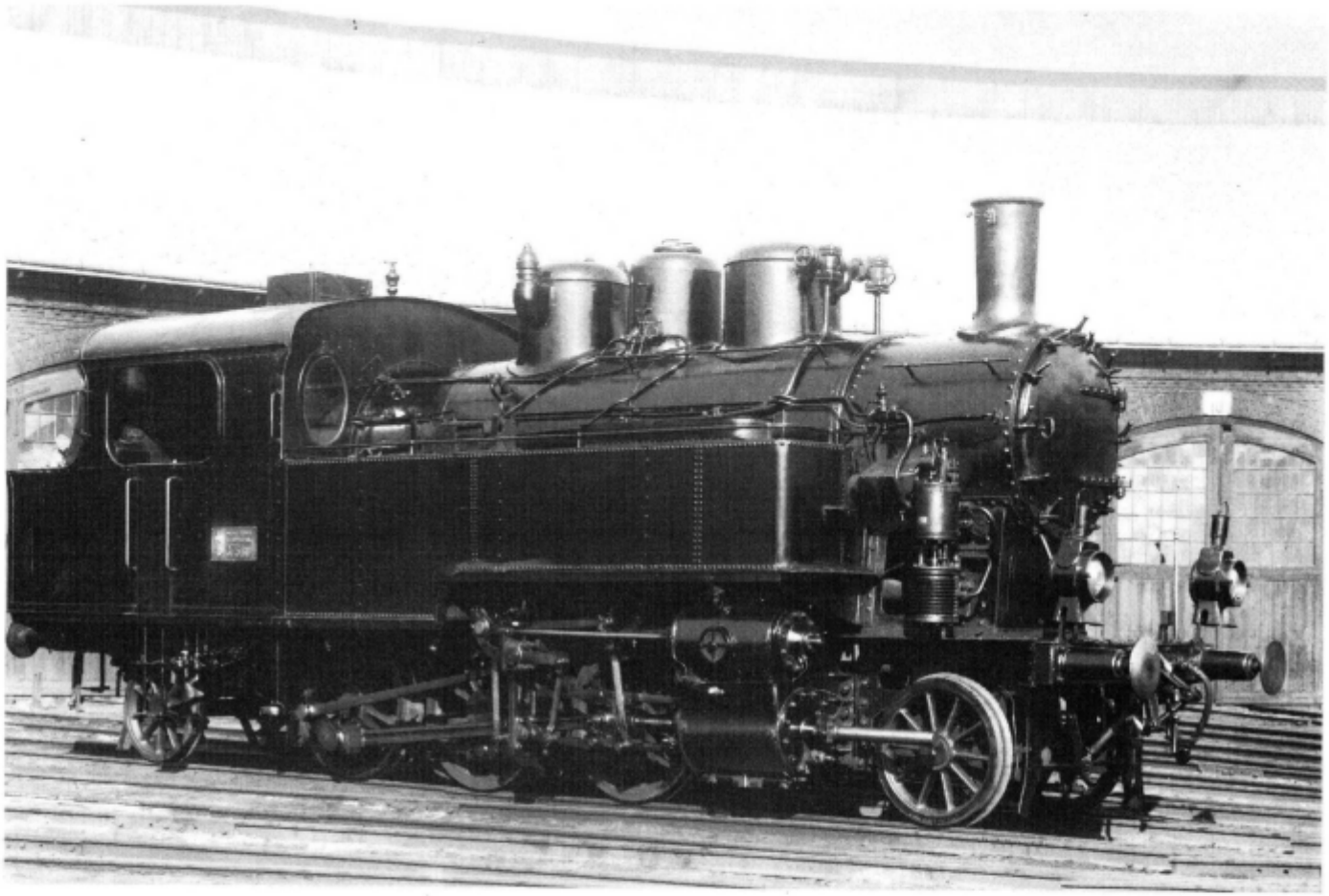
Main Data

Track gauge	0.760	m
Coupled wheel dia	0.600	m
Total wheel base	1.4	m
Cylinder dia	0.22	m
Piston stroke	0.3	m
Grate area	0.51	sq.m
Heating surface, total	19.6	sq.m
Steam pressure	12	bar
Locomotive running order weight	11.25	t
Adhesion weight	11.25	t
Coal supply	0.6	t
Water supply	1.2	cu.m
Length over buffers	5.262	m
Top speed	30	k.p.h.

Up to the early 1900's the majority of locomotives for the narrow lines of the MÁV had been imported from abroad. Recognizing the increase of demands MÁV Gépgyár (i.e. Engineering and Machine Works of MÁV) had manufactured a great number of narrow-gauge steam locomotives. The development in quantity of manufacture can be well characterized by the fact, that the built unit number of narrow-gauge locomotives was five times higher in the period of 1905-1912 than the deliveries within the interval of 1876 and 1905. The Class 399 locomotives had been constructed in 1906 and ran not only on the narrow-gauge network of MÁV but on the lines of various forestry Railways and industrial Railways, too.

Class 375 (Former: Class TV)

Wheel arrangement
(British coding) 2-6-2
(American coding) Prairie
Axle arrangement
(German coding) 1' C 1'
Steam superheated
Cylinders 2
Expansion simple



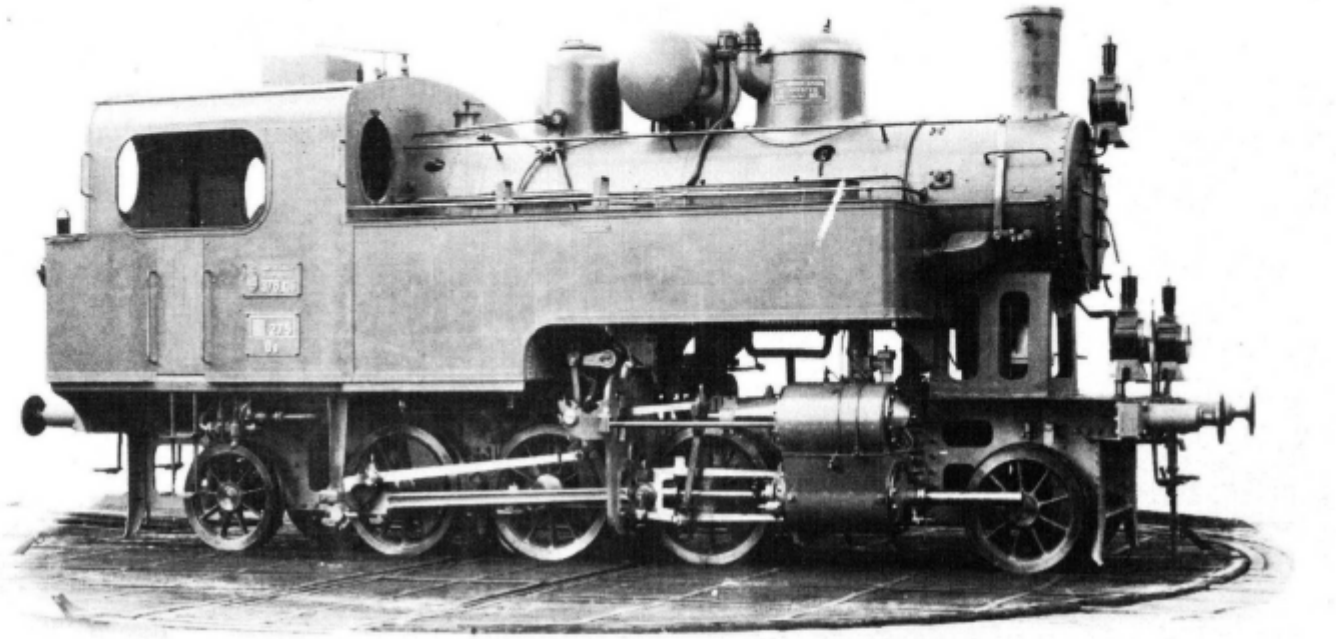
Main Data

Coupled wheel dia	1.180	m
Running wheel dia	0.950	m
Total wheel base	7.650	m
Cylinder dia	0.41	m
Piston stroke	0.600	m
Grate area	1.85	sq.m
Heating surface, total	105.38	sq.m
Superheated surface	20.2	sq.m
Steam pressure	12	bar
Locomotive running order weight	53.82	t
Adhesion weight	32.73	t
Coal supply	3.2	t
Water supply	5.6	cu.m
Length over buffers	10.930	m
Top speed	60	k.p.h.

The Class TV (later marked as Class 375) locomotive was one of the best proven branch-line tank locomotive of MÁV. This locomotive capable to haul stopping and goods trains had been built in various executions over the decades, for example with saturated steam, with compound machinery, with Brotan-Deffner type boiler, with twin machinery. The locomotives built originally with compound machinery and using saturated steam were rebuilt to twin cylinder machinery and had equipped with superheaters. The locomotive was capable to haul a 330 t trainload at a speed of 60 k.p.h. or a 630 t train at a speed of 40 k.p.h. on level track. 596 units had been manufactured in the period of 1907 and 1959 mostly on order of MÁV, but in 1927 30 units were purchased by JZD (i.e. Yugoslavian State Railways) from MÁVAG. In 1959 with the manufacture of a Class 375 locomotive which wore the nameplate 375.1032 terminated in Hungary the almost ninety years period of the manufacturing of steam locomotives.

Class 376 (Former: Class TVa)

Wheel arrangement
(British coding) 2-6-2
(American coding) Prairie
Axle arrangement
(German coding) 1' C 1'
Steam superheated
Cylinders 2
Expansion simple



Main Data

Coupled wheel dia	1.040	m
Running wheel dia	0.875	m
Total wheel base	6.530	m
Cylinder dia	0.37	m
Piston stroke	0.54	m
Grate area	1.6	sq.m
Heating surface, total	82.2	sq.m
Superheated surface	16.9	sq.m
Steam pressure	12	bar
Locomotive running order weight	45.9	t
Adhesion weight	27.8	t
Coal supply	1.6	t
Water supply	5	cu.m
Length over buffers	9.820	cu.m
Top speed	50	k.p.h.

