Oct. 1, 1946. C. J. SURDY 2,408,701

STEAM MOTIVE POWER

Filed May 31, 1944 3 Sheets-Sheet 1

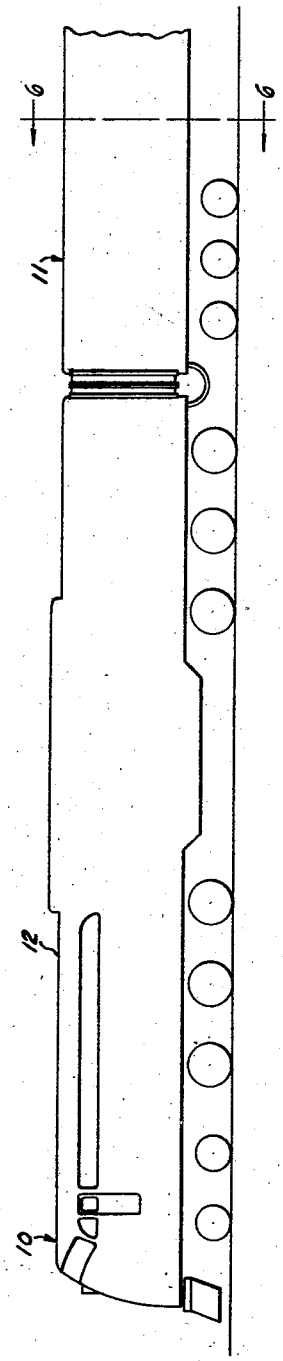
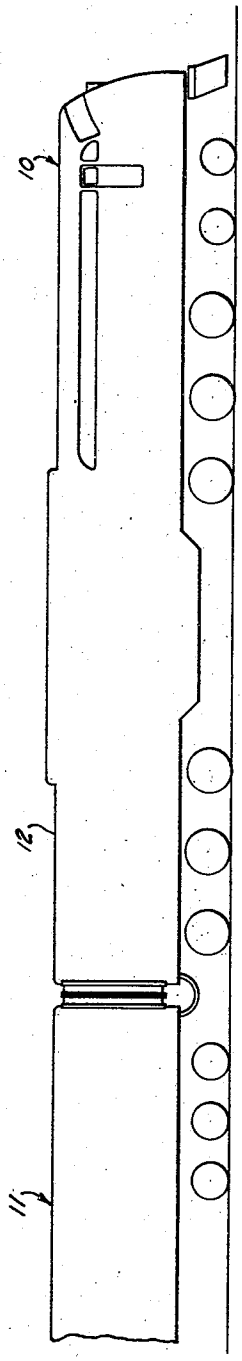


FIG. 1



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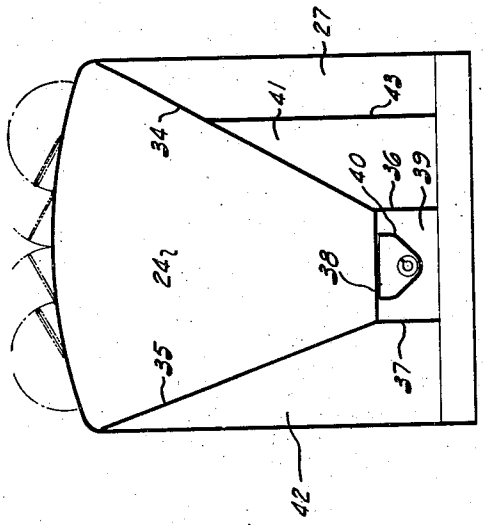


