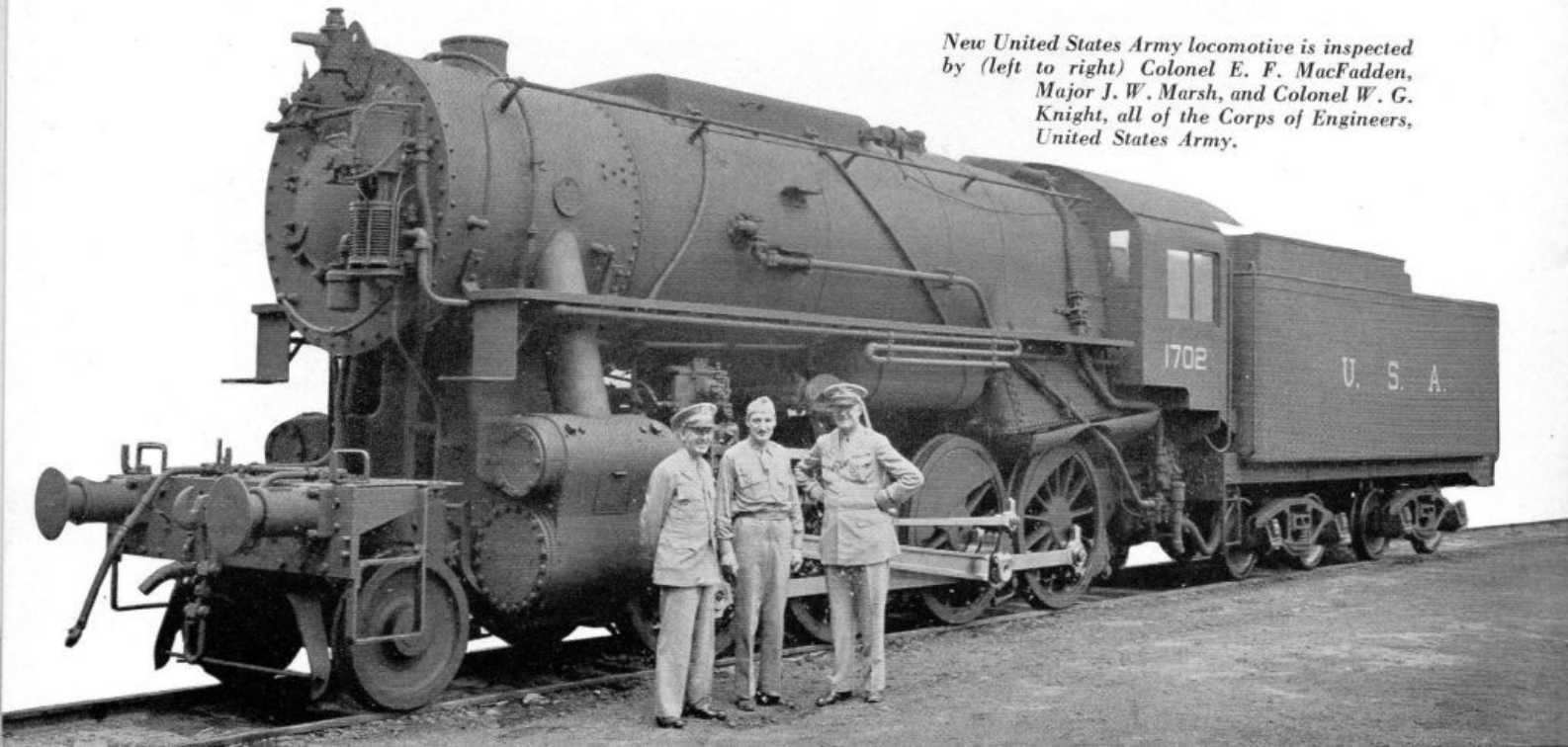
NEW LOCOMOTIVES FOR THE WAR DEPARTMENT

United States Government

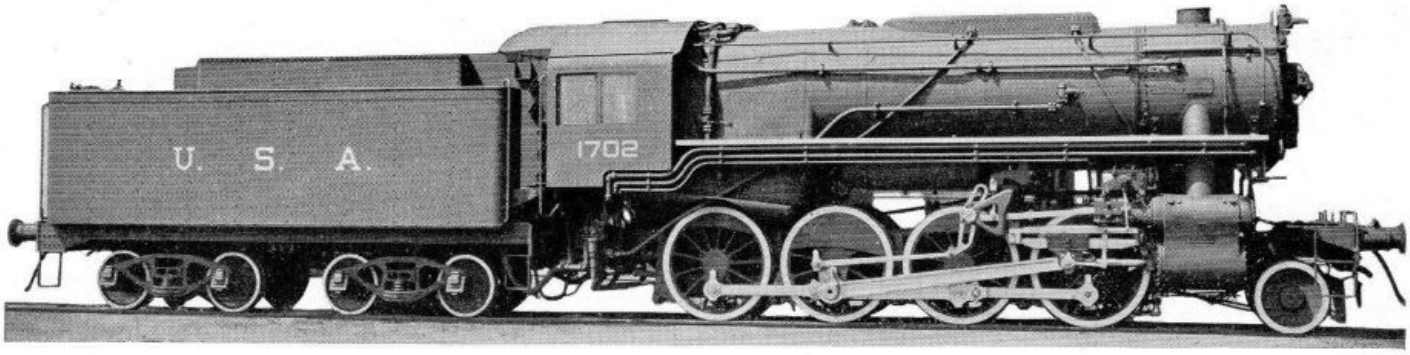
THE War Department of the United States Government is receiving a large consignment of standard gauge steam locomotives of the 2-8-0, or Consolidation type. The three principal builders in this country—The American Locomotive Company, The Baldwin Locomotive Works and the Lima Locomotive Works, Inc.—are all participating in the building of these engines. As the three manufacturers are working from the same drawings, the locomotives are all duplicates.

The first Consolidation type locomotive was built for the Lehigh Valley Railroad in 1866. This type has four pairs of driving wheels, and a two-wheel leading truck; nearly 90% of the total weight is carried on the driving wheels, fitting the design especially for heavy freight service at moderate speeds. For many years the Consolidation type was used in this country