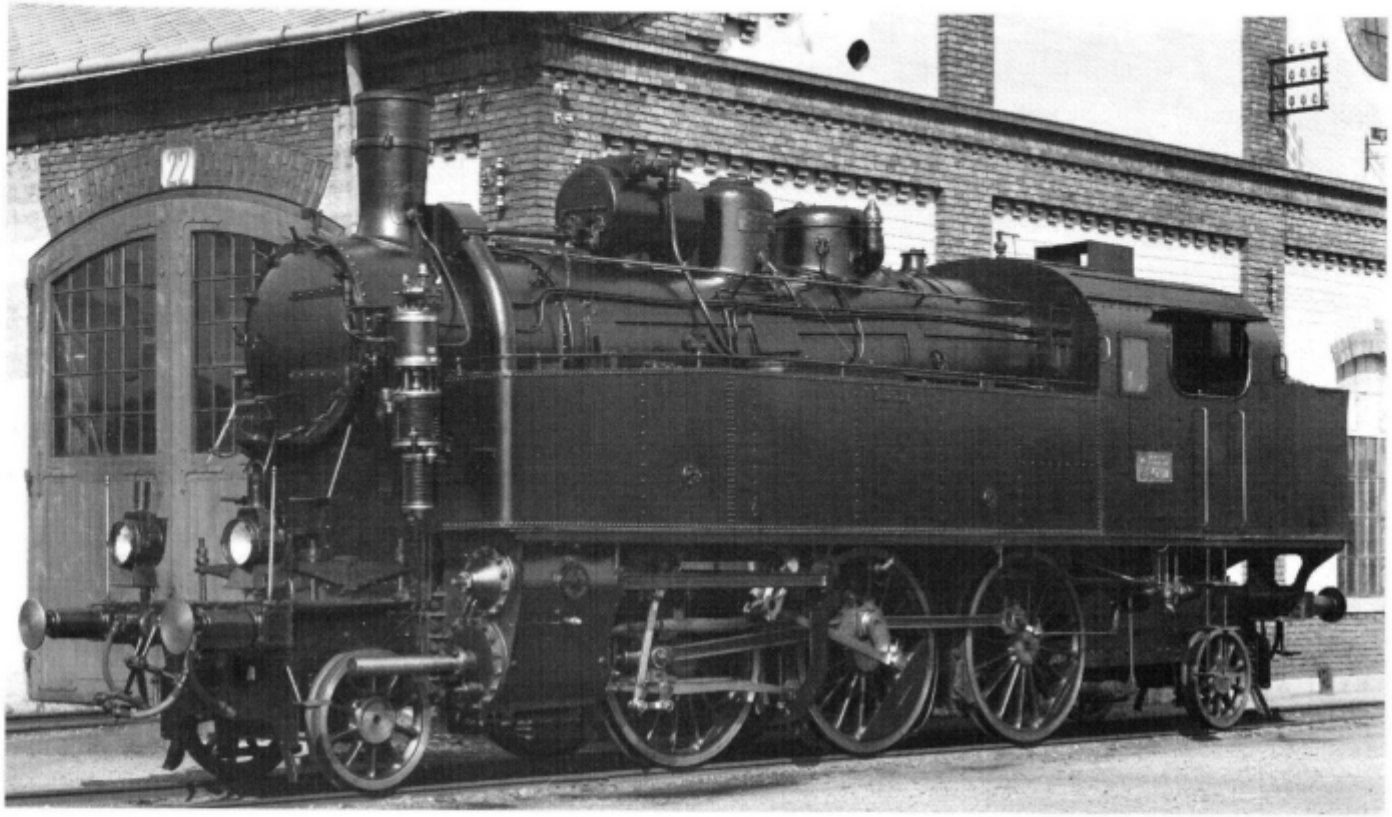
In the 1910's the permitted axle load was only 9 t on a significant part of the branch lines of MÁV. On these lines the traffic was maintained for a long time with Class 377 locomotives. The increasing hauling demands required the purchase of locomotives with improved performance. Although the Class 375 locomotives met transportation demands their axle loads exceeded the axle load limit of 9 t. Therefore MÁV were obliged to provide for such locomotives which were sufficient to maintain the traffic from point of view of the track, too. In 1910 had begun the manufacturing of the Class TVa (later marked as Class 376) tank-type locomotives. This engine differs from the Class TV (Class 375) locomotives first of all with her smaller sizes and weight as well as with her performance reduced by appr. 20 per cent. The Class 376 locomotives had been built in various constructional executions, such with compound machinery using saturated steam and with superheater and twin cylinder machinery. In the years of World War I bacause of shortage on copper the locomotives were manufactured with Brotan-Deffner type boilers. The Class 376 locomotives were capable to haul a trainload of 405 t at a speed of 50 k.p.h. while a trainload of 735 t at a speed of 30 k.p.h. on level track. A total of 319 units had been manufactured of this locomotive well proven in branch-line service.

Class 342

Wheel arrangement
(British coding) 2-6-2
(American coding) Prairie
Axle arrangement
(German coding) 1' C 1'
Steam superheated
Cylinders 2
Expansion simple

Main Data

Coupled wheel dia	1.606	m
Running wheel dia	0.950	m
Total wheel base	9.640	m
Cylinder dia	0.500	m
Piston stroke	0.650	m
Grate area	2.34	sq.m
Heating surface, total	157.4	sq.m
Superheated surface	38.8	sq.m
Steam pressure	13	bar
Locomotive running order weight	71	t
Adhesion weight	43.2	t
Coal supply	4.4	t
Water supply	7.5	cu.m
Length over buffers	12.944	m
Top speed	90	k.p.h.



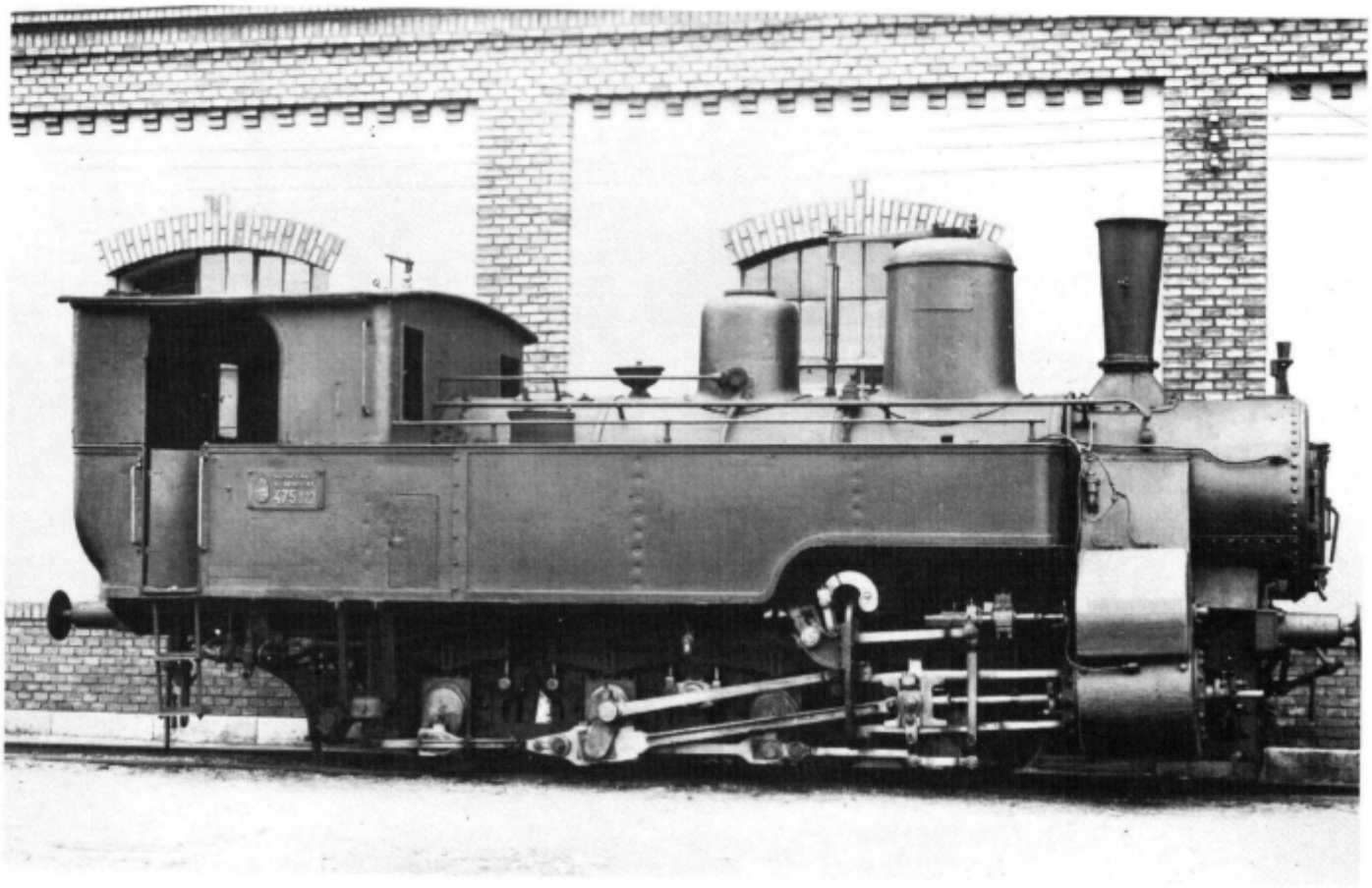
In the middle of the 1910's the purchase of steam locomotives of higher capacity than the earlier ones were required for the updating of the commuter traffic of Budapest. The use of tank- type locomotives seemed to be practical on the shorter line sections which were able to run at the same permitted speed in both travel directions. The Class 342 steam locomotives had been constructed to meet this task of transportation. 143 units of this Class were built in the interval between 1915-1919 by MÁV Gépgyár (Engineering and Machine Works of MÁV) and simultaneously 153 units were manufactured by the Henschel Works in Germany. These locomotives were capable to haul 300-400 t trainloads of stopping trains at a speed of 60-70 k.p.h. on level track. With the exception of the first-built two units which wore the nameplates 342,001 and 342,002 because of the shortage on copper caused by the war conditions all of the Class 342 locomotives had been built with boilers of system Brotan-Deffner. Because of the insufficient boiler capacity relative to the swept volume of the steam cylinders the boiler pressure was slightly unstable. The well-proven running gear of these locomotives, which was characterized by the aligning running wheels of system Adams-Webb both at front and rear, permitted the increasing of their top speed up to 90 k.p.h. rated originally to 85 k.p.h.