FIG. 5

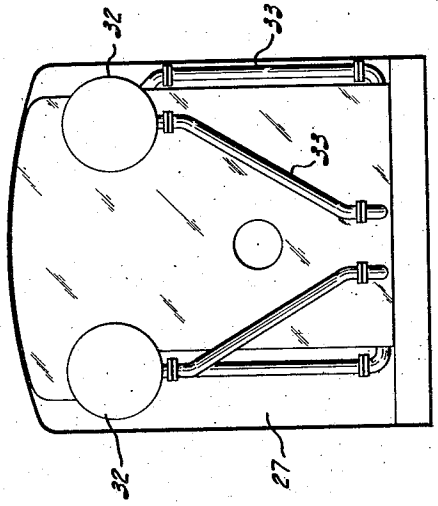


FIG. 4

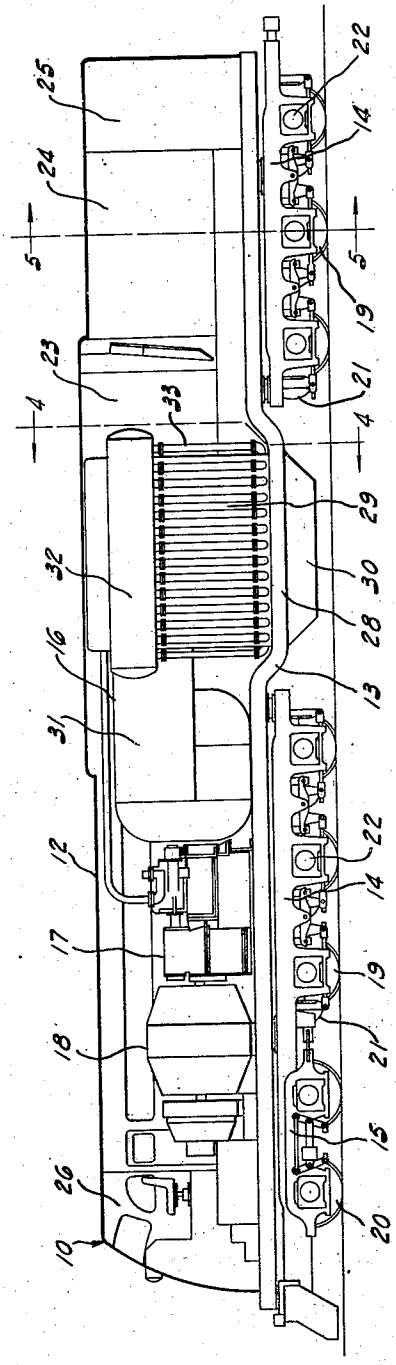


FIG. 2

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STEAM MOTIVE POWER

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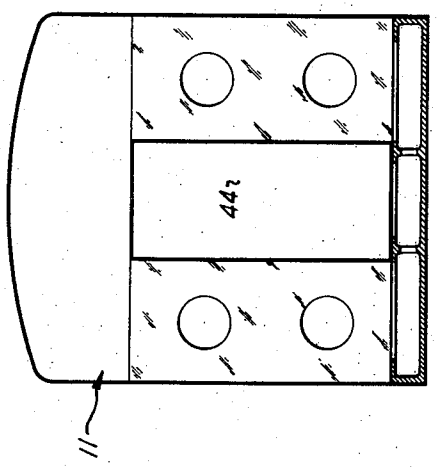


FIG. 6

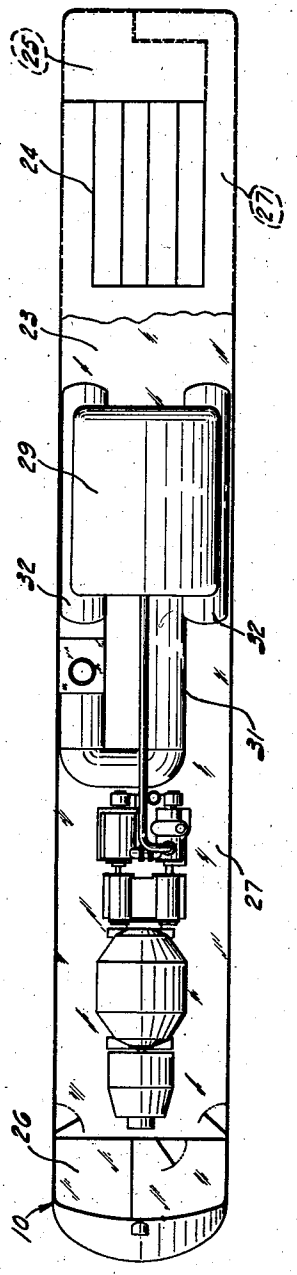


FIG. 3

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STEAM MOTIVE POWER

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Application May 31, 1944, Serial No. 538,165

3 Claims. (Cl. 105—36)

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This invention relates to railroad motive power of the turbo-electric type employing steam generating means as a source of power.