for such work to a greater extent than any other; and it has also been built for export and has done excellent service in practically all parts of the world.

The new locomotives for the War Department are of special interest because they recall the famous "Pershing" engines, which had the same wheel arrangement, and which were built in large numbers during the first World War. The first of the "Pershing" locomotives was completed in August, 1917, and the total number ordered by the



New United States Army locomotive is inspected by (left to right) Colonel E. F. MacFadden, Major J. W. Marsh, and Colonel W. G. Knight, all of the Corps of Engineers, United States Army.



The new 2-8-0 type locomotives, built by Baldwin in 1942 for the United States Army, are rugged and powerful.

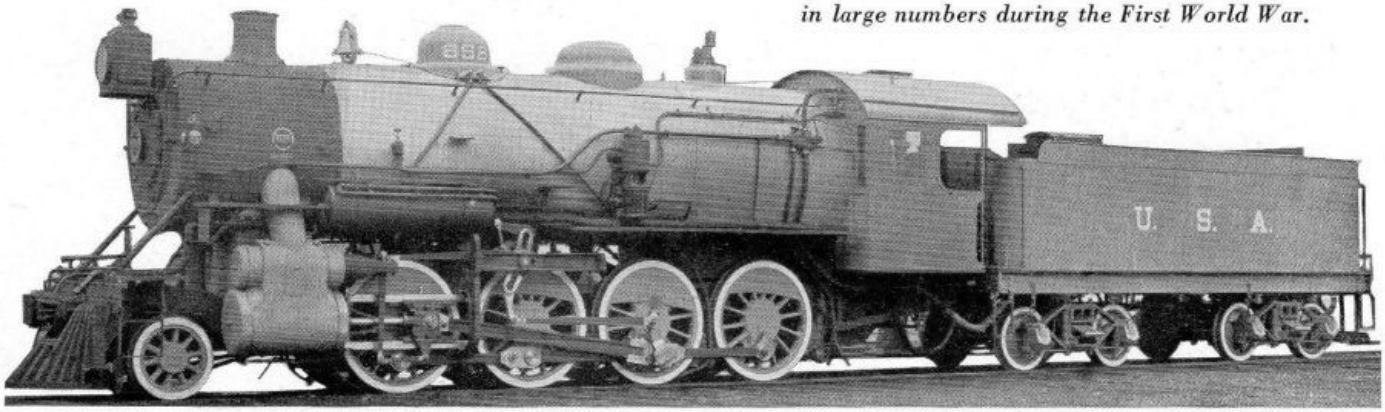
Government, up to the close of the War, was 1946. These engines did notable work handling troops and supplies on the French railways.