Class 475
(Former: Class XIVa)

Wheel arrangement
(British coding) 0-8-0
(American coding) 8-wheel switcher
Axle arrangement
(German coding) D
Steam saturated
Cylinders 2
Expansion compound

Main Data

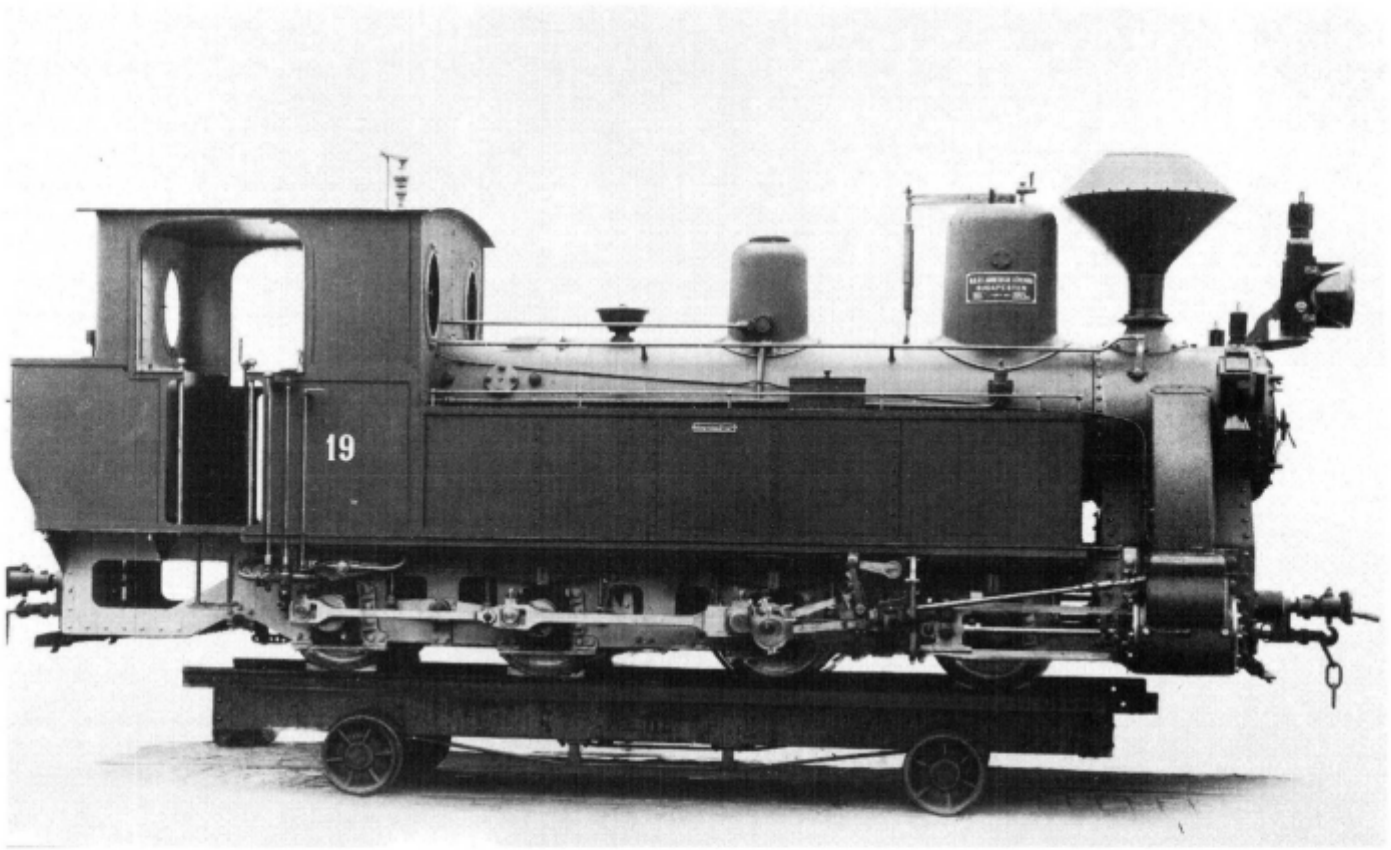
Coupled wheel dia	0.950	m
Running wheel dia	–	
Total wheel base	3.350	m
Cylinder dia (high/low pressure)	0.42/0.60	m
Piston stroke	0.46	m
Grate area	1.9	sq.m
Heating surface, total	97	sq.m
Steam pressure	12	bar
Locomotive running order weight	40.2	t
Adhesion weight	40.25	t
Coal supply	1.2	t
Water supply	4.3	cu.m
Length over buffers	8.860	m
Top speed	40	k.p.h.



By the end of the past century because of the increase of the traffic the performance of the Class XII (later marked as Class 377) locomotives having three coupled wheels got insufficient on branch lines with gradients of 1.6-2.5 per cent. On some lines hauling of trains were possible only with double heading traction. A locomotive with four coupled wheels was required to meet demands of the mixed as well as goods train traffic. The Class XIVa (later marked as Class 475) locomotives had been constructed to meet these tasks of transportation. To improve the performance, the boiler of this locomotive constructed with compound machinery was almost of twice higher capacity than that of the Class 377. The coupled wheel dia being 0.95 m met requirements both for low speed as well as high tractive effort. The hauling capacity of this locomotive was characterized by trainloads of 255 t and 98 t which could be hauled on gradients of 1.0 per cent and 2.5 per cent, respectively. A total of 40 units had been manufactured with MÁV Gépgyár (Engineering and Machine Works of MÁV) in the period of 1896-1901.

Class 490
(Former: Class XXIc)

Wheel arrangement
(British coding) 0-8-0
(American coding) 8-wheel switcher
Axle arrangement
(German coding) D
Steam saturated
Cylinders 2
Expansion simple



Main Data

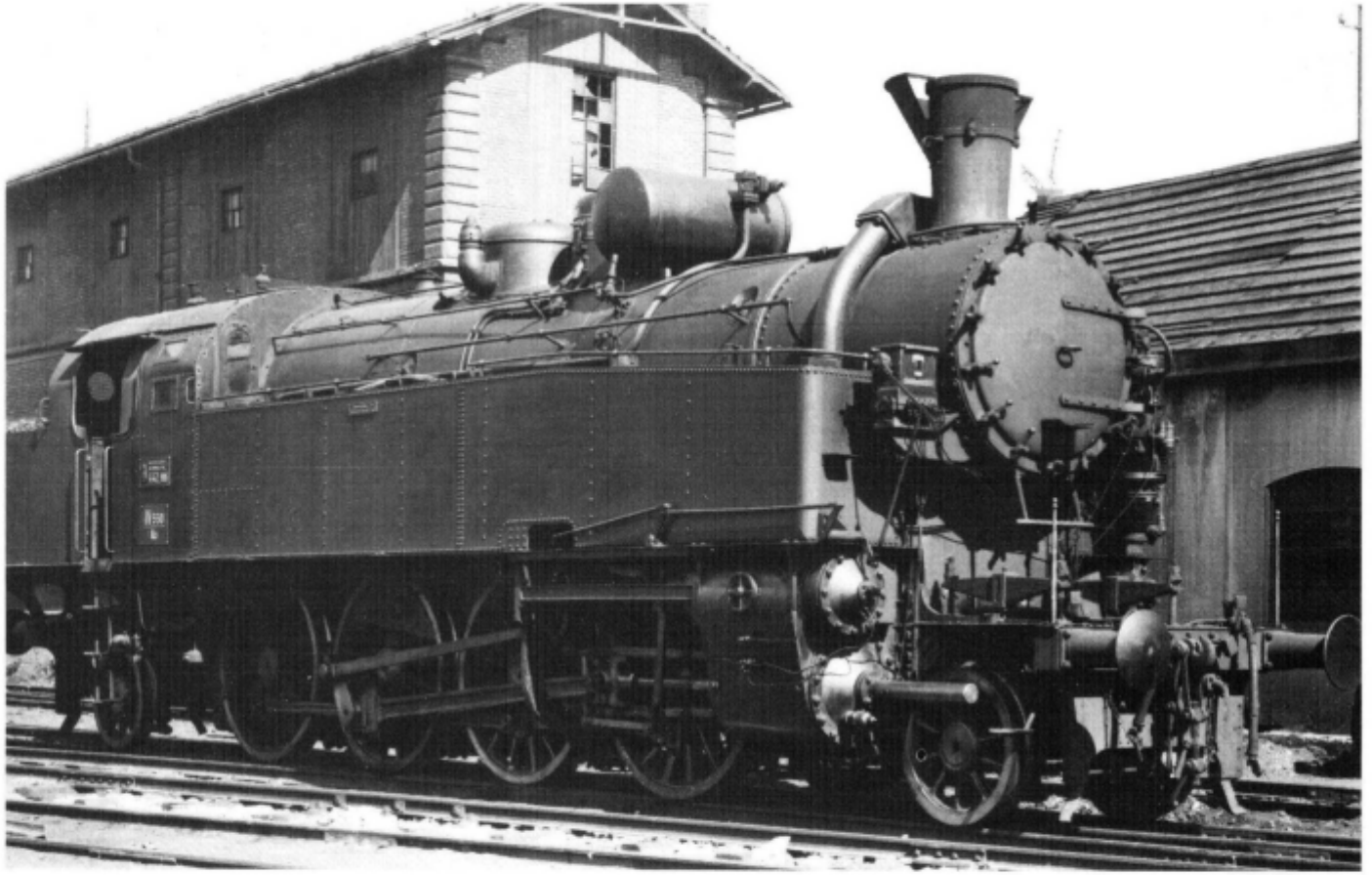
Track gauge	0.760	m
Coupled wheel dia	0.750	m
Total wheel base	3.350	m
Cylinder dia	0.325	m
Piston stroke	0.350	m
Grate area	1.04	sq.m
Heating surface, total	48	sq.m
Steam pressure	14	bar
Locomotive running order weight	22	t
Adhesion weight	22	t
Coal supply	0.8	t
Water supply	2	cu.m
Length over buffers	7.375	m
Top speed	30	k.p.h.

The Class 490 locomotive was one of the highest powered and most up-to-date engine not only at the MÁV but at all of the home narrow-gauge Railways. The first unit had been built in 1906. To negotiate easier sharp curves she was designed with wheel guidance of System Klien-Lindner. The run of the locomotive caused by small guided length was not smooth enough. The locomotives had been manufactured in various executions and in the course of time a number of their constructional parts were updated.