It is an object of the invention to provide a novel motive power unit of the above type that is self-propelled and complete in itself, and is comparatively simple in its construction and arrangement.

More particularly the invention contemplates a novel and advantageous combination and arrangement of structure and apparatus such as the control cab, generator, turbine, firebox, boiler, fuel and water space, in a motive power unit of the above type, adapted to conserve space but which nevertheless permits free access to operative parts of the unit and free passage through the unit.

Another object of the invention is to provide a motive power system having a high degree of flexibility whereby the motive power system is conveniently accommodated to meet varied traffic requirements. The novel motive power units are adapted to be operated as single units or in multiple, permitting the use of the minimum number of units necessary for the load to be hauled or the grade of the road traversed.

Another object of the invention is to increase the operating radius of a motive power system comprising one or more of the above referred to novel motive power units, without stopping to take on additional water.

Other objects and advantages of the invention will become apparent from the following description, a preferred embodiment of which is illustrated in the accompanying drawings, wherein

Figure 1 is a view in side elevation of a motive power system comprising two novel power units with an auxiliary water tank therebetween;

Figure 2 is a vertical longitudinal section, diagrammatically shown, through one of the novel power units;

Figure 3 is a sectional plan view, diagrammatically shown, through one of the novel power units;

Figure 4 is a diagrammatic sectional view taken on the line 4—4 of Figure 2;

Figure 5 is a diagrammatic sectional view taken on the line 5—5 of Figure 2; and

Figure 6 is a diagrammatic sectional view taken on the line 6—6 of Figure 1.

In one embodiment of the invention, referring to Figure 1, a pair of turbo-electric motive units

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10 are arranged end to end with an auxiliary water tank unit 11 therebetween.

As shown in Figure 2, the motive unit 10 is provided with an external shell 12 supported on a frame 13 which in turn is mounted on the two six wheel trucks 14. A lead truck 15 is associated with the foremost of the two six wheel trucks 14.

Within the shell 12, offset to one side thereof and about midway between the ends of the motive unit 10, is mounted the steam generating plant or bolier 16 and forward thereof is the turbo-electric generating means operable by steam from the boiler 16. The turbo-electric generating means comprises the turbine and gear set 17 and the generator and exciter 18. All of the wheels 19 of the two six wheel trucks 14, as well as all the wheels 20 of the lead truck 15, are preferably utilized as drive wheels, and each pair of them is provided with a driving motor 21, the driving motors being operable by current from the turbo-electric means 17, 18, and being suitably supported on the truck frames and suitably geared to the axles 22 of the wheel trucks.

At the rear of the boiler 16 is a space 23 for the fireman and to the rear of this is a coal bin 24 and a water tank 25. The engineer's cab 26, in which is the control mechanism, is located at the forward end of the locomotive and a passageway 27, shown in Figures 3 and 4, extends from the cab 26 along the side of the generator 18, turbine 17, and the boiler 16 to the fireman's space 23 and thence along the side of the coal bin 24 and water tank 25.

The trucks 14 are spaced apart, as shown in Figure 2, and that part of the frame 13 lying therebetween is depressed, as at 28. The firebox unit 29 of the boiler 16 is mounted on the depressed portion 28 of the frame and an ash pan 30 for the firebox unit 29 depends therefrom in the space between the trucks 14. It will be seen that this construction and arrangement of elements provides for a firebox of maximum overall height without increasing the height of the top of the firebox above the level of the rails. This increased overall height provides greater evaporating surface in the firebox unit of the boiler thereby making it possible to materially shorten the overall length of the boiler as compared with the usual locomotive steam boiler.

The boiler 16 comprises the firebox unit 29 which is of the water tube evaporating type, and a fire tube evaporating unit 31. A pair of laterally spaced steam and water drums 32 extend longitudinally through the upper portion of the

firebox unit 29. Water evaporating tubes, not shown, extend upwardly within the firebox and communicate with the drums 32, and water circulating downcomers 33 extend downwardly from the drums 32 along the outside of the firebox.