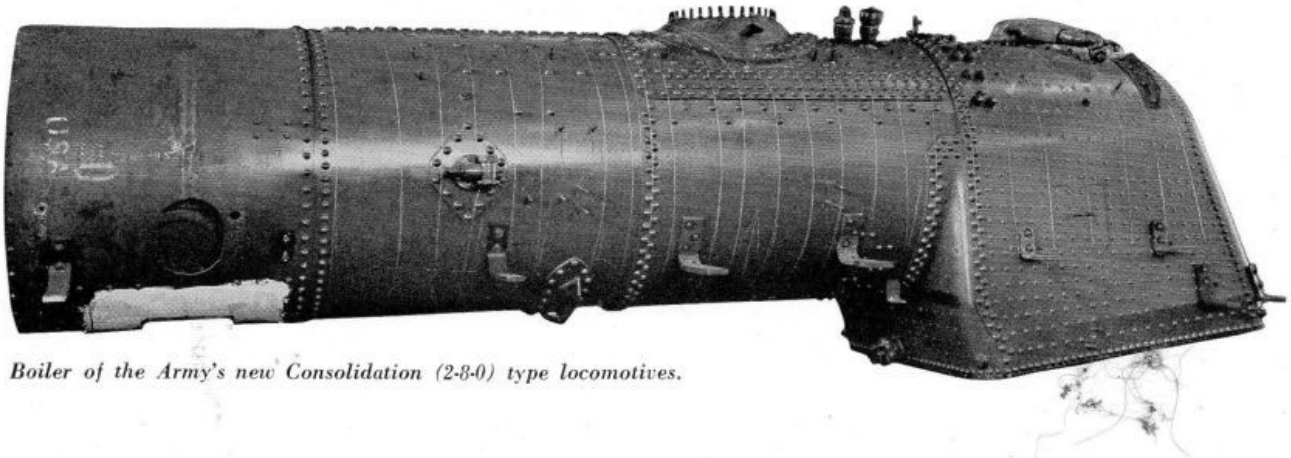
The present locomotives, while somewhat smaller than the "Pershings", are comparable to them in weight and hauling capacity. Many improvements have been made since the "Pershing" locomotives were built, however, and the new engines are strictly modern in design and equipment. The requirements called for an all-around service locomotive which should be simple and rugged, with easily accessible working parts and including, in its construction, no untried details that might give trouble under hard usage.

The locomotives are built to conform to a universal clearance diagram with an overall height of 12 feet 10½ inches, and an overall width of 9 feet and with closer restrictions at various heights from the rail. The weight on any one pair of driving wheels is limited to 36,000 pounds, with uniform distribution on the four driving axles. It was also required that the shipping length of the locomotive be such as to permit loading through the hatch of the average steamer. It was further required that they be suitable for operation at elevations as great as 6,800 feet above sea level, and with boiler feed level as high as 135° Fahrenheit. Ingenuity had to be used in order to produce a design of the desired capacity within such hampering clearance and weight limitations, but the result is a locomotive that can be used on practically any standard gauge railway in the world. As built, the locomotives are fitted for burning coal, and they have rocking grates and brick arches in the fireboxes.