Thus, for example the units of newer series were controlled by Walschaert- (Heusinger-) type link motion instead of the Stephenson-type valve gear used at the older ones. Some locomotives were equipped with air brake, too. The Class 490 engine was capable to haul a 210 t trainload at a speed of 25 k.p.h. on level track. A total of 142 units had been manufactured in the interval between 1906 and 1950 for MÁV furthermore for the home and foreign farm railways, logging railways and industrial railways.

Class 442

Wheel arrangement
(British coding) 2-8-2
(American coding) „Mikado"
Axle arrangement
(German coding) 1' D 1'
Steam superheated
Cylinders 2
Expansion simple



Main Data

Coupled wheel dia	1.606	m
Running wheel dia	0.950	m
Total wheel base	10.700	m
Cylinder dia	0.570	m
Piston stroke	0.650	m
Grate area	2.77	sq.m
Heating surface, total	166.25	sq.m
Superheated	31.05	sq.m
Steam pressure	12	bar
Locomotive running order weight	86	t
Adhesion weight	57.8	t
Coal supply	5	t
Water supply	8	cu.m
Length over buffers	14.264	m
Top speed	85	k.p.h.

In the 2nd half of the 1910's the load of the commuter trains running between Budapest and Gödöllő increased to 420-470 ton. The Class 342 locomotives were already not sufficient to haul these trains, especially on the track section having gradients of 0.7-0.8 per cent. To cover these demands the purchase of the Class 442 locomotives began in 1917 from the MÁV Gépgyár (Engineering and Machine Works of MÁV). The engines were built with boilers of System Brotan-Deffner. The proper alignment of the leading and trailing wheels into sharp curves was ensured by the wheel guidance adapted (System Adams-Webb). The hauling capacity of this locomotive was a 600 t trainload on level track or a 530 t train on upgrades of 0.7 per cent, both at a speed of 60 k.p.h. The total of the manufactured units between the years 1917 and 1922 amounted to 30.

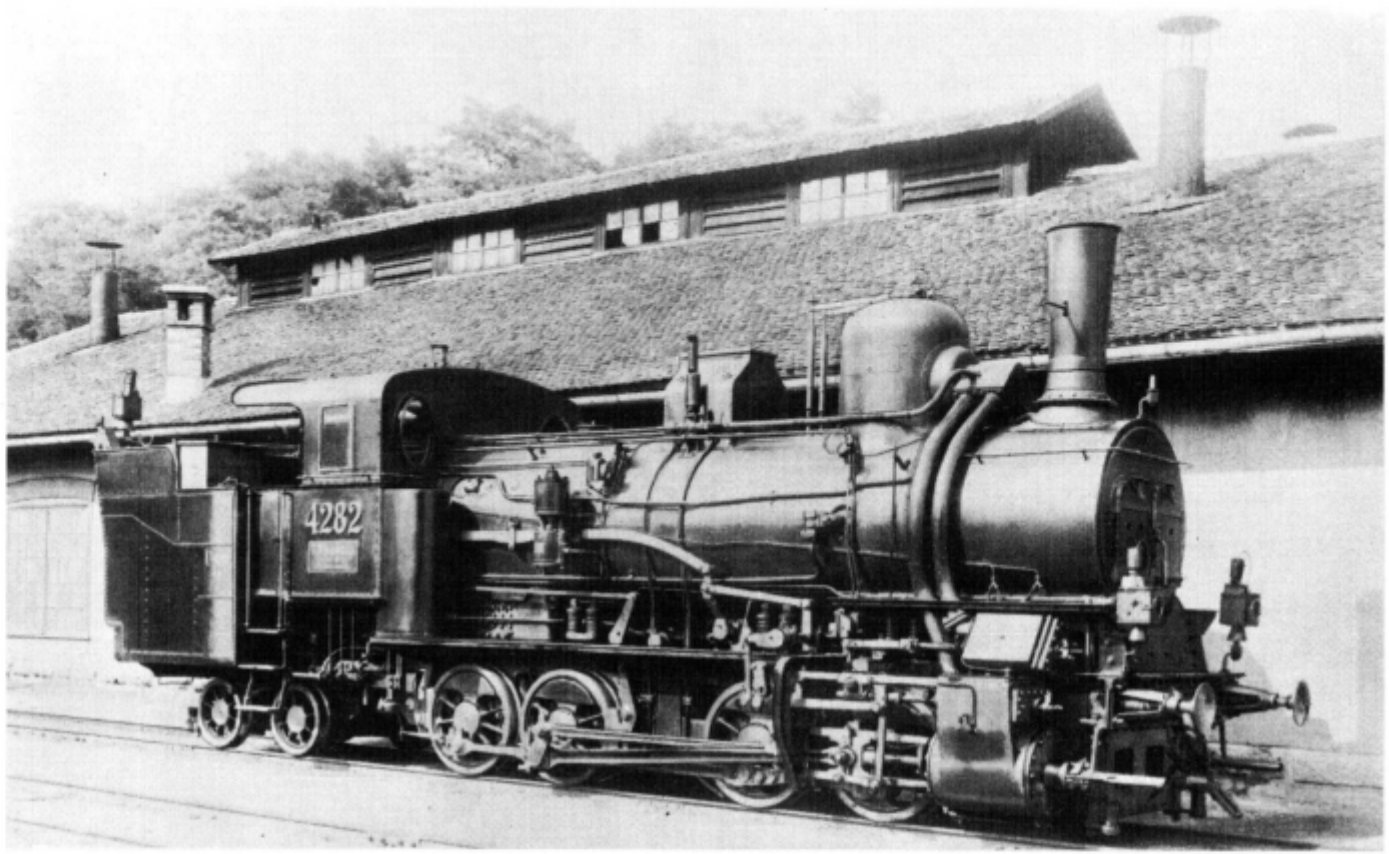
Class 41 (Former: Class TIVb)

Wheel arrangement
(British coding) 0-8-2
(American coding) –
Axle arrangement
(German coding) D 2
Steam saturated
Cylinders 2 + 2
Expansion simple

Main Data

Coupled wheel dia	1.050	m
Running wheel dia	0.750	m
Total wheel base	7.900	m
Machinery for adhesion drive		
cylinder dia	0.500	m
piston stroke	0.500	m
Machinery for rack drive		
cylinder dia	0.420	m
piston stroke	0.450	m
Grate area	2.4	sq.m
Heating surface, total	165.8	sq.m
Steam pressure	12	bar
Running order weight	71.9	t
Adhesion weight	53.5	t
Coal supply*	3.2	cu.m
Water supply	7.2	cu.m
Length over buffers	11.739	m
Top speed		
on adhesion section	25	k.p.h.
on rack section	12	k.p.h.

* capacity of the coal tank

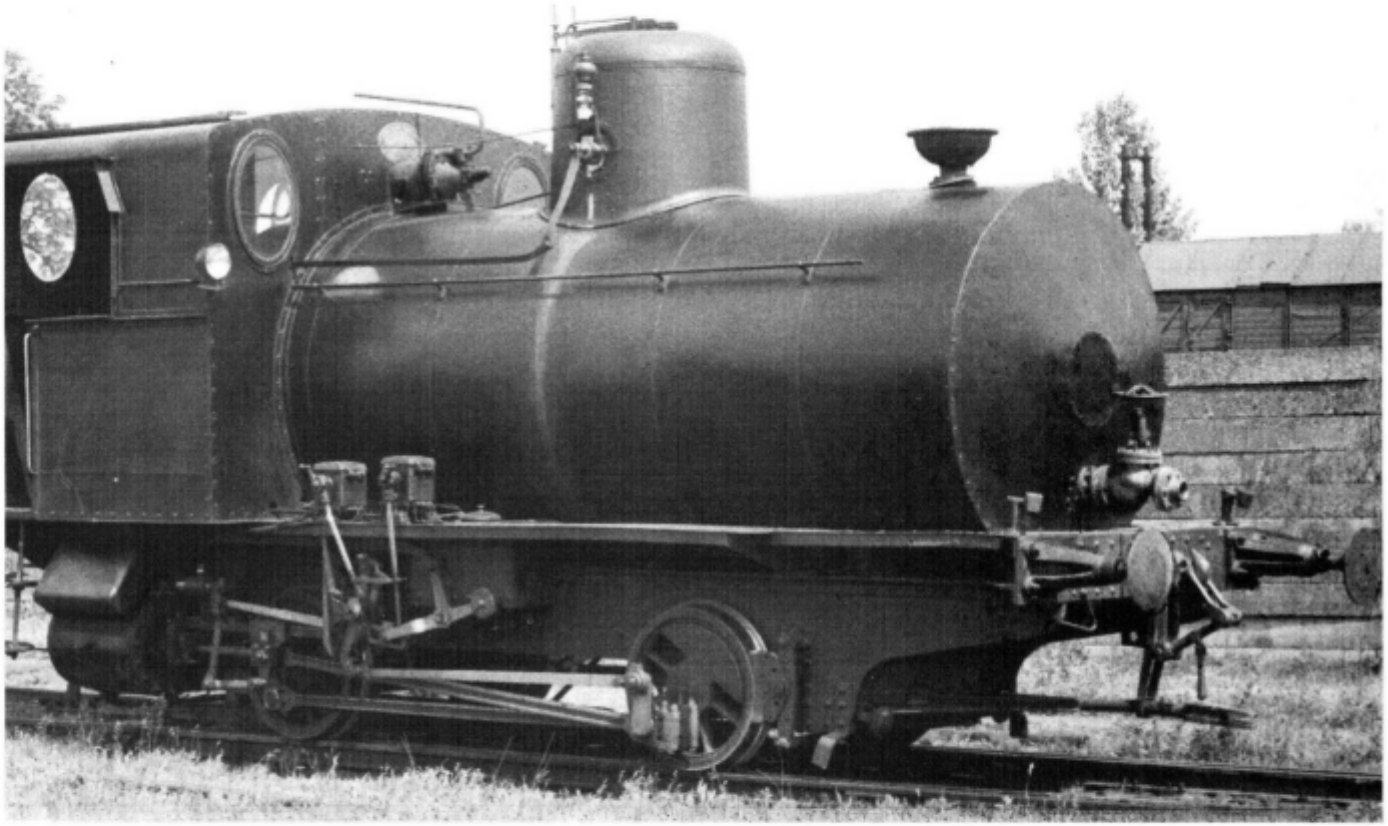


The track section between Erdőköz and Gömörvég of the 42 km long line of the Zólyombrézó-Tiszolc-i Helyiérdekű Vasút (i.e. Local Railways between Zólyombrézó and Tiszolc, nowadays on the territory of Slovakia) had to be constructed with an upgrade of 5.0 per cent because of the terrain features. The 6 km long track section with a gradient of 5.0 per cent had been constructed as an Abt-system rack railway. To maintain the traffic of this line MÁV placed an order with the locomotive works of Floridsdorf, Austria to deliver 4 units of rack and adhesion locomotive. These locomotives were capable to haul trains not only on the rack section but on the connecting adhesion track sections, too. The Class TIVb (later marked as Class 41) locomotives were equipped with two machineries which could work independent of each other. With the machinery arranged outside the frame tractive effort was exerted in adhesion service while the other machinery arranged inside the frame could have been operated on rack section only. In normal operation (on the adhesion section) the locomotive could be braked either by means of an air brake or by hand brake. In downhill run on rack sections the inside machinery was used for braking by compressing air in its steam cylinders. This locomotive was capable to haul a trainload of 129 t on the gradient of 5.0 per cent. Four units of this type had been manufactured between 1896 and 1900.