Referring particularly to Figure 5, the coal bin 24 is provided with downwardly and inwardly extending sidewalls 34 and 35. The vertical longitudinal walls 36 and 37 extending downwardly from the lower edges of the bin side walls 34 and 35, respectively, form with the bottom 38 of the bin 24, a compartment 39 in which is housed the trough 40 of a suitable type of stoker. On each side of the bin 24 and compartment 39 is provided additional water space in the form of compartments 41 and 42. The upright longitudinally extending wall 43 separates the water compartment 41 from the passageway 27.

It is evident from the above description that the motive unit 10 is complete in itself and is self propelled and adapted to haul a train of cars. The units 10 may be operated singly or in multiple depending on the load to be hauled or the grade of the road. The units when operated in multiple, are preferably arranged back end to back end, so that the system can be operated from either end and in either direction, obviating turning the motive power system around at terminals.

If it is desired to increase the operating radius of the motive power system without stopping to take on additional water, a water tank car 11 is provided. The water tank car 11 may be coupled with a single motive power unit 10 or it may be coupled intermediate a pair of motive power units 10 as shown in Figure 1, as traffic conditions require.

The water tank car 11 is provided with a passageway 44 extending therethrough communicating at its ends with the passageways 27 of the motive power units 10. Thus in a motive power system such as illustrated in Figure 1, a continuous passageway is provided extending from the cab at the head end of the lead unit 10, through the water tank car 11 to the cab at the rear of the trailing unit 10 thereby permitting the locomotive crew to travel from one end of the motive power system to the other and providing convenient access to the component parts thereof for inspection or repair while the motive power system is in motion.

I claim the following:

1. A railroad motive power unit comprising a steam generating plant, the upper portion of said steam generating plant being disposed within the outer confines of the unit and extending substantially the width thereof, the lower portion thereof being indented along one side providing a passageway between said indented side and the side of the said unit and beneath the upper portion of said steam generating plant, turbo-electric generating means forward thereof operable by steam from said plant, said turbo-electric generating means being disposed in said unit to provide a passageway along one side thereof, a control cab forward of said turbo-electric generating means, a fireman's space at the rear of said steam generating plant, and fuel and water compartments at the rear of said fireman's space, said fuel and water compartments being offset to one side of said unit to provide a passageway, said passageways being in communication and extending from said control cab rearwardly through the end of said unit.

2. A railroad motive power unit comprising a steam generating plant, turbo-electric generating means forward thereof, operable by steam from said plant, said steam generating plant and turbo-electric generating means being disposed in said unit to provide a passageway along one side thereof, a control cab forward of said turbo-electric generating means, a fireman's space at the rear of said steam generating plant, longitudinally extending converging walls in said unit rearward of said fireman's space forming a fuel bin extending the width of said unit at its upper end, a longitudinally extending wall projecting downward from one of said converging walls to provide an inner compartment for water and an outer compartment forming a passageway, a water tank at the rear of said fuel compartment offset to one side of said unit providing a passageway along the other side of said unit, said passageways being in communication and extending from said control cab rearwardly through the end of said unit.

3. A railroad motive power unit comprising a steam generating plant, the upper portion of said steam generating plant being disposed within the outer confines of the unit and extending substantially the width thereof, the lower portion thereof being indented along one side providing a passageway between said indented side and the side of said unit and beneath the upper portion of said steam generating plant, turbo-electric generating means forward thereof, operable by steam from said plant, said turbo-electric generating means being disposed in said unit to provide a passageway along one side thereof, a control cab forward of said turbo-electric generating means, a fireman's space at the rear of said steam generating plant, longitudinally extending converging walls in said unit rearward of said fireman's space forming a fuel bin extending the width of said unit at its upper end, a longitudinally extending wall projecting downward from one of said converging walls to provide an inner compartment for water and an outer compartment forming a passageway, a water tank at the rear of said fuel compartment offset to one side of said unit providing a passageway along the other side of said unit, said passageways being in communication and extending from said control cab rearwardly through the end of said unit.

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