In the "Pershing" design the boiler had a long, narrow firebox placed above the frames, with a grate area of 32.7 square feet. In the new locomotives the boiler has been raised, and the firebox is placed above the rear drivers so that it can be widened out, increasing the grate area to 41 square feet. Superheated steam is used, and the boiler carries a pressure of 225 pounds, as compared to 190 pounds in the "Pershing" locomotives. This higher pressure permits the use of cylinders 19 inches in diameter, as compared to 21 inches in the "Pershings". At the same time the stroke has been reduced from 28 inches to 26 inches, so that the piston speed is lower for a given engine speed —an advantage in service where fairly high speeds are attained. Steam is distributed to the cylinders by 10-inch piston valves, which are operated by

One of the famous "Pershing" locomotives, built by Baldwin in large numbers during the First World War.





Boiler of the Army's new Consolidation (2-8-0) type locomotives.

Walschaerts valve gear. Oil lubrication is used throughout, and there are two mechanical lubricators which are mounted on the back steam chest heads and are driven from the valve motion. These lubricators feed oil to the steam chests, cylinder barrels, guides, engine truck boxes, and driving boxes.

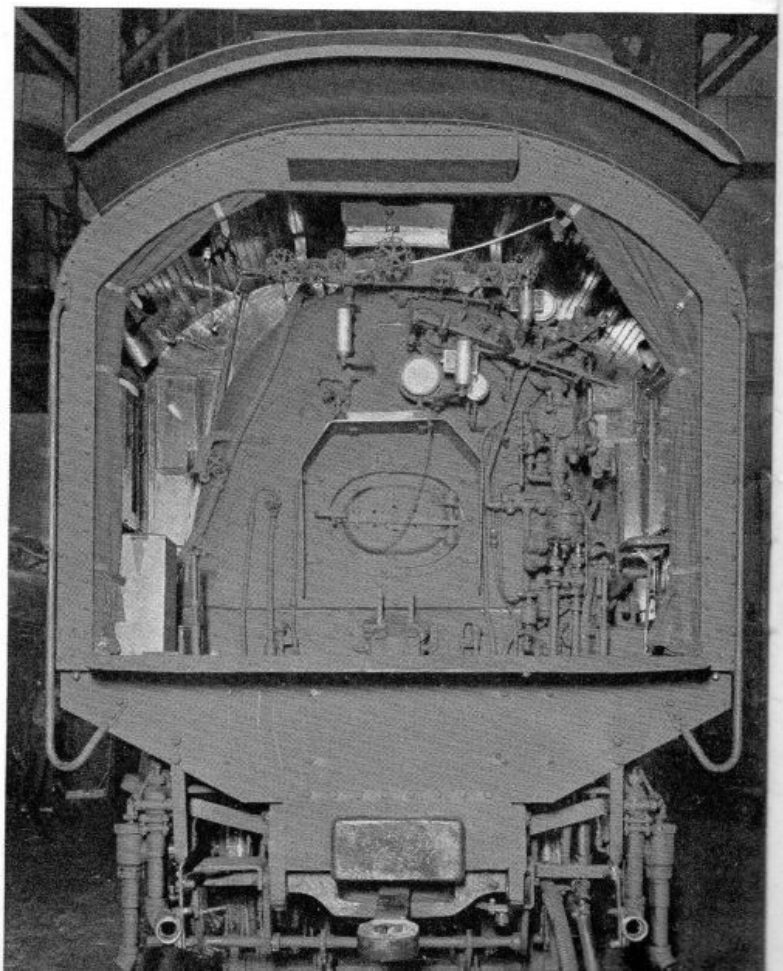
An interesting detail is the provision that has been made for crank pin lubrication. The rod oil cups are of the fabricated type, and of welded construction. They are provided with yarn wick feeds and are secured to the rods by hollow studs extending through the bushings. In spite of the large size of the cups, the rods have a neat appearance. As these locomotives will be operated with a minimum amount of attention, an ample supply of oil for lubricating the pins is a matter of importance.