STEAM ACCUMULATOR LOCOMOTIVE

Class 91

Wheel arrangement
(British coding) 0-4-0
(American coding) 4-wheel switcher
Axle arrangement
(German coding) B
Steam saturated
Cylinders 2
Expansion simple

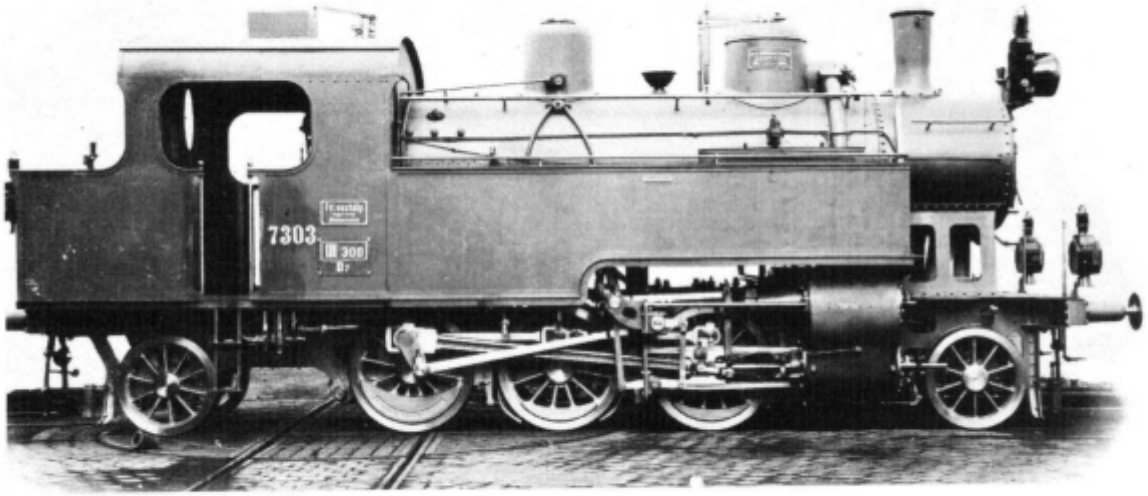


Main Data

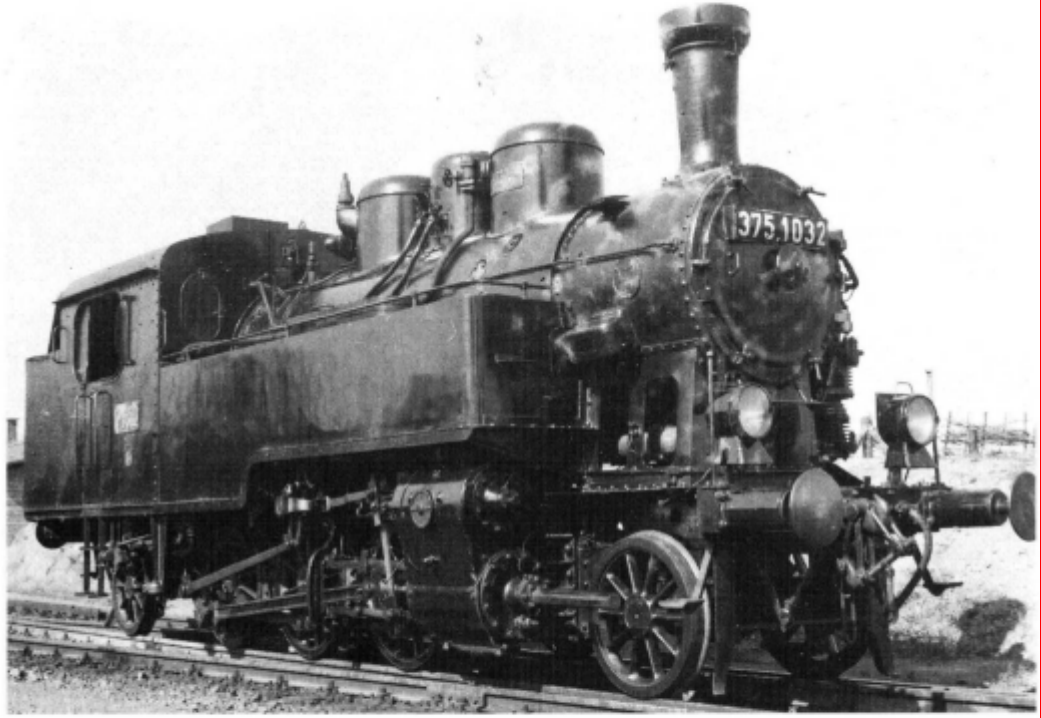
Coupled wheel dia	0.800	m
Wheel base	2.600	m
Cylinder dia	0.450	m
Piston stroke	0.400	m
Steam pressure	12	bar
Running order weight	25.5	t
Adhesion weight	25.5	t
Length over buffers	7.600	m
Top speed	25	k.p.h.

MÁV purchased the Class 91 fireless steam locomotive to maintain the internal shunting service of their fire-hazardous plants and shops. These locomotives had been manufactured with the Austrian works of Krauss in 1915. The heat insulated boiler of this locomotive was filled up with pressurized hot water and she could operate by the use of the steam discharging from the hot water for 3-4 hours. The hot water capacity of the locomotive boiler was 8.5 cu.m.

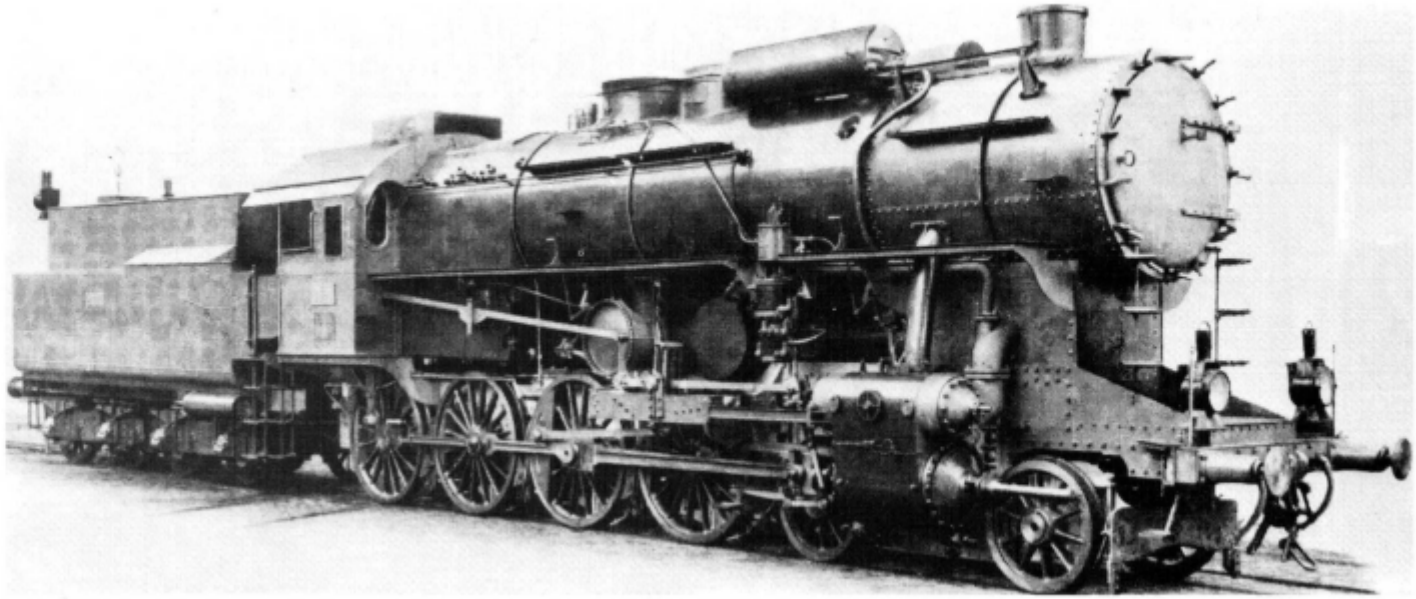
This locomotive was of extraordinary simple mechanical construction and operation, her expediency is demonstrated by the fact that one unit of them is still working. As a matter of curiosity can mentioned, that under the disturbed conditions after finishing World War II the Class 91 fireless locomotive of the MÁV-owned wood impregnating work at Dombóvár hauled from time to time local trains, too.



