H. W. BELL.

LOCOMOTIVE.

APPLICATION FILED JUNE 14, 1913.

1,084,388.

Patented Jan. 13, 1914.

2 SHEETS—SHEET 1.

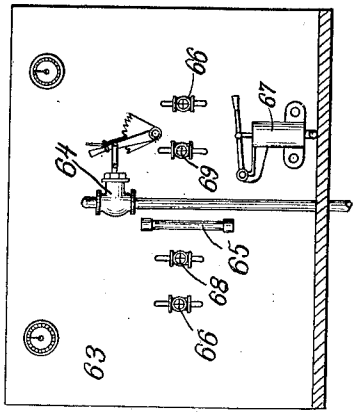

Fig. 2.

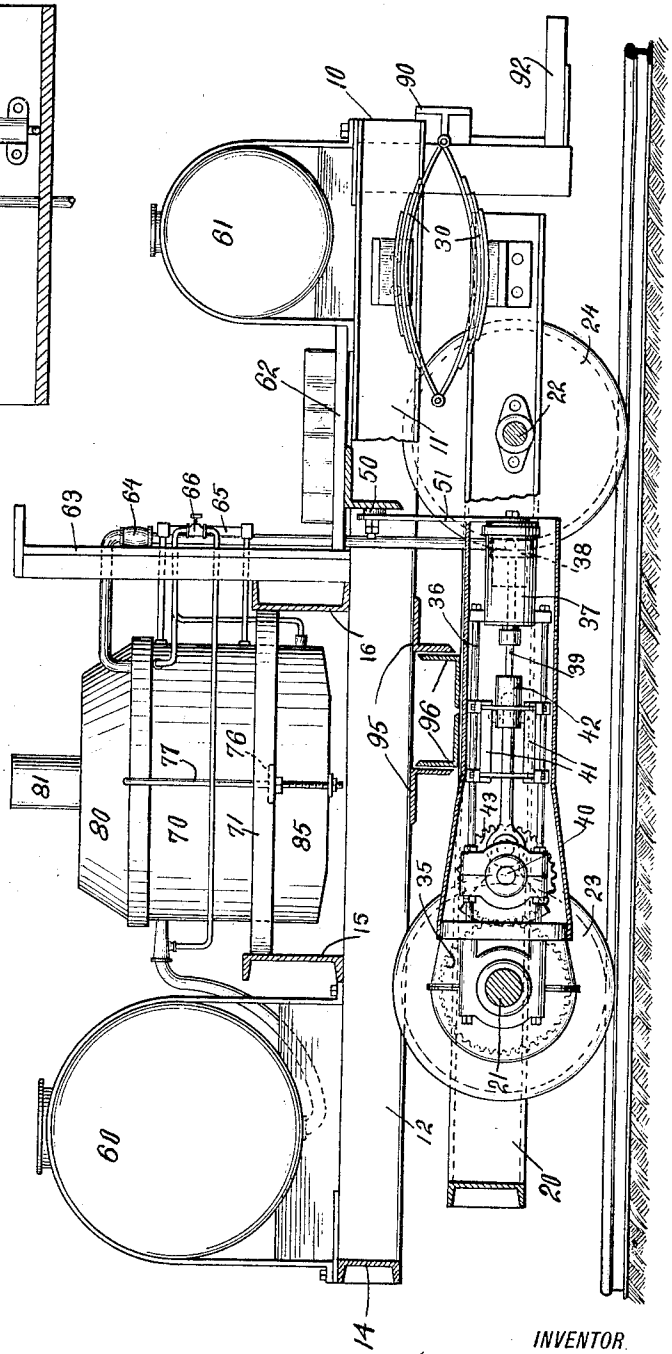

Fig. 1.