The cab is of steel plate, lined with wood, and having a ventilator in the roof. As the locomotives may be required to work in localities subject to air raids, the side windows have black-out curtains, and the back of the cab can be closed with a canvas curtain having a vertical center opening. Ample precautions have thus been taken to prevent the escape of glare from the cab when operating at night. The cab fittings are arranged for right-hand operation.

These locomotives have large sand boxes, fitted with steam operated sanders, and delivering sand ahead of the front drivers and back of the main drivers. The sand box is placed on top of the boiler, and is combined with the dome casing.

Due to the fact that the locomotives must be fitted for service on various railways using different types of brakes, the brake equipment is arranged for handling trains fitted with either automatic air brakes or with vacuum brakes. The brakes on the locomotive and tender are operated by steam. There are separate valves in the cab for controlling either the air brakes or the vacuum brakes, but each of these valves is arranged to simultaneously control the steam brakes on the locomotive and tender. The steam brakes can also be applied independently of the train brakes. The compressor for the air brakes is mounted on the

Looking into the cab of one of the new Army locomotives, showing convenient arrangement of controls and fittings.



smokebox front. This braking system, while flexible, is simple for the engineman to operate, and covers any kind of equipment which the locomotives may be called upon to handle.

The front bumper is of steel plate, suitable for either center buffers, automatic couplers, or hook and link couplings with side buffers. Coupling heights can be varied from 34 inches to 42 inches above the top of the rail. Provision is thus made for a variety of coupling arrangements to suit the practice of the railways to which the locomotives may be assigned.

The tender has a steel underframe, and is carried on two four-wheel trucks of rugged design. The tank is "U" shaped, with a water bottom, having a capacity of 6,500 gallons of water and ten tons of coal. An oil tank can be placed in the fuel space, should it be desired to change the fuel from coal to oil.

A novel arrangement for lifting and loading these locomotives is used. The dome cap is removed and a cap with lifting lug is applied. A beam engages this dome lifting lug and a lug secured to the front end of the smoke box. The crane hook engages a pin in the beam at the center of gravity of the locomotive. This device replaces the beam under the back of the locomotive and the cable slings from smoke box to the crane hook. It is not necessary to detach any parts from the locomotive, and the handling and removal of complicated lifting rigging from the locomotive in crowded ship spaces is simplified.

The following table gives the principal dimensions of the new engines, as compared with the "Pershing" locomotives built in 1918:

	"Pershing" Locomotive	New Locomotive
Cylinders	21″ x 28″	19″ x 26″
Boiler, diameter	70″	68¾″
Steam pressure	190 lb.	225 lb.
Firebox, length	122 15/16″	84¼″
Firebox, width	38¼″	70¼″
Tubes, diameter	5⅜″ and 2″	5⅜″ and 2″
Tubes, number, 5⅜″ diameter	26	30
Tubes, number, 2″ diameter	165	150
Tubes, length	13′ 9″	13′ 6″
Water Heating Surface, square feet	1862	1773
Superheating Surface, square feet	420	480
Grate Area, square feet	32.7	41
Driving Wheels, diameter	56″	57″
Wheel Base, Driving	15′ 6″	15′ 6″
Wheel Base, Total Engine	23′ 8″	23′ 3″
Wheel Base, Total Engine and Tender	57′ 4½″	51′ 7¾″
Weight on Driving Wheels	150,000 lb.	141,000 lb.
Weight, Total Engine	166,400 lb.	162,500 lb.
Weight, Total Engine and Tender (fully loaded)	275,000 lb.	288,950 lb.
Tank Capacity (U. S. gallons)	5,400	6,500
Fuel Capacity (Tons)	9	10
Tractive Force	35,700 lb.	31,500 lb.