The original construction of the Class 375 locomotive



The final construction of the Class 375 locomotive

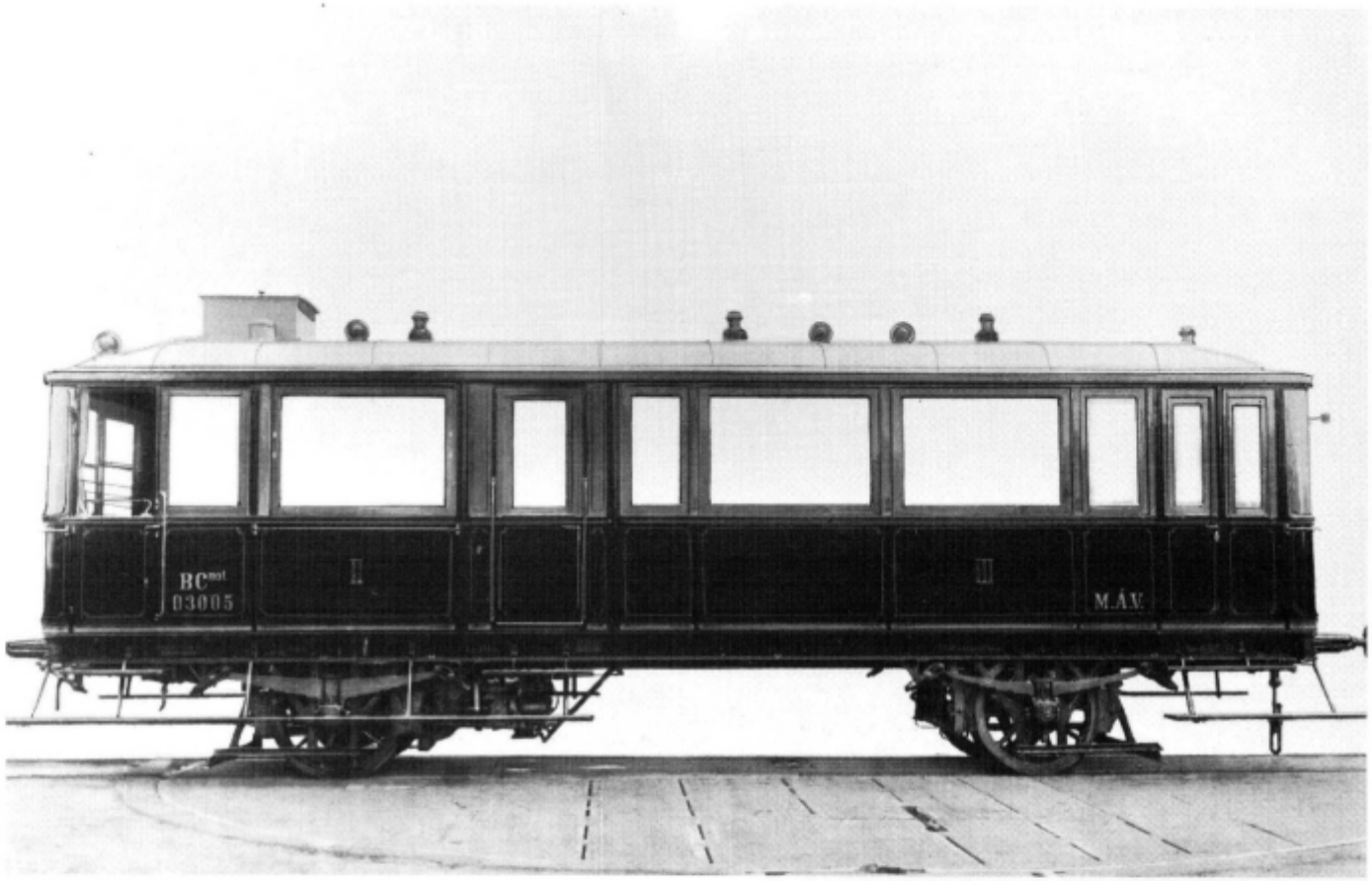


The original construction of the Class 424 locomotive

The final construction of the Class 424 locomotive (oil burner version)

Class BC^{mot}

Nameplate No-s:
03001-03002 and 03004-03005



Main Data

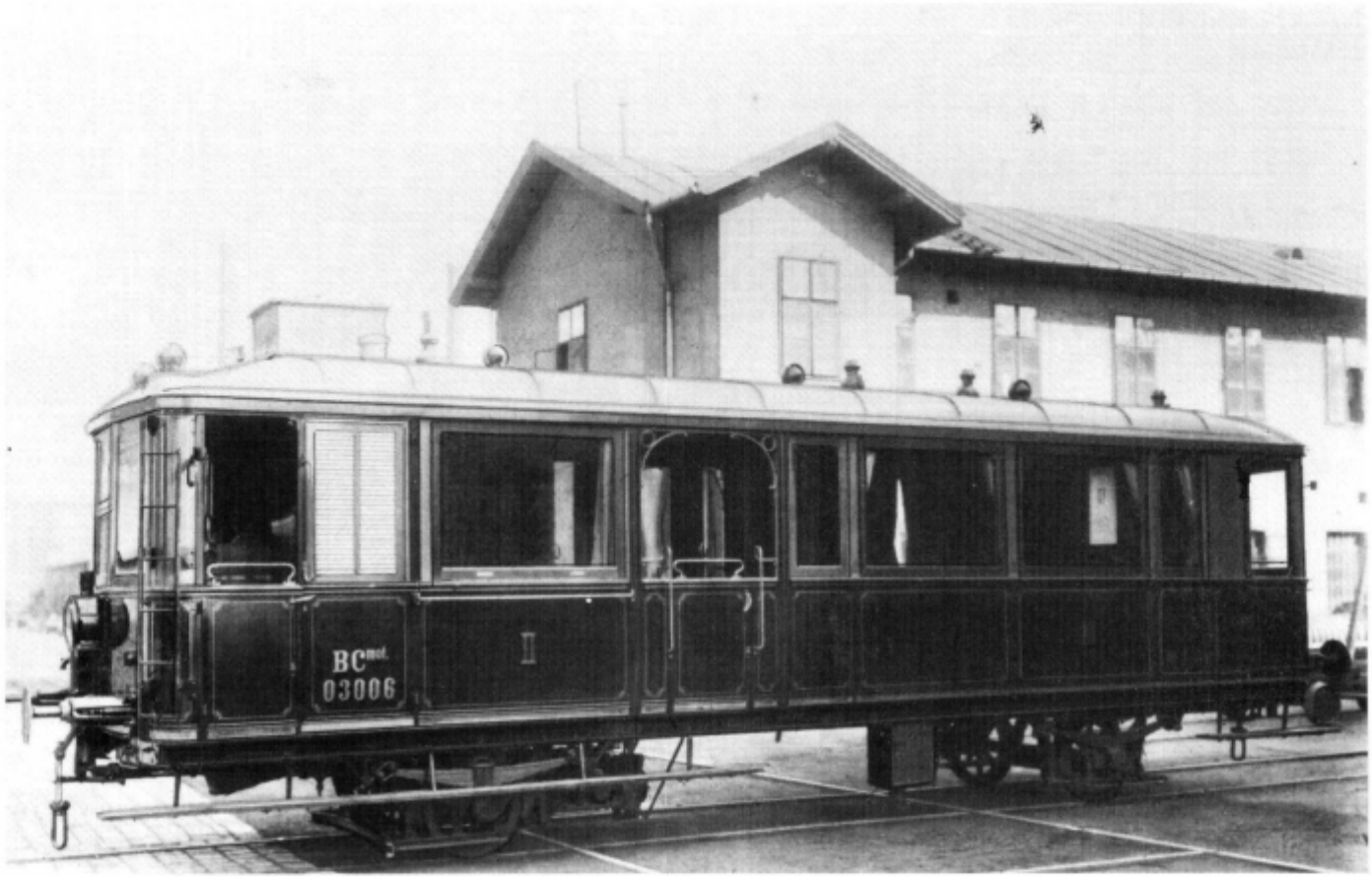
Output of steam engine	26	kW
System	de Dion-Bouton	
Steam pressure	18	bar
Wheel arrangement	(British coding) 0-2-2	
Axle arrangement	(German coding) A 1	
Wheel dia	1.008	m
Wheel base	5.500	m
Lenght over buffers	10.950	m
Running order weight	14.5	t
Top speed	45	k.p.h.
Seats:		
2nd class	9	
3rd class	24	

The first steam engine powered railcars in Hungary were commissioned by the private Railways. In 1902 began the steam powered railcar service at the Arad-Csanádi Egyesült Vasutak (i.e. United Railways of Arad-Csanád, ACSEV). In 1903 the State Sectretary of Commerce and Transportation of the time performed a test run travel by the steam-engine powered railcar of ACSEV. After the visitation of the Secretary MÁV placed an order with the Ganz works to deliver 3 units of steam-powered railcars. Two of them, the Class VIIa (later marked as Class BC^{mot}) railcars wore the nameplates 03001 and 03002 (later renumbered to 06101 and 06102) had been completed in 1903. The regular steam-engine powered railcar service on the lines of MÁV started with these railcars. The mentioned first railcars maintained a traffic between Debrecen and Tiszalök resp. Nyíregyháza and Tiszapolgár. At early 1904 delivered Ganz on order of the Kaba-Nádudvari Helyiérdekű Vasutak (i.e. local Railways of Kaba-Nádudvar) the Class BC^{mot} steam engine powered railcars that wore the nameplates 03004 and 03005 (the nameplate No-s had been changed later to 06104 and 06105, respectively).