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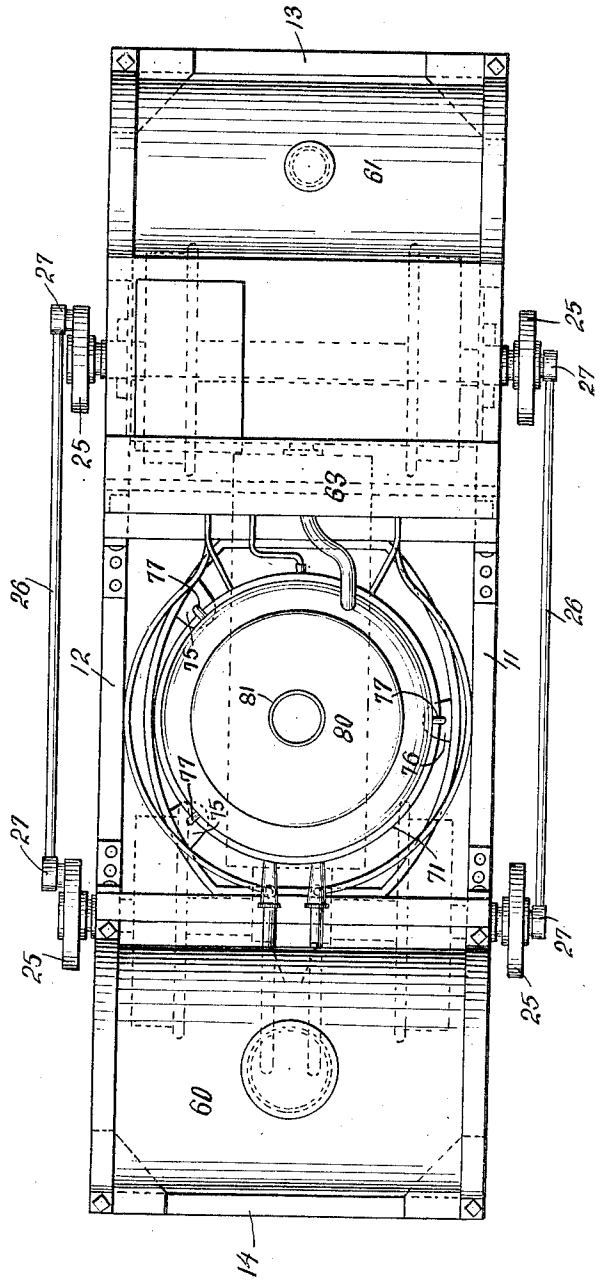
Fig. 3



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UNITED STATES PATENT OFFICE.

HARVEY W. BELL, OF YONKERS, NEW YORK.

LOCOMOTIVE.

1,084,388. Specification of Letters Patent. Patented Jan. 13, 1914.

Application filed June 14, 1913. Serial No. 773,599.

To all whom it may concern:

Be it known that I, HARVEY W. BELL, a citizen of the United States, and a resident of Yonkers, county of Westchester, and State of New York, have invented certain new and useful Improvements in Locomotives, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

My invention relates to self-propelled vehicles and has special reference to industrial railway and mine locomotives which are adapted to operate in tunnels, mine shafts and other passages of limited dimensions.

One object of my invention is to provide a locomotive of the class above indicated having a particularly compact and desirable arrangement of propelling and control apparatus.

Another object is to provide a steam locomotive having a boiler adapted for use with liquid fuel, such for example as crude oil or kerosene and a steam engine which shall be, to such an extent, independent of the boiler in its mounting as to relieve the boiler from a large proportion of the strains to which it would otherwise be subjected and so prolong its life and avoid the necessity for frequent repairs.

Other objects and advantages of my invention will be set forth hereinafter.

I will describe my invention in the following specification and point out the novel features thereof in appended claims.

Referring to the drawings,—Figure 1 is a side elevation partly in longitudinal section of a locomotive arranged and constructed in accordance with my invention. Fig. 2 is a front view of the control panel of the locomotive. A plan view of the locomotive is shown in Fig. 3.

Like characters of reference designate corresponding parts in all the figures.