STEAM ENGINE POWERED RAILCAR

Class BC^{mot}

Nameplate No-s: 03006-03008



Main Data

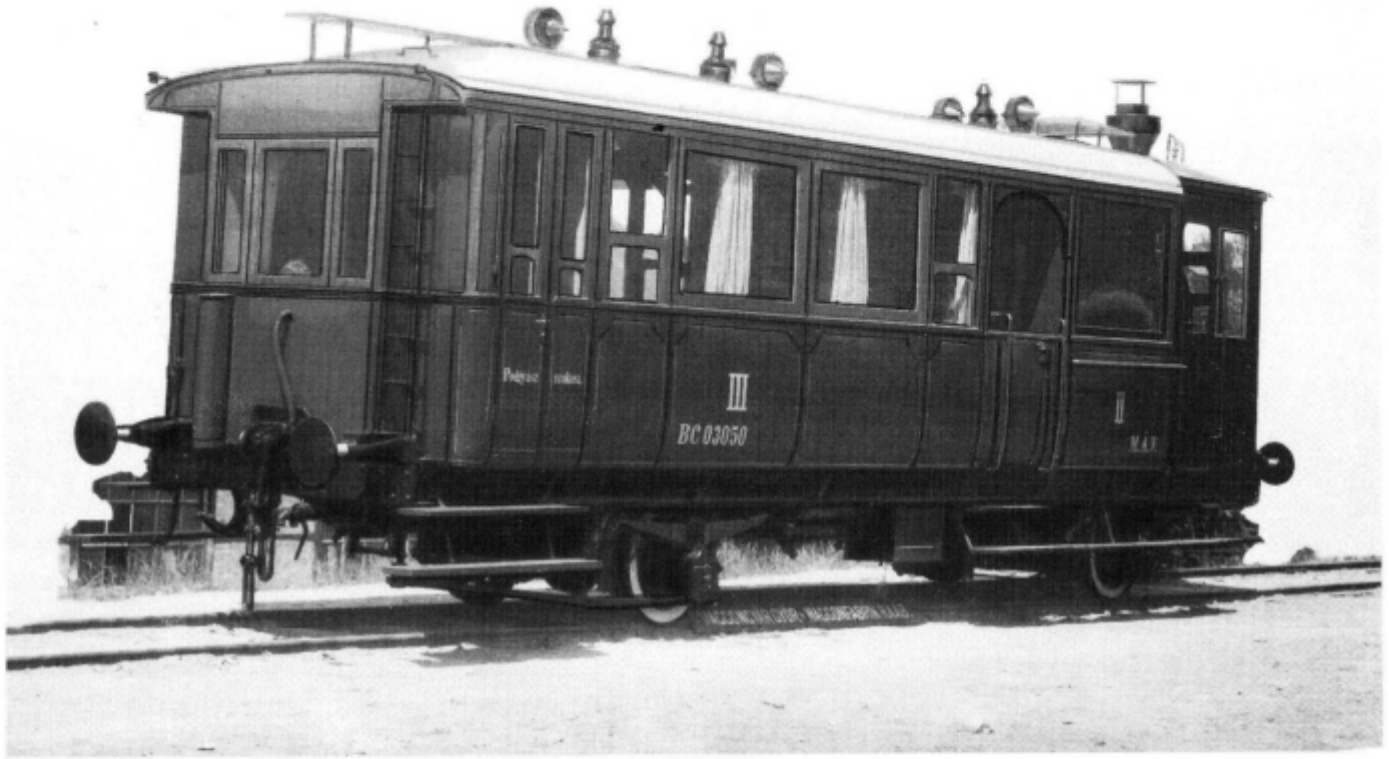
Output of steam engine	37 kW	
System	de Dion-Bouton	
Steam pressure	13	bar
Wheel arrangement	(British coding) 0-2-2	
Axle arrangement	(German coding) A 1	
Wheel dia	1.008	m
Wheel base	5.500	m
Length over buffers	10.950	m
Running order weight	13.8	t
Top speed	50	k.p.h.
Seats:		
2nd class	9	
3rd class	24	

MÁV commissioned in 1904 further Ganz-made steam railcars. The Class VIIc railcars that wore the nameplates BC^{mot} 03006-BC^{mot} 03008 (later the numbers had been changed to 06121-06123) were higher powered than the Class VIIa ones. The steam generators of the mentioned railcar classes were identical, but the output of the steam engine was increased to 37 kW. At front of the railcar was arranged the machine room, here were accomodated the steam generator, the control devices for driving of the railcar, the coal box as well as the water storage tanks. Behind the machine room was arranged the 2nd class saloon followed by a vestibule, further by a 3rd class saloon and on the rear end of the car there was a vestibule, too. These railcars maintained the passenger traffic of the branch lines, too.

STEAM ENGINE POWERED RAILCAR

Class BC^{mot}

Nameplate No. 03050



Main Data

Output of steam engine	29	kW
System	Stoltz	
Steam pressure	50	bar
Wheel arrangement (British coding)	0-2-2	
Axle arrangement (German coding)	A 1	
Wheel dia	1.008	m
Wheel base	5.500	m
Length over buffers	11.230	m
Running order weight	14.3	t
Top speed	45	k.p.h.
Seats:		
2nd class	9	
3rd class	24	

At the beginning of this century the Magyar Waggon- és Gépgyár at Győr (i.e. Hungarian Wagon and Machine Works, Mechanical Engineers, the foregoer of the RÁBA Works) had manufactured steam engine powered railcars, too. The railcar wore the nameplate BC^{mot} 03050 (later marked as BC^{mot} 06501) manufactured at Győr and delivered to MÁV for demonstration purposes was equipped with a machinery of System Stoltz. The steam generator constructed by the German designer Stoltz exerting his activity in Berlin was a vertical flue-tube boiler equipped with superheater. This boiler was capable of producing steam of 50 bar pressure in 23 minutes from the starting-up.

The System Stoltz steam engine was a 2-cylinder compound engine similar to the Ganz-made steam engines of the System De Dion-Bouton. This steam engine drove the wheels of the railcar by means of a two-step gear drive of constant gear ratio. Magyar Waggon- és Gépgyár delivered in the years 1905 and 1906 13 units of steam engine powered railcars having an output of 29 kW for MÁV, equipped with System Stoltz machinery manufactured by themselves. The main dimensions of these railcars were equal to that of the so-called „standardized" railcars of the Ganz Works.

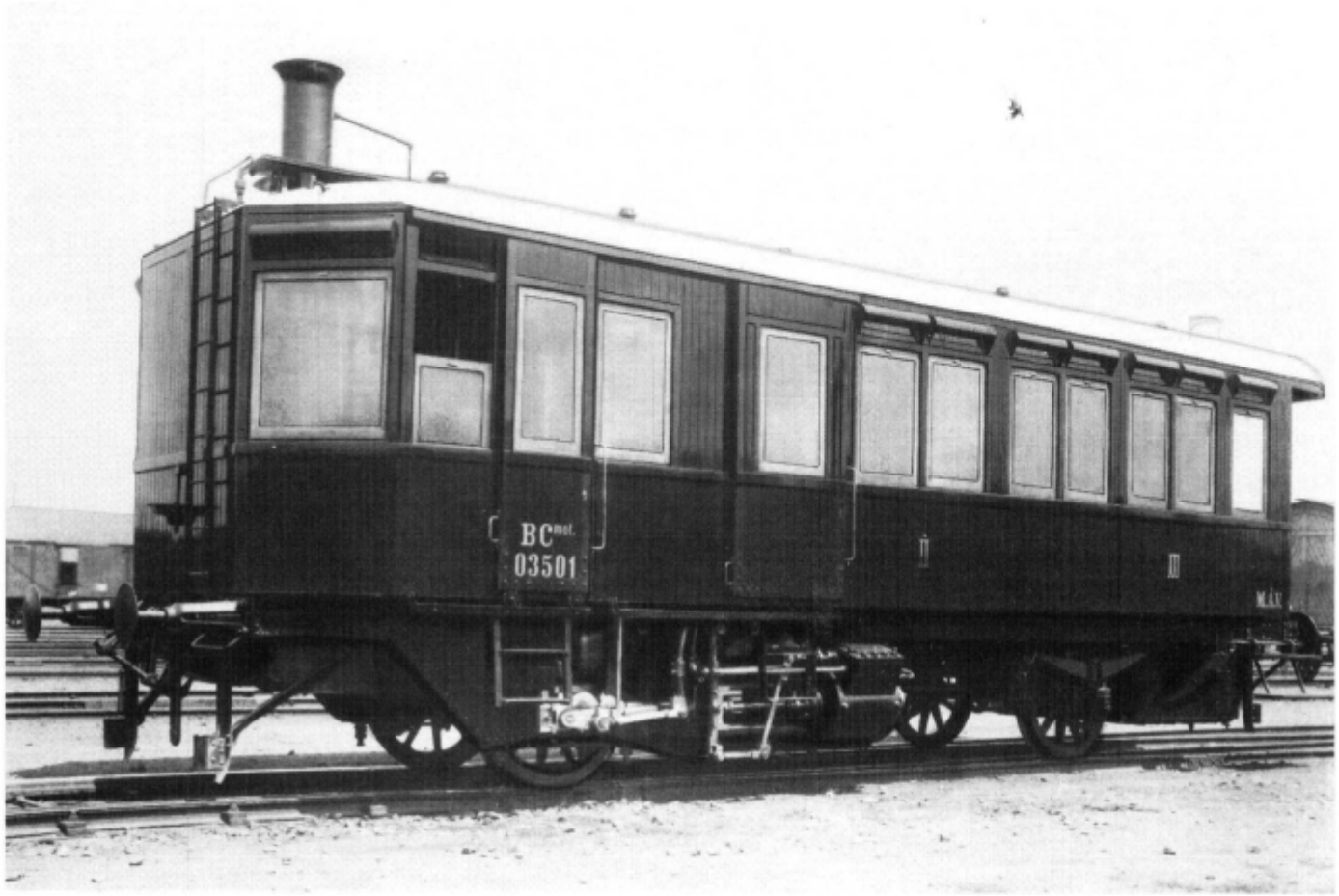
STEAM ENGINE POWERED RAILCAR

Class BC^{mot}

Nameplate No. 03501

Main Data

Output of steam engine	110	kW
System	Komarek	
Steam pressure	25	bar
Wheel arrangement	(British coding) 0-2-2	
Axle arrangement	(German coding) A 1	
Wheel dia	1.000	m
Wheel base	5.000	m
Length over buffers	11.000	m
Running order weight	25.5	t
Top speed	45	k.p.h.
Seats:		
2nd class	10	
3rd class	22	