10 is the body frame of the locomotive and comprises a pair of longitudinal beams or sills 11 and 12, transoms 13 and 14 at its respective ends and channel beam bolsters 15 and 16 extending transversely of the body frame intermediate its ends and resting on the sills 11 and 12 to which they are secured. The locomotive further comprises a substantially rectangular truck frame 20 which is flexible in construction and is structurally built up of channel beams. The truck frame is supported directly on a pair of driving axles 21 and 22 to which wheels 23 and 24 are secured in the usual manner. The axles extend beyond the truck frame and crank heads 25 are secured to their respective ends, connecting rods 26 being located on the respective sides of the locomotive and connecting crank pins 27. The two pairs of cranks are preferably set at 90 degrees to each other in accordance with the usual practice. The body frame 10 is resiliently supported on the truck frame 20 by elliptic springs 30 and consequently the body frame together with the apparatus attached to it, is so far independent of the truck frame and the engine, as to largely avoid vibration, and wear and tear as hereinafter explained.

Pivotally supported near one end on the axle 21 is a frame 36 of the engine. In addition to the frame the engine comprises a cylinder 37, a piston 38, a piston rod 39 and a shaft 40. The engine frame is provided with guideways 41 between which slides a block 42 on the outer end of the piston rod. The shaft 40 is operatively connected to the block 42 by a crank and shaft connection and is provided with a pinion 43 which meshes with a gear wheel 35 on the axle. The arrangement of parts is such that the engine frame is free to swing about the axle 21 as a pivot, without in any way interfering with the driving connection which exists between the piston rod and the axle, the pinion 43 merely rolling around on the gear wheel 35. Aside from the fact that the engine is pivotally mounted on the axle 21, it is nowhere secured or connected to the truck frame, the opposite end of the engine frame from the axle being connected to the body frame 10 at 50 (see Fig. 1) by means of a strap or straps 51 which are more or less flexible. The body frame together with its attached parts is thus free to ride up and down on the springs 30 carrying the outer end of the engine frame with it, the engine frame being thus swung through a small angle about the axle 21 as a pivot.

Mounted on the body frame 10 near one end, is a water tank 60 and near the opposite end a liquid fuel tank 61. The fuel tank as illustrated in the drawings, is somewhat smaller than the water tank and a platform 62 is located adjacent to it. At the side of the platform toward the center of the locomotive is a control panel 63 upon which a throttle lever 64, a water column 65, injectors 66, a hand pump 67 and control valves 68 and 69 are mounted. The bolster 16 is

located directly behind the control panel while the bolster 15 is located adjacent to the water tank 60.

A vertical boiler 70 is supported in a cradle 71 between the bolsters 15 and 16 and is suitably connected to both the water and the fuel tanks, the connecting pipes being in each instance carried over to the control panel and provided with valves so that an attendant on the platform can readily control the entire locomotive. The connecting steam pipe between the boiler and the engine cylinder 37 is attached to the latter near its point of attachment with the straps 51 which are affixed to the body frame and consequently it is unnecessary to utilize a hose or other flexible connection. The pipe may be arranged with a swivel connection to the engine in order to avoid leakage when the body frame rides up and down on the springs 30. The arrangement is particularly designed to relieve the boiler of strains to which locomotive boilers as ordinarily arranged are invariably subjected. The cradle 71 is preferably formed of a substantially rectangular frame secured at its ends to the bolsters 15 and 16 and having its sides curved outwardly to conform more nearly to the sides of the boiler which is cylindrical in form. The curved sides of the cradle are respectively provided with a pair of projections 75 and a single projection 76 all of which extend inwardly and constitute three points of support for the boiler. Clamping bolts 77 which extend through the projections 75 and 76 and are bent at their upper ends to hook over the top flange of the boiler securely affix the boiler to the supports. A smoke box 80 is secured to the boiler at the top and terminates in a short stack 81. Beneath the boiler is a combustion chamber 85 in which an oil burner (not shown) of any suitable type is located.

There is a certain amount of flexibility in the truck frame 20 by reason of the relatively light flexible structural beams of which it is constructed and consequently the locomotive is not easily derailed even when used on tracks of the rough and uneven character often found on construction work.

Bumpers 90 and couplers 91 as well as steps 92 are secured to the respective ends of the locomotive thus making it reversible.

In order that the tractive effort developed at the locomotive drivers may be transferred to the draw bar without tending to distort the springs 30, a pair of transverse angle iron bars 95 are secured to the under side of the body frame 10 near its central plane and a pair of similar angle iron bars 96 are secured to the truck frame 20. The bars 96 are so spaced that they extend loosely between the bars 95 as shown in Fig. 1. The bars 96 are not in any way secured to the engine frame or casing, but are attached to the truck frame 20. The springs 30 are also relieved by the cross bars when the locomotive is being coupled to a train of cars or a hard blow is otherwise delivered to the bumper 90.

As will be readily understood from the foregoing description, the entire control of the locomotive including the boiler is accomplished from one place, viz., the control panel and consequently only a single attendant is required. The weight of the locomotive is entirely borne on the wheels 23 and 24, both sets of which are driving wheels since they are inter-connected by the side rods 26, and consequently a maximum tractive effort is obtained. The boiler is detachable and is removable as a unit so that it may be taken off for repairs without disturbing the rest of the apparatus, and the same thing is true of the engine.

Other advantages of my invention will be apparent to those skilled in the art.

The structure shown and described is intended to be illustrative of the principles of my invention and I do not intend to be restricted to the details set forth but only by such limitations as are indicated in the appended claims.

What I claim is:

1. In a locomotive, the combination with a body frame, a vertical boiler, centrally mounted thereon, a transverse fuel tank at one end, and a transverse water tank at the opposite end, of a truck frame on which the body frame is resiliently mounted, means independent of the springs for limiting the relative longitudinal movement of the frames and a driving motor operatively connected to and pivoted about a locomotive axle at one end, and secured to the body frame at the other end.

2. In a locomotive, the combination with a truck frame, a pair of rotatable wheel axles on which the truck frame is mounted and a driving motor operatively connected to and pivotally mounted on one of the axles, of a body frame, springs interposed between the truck frame and the body frame, means for limiting the relative longitudinal movement of the two frames, a relatively resilient cradle mounted near the center of the body frame, a vertical boiler secured to the cradle, a transverse cylindrical water tank at one end of the locomotive adjacent to the boiler, a control panel on the opposite side of the boiler and a transverse cylindrical fuel tank near the opposite end of the body frame, said driving motor being secured at its outer end to the body frame.

3. In a locomotive, the combination with a pair of axles having driving wheels secured thereto, a truck frame mounted on the axles, a driving engine having a frame pivoted on one of the axles and a piston rod operatively connected thereto, and side rods

operatively connecting the two axles together, of a body frame resiliently mounted on the truck frame, means for limiting the relative longitudinal movement of the two frames, and steam generating apparatus mounted on the body frame, said engine frame being connected at its outer end to said body frame.

4. In a locomotive, the combination with a single truck having a frame and wheel axles, a steam engine for driving the truck wheels, a body frame resiliently mounted on the truck frame, steam generating apparatus on the body frame, and means for limiting the longitudinal movement of the truck frame relative to the body frame whereby the body is driven through said limiting means and its resilient mounting is relieved.

5. In a locomotive, the combination with a truck comprising a pair of driving wheel axles and a rigid frame, a steam engine comprising a frame pivotally mounted on one of the axles, a shaft connected to be driven by the engine, and gear wheels interposed between the engine shaft and the axle on which the engine frame is pivoted, of a body frame, steam generating apparatus thereon, and coöperating stop projections between the frames for limiting their relative longitudinal movement without interfering with their relative vertical movement, the outer end of said engine frame being connected to the body frame.

6. In a locomotive, the combination with a resiliently mounted body frame, of a cradle located near the center of the body frame, and a vertical boiler slung in the cradle, of fuel and water tanks located at the respective ends of the body frame, and a control panel adjacent to the boiler.

7. In a locomotive, the combination of a single substantially central truck having a flexible truck frame, wheel axles mounted thereon, a body frame resiliently mounted upon the truck frame, a steam engine supported between one of the wheel axles and said body frame and steam generating apparatus on the body frame.

In witness whereof, I have hereunto set my hand this 13th day of June, 1913.

HARVEY W. BELL.

Witnesses:
G. R. QUIMBY,
F. B. GRAVES.