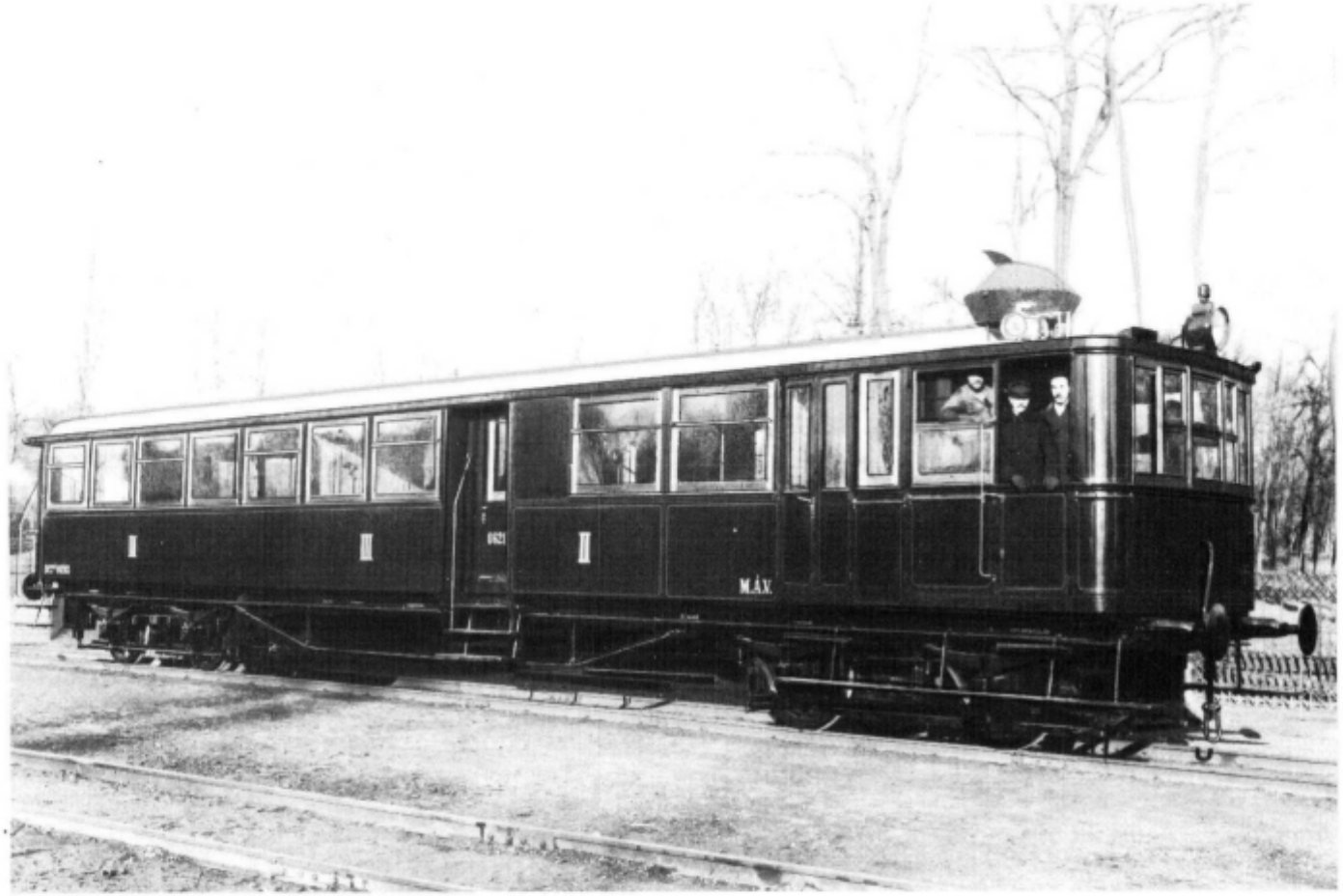


To perform a comparative test with the home-made steam engine powered railcars MÁV placed an order with the Vienna works of the Austrian designer Komarek in 1903 to deliver a steam railcar. The steam railcar wore the nameplate BC^{mot} 03501 (later marked as BC^{mot} 06701) was equipped with superheated steam producing boiler and her machinery corresponded to that of the traditional machinery of steam locomotives. The boiler was accomodated at the front of the railcar between the two longitudinals of the main frame, while the both steam cylinders, the coupling rod drive as well as the valve gear were placed on the sheet frame built together with the underframe of the railcar. The axle load of the steam railcar commissioned in 1904 proved to be too high for the branch lines of MÁV therefore a pair of additonal running wheels were subsequently applied in front of the driven wheels. The classification test run of the Komarek-type steam railcar was held on the line between Budapest and Hatvan. A trainload of 70 t was hauled by the railcar on a gradient of 0.7 per cent between Aszód and Gödöllő at a speed of 45 k.p.h.

STEAM ENGINE POWERED RAILCAR

Class BCa^{mot}

Nameplate No-s: 06201-06207



Main Data

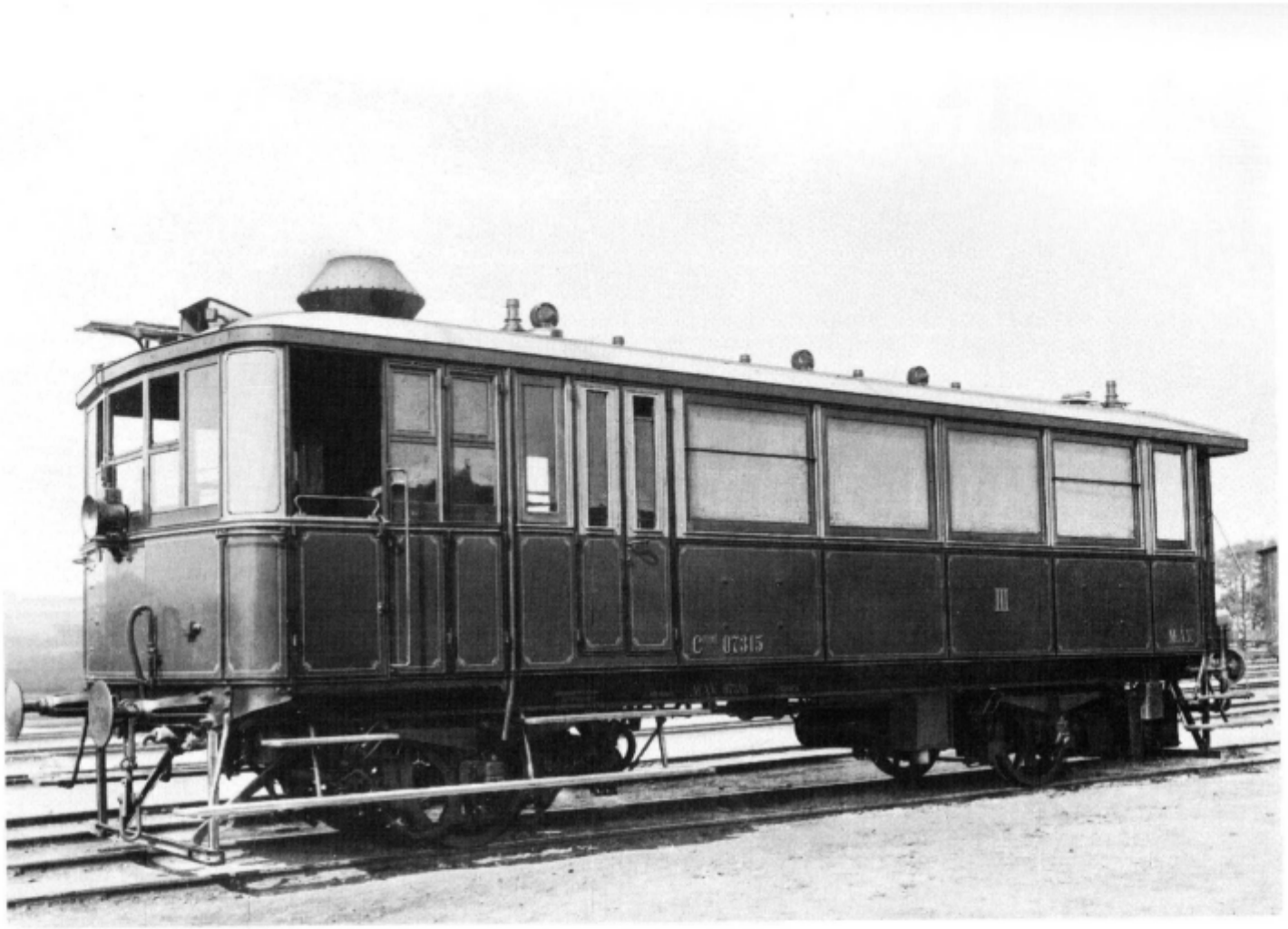
Output of steam engine	59	kW
System	Ganz-de Dion-Bouton	
Steam pressure	18	bar
Wheel arrangement	(British coding) 2-2-4	
Axle arrangement	(German codint) 1A' 2'	
Wheel dia	1.020	m
Wheel base bogie/total	2.200/12.750	m
Length over buffers	19.610	m
Running order weight	35.9	t
Maximum axle load	9.6	t
Top speed	45	k.p.h.
Seats:		
2nd class	20	
3rd class	76	

The Class BCa^{mot} steam railcars built in 1907 were remarkable among the home-made ones by their appearance. These were manufactured by Ganz works for the Siófok-Mocsoládi Helyiérdekű Vasutak Részvénytársaság (i.e. joint stock railway company of the local railways Siófok-Mocsolád) being under direction of MÁV. In spite of their dimensions and layout similar to that of the mainline railway coaches these railcars maintained the passenger traffic on the second rank branch-line between Siófok and Kaposvár at a speed of 45 k.p.h. permitted for this track section. This steam railcar was the sole among the types purchased by MÁV before the World War I, the units of which worked in the post-war period in a service complying with the original destination. Four units maintained traffic until 1934 from the seven steam railcars stationed at the Kaposvár locomotive shed; they were withdrawn from service in 1935.

STEAM ENGINE POWERED RAILCAR

Class C^{mot}

Nameplate No-s: 07315-07316



Main Data

Output of steam engine	37	kW
System	de Dion-Bouton	
Steam pressure	18	bar
Wheel arrangement	(British coding) 0-2-2	
Axle arrangement	(German coding) A 1	
Wheel dia	1.020	m
Wheel base	6.000	m
Lenght over buffers	11.650	m
Running order weight	17.2	t
Top speed	50	k.p.h.
Seats:		
2nd class	–	
3rd class	40	

In 1906 2 units of steam railcars were manufactured for the Orosháza-Szentes-Csongrádi Helyiérdekű Vasutak (i.e. Local Railways of Orosháza-Szentes-Csongrád) in the Ganz works. The Class VIIIf railcars wore the nameplates C^{mot} 07315 and Cmot 07316 were stationed at first at Orosháza but later at Cegléd. In 1908 one additional railcar of the same design was commissioned. Ganz had built this railcar in 1905 for stock and she came finally in 1913 to the fleet of MÁV after a 5 years period of being leased to MÁV and got the nameplate of C^{mot} 07317. In the early 1920's these steam railcars had been rebuilt to guards van by removing the boiler and machinery.