May 10, 1927. 1,628,217

E. O. BAUM

COMPRESSED AIR LOCOMOTIVE

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Fig. 1

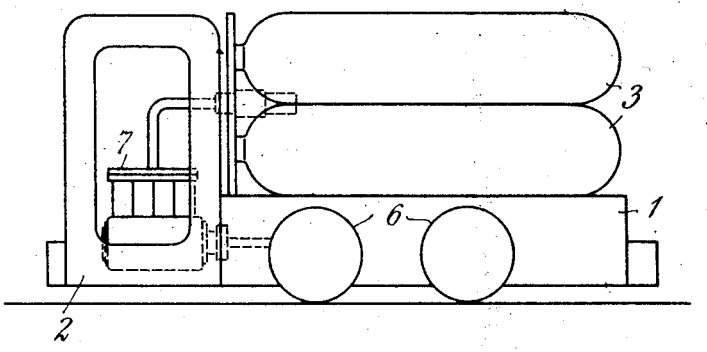

Fig. 7

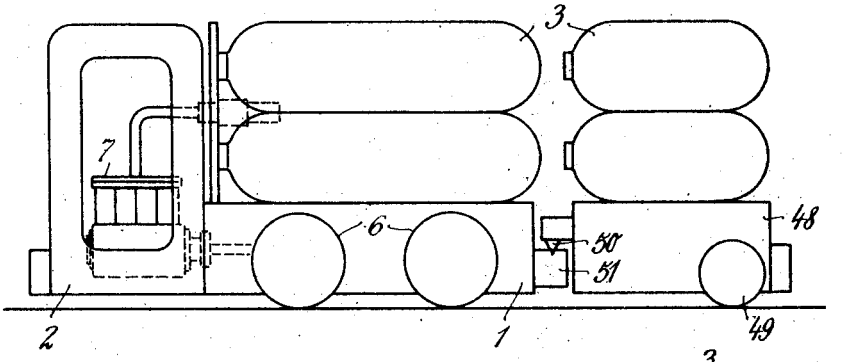

Fig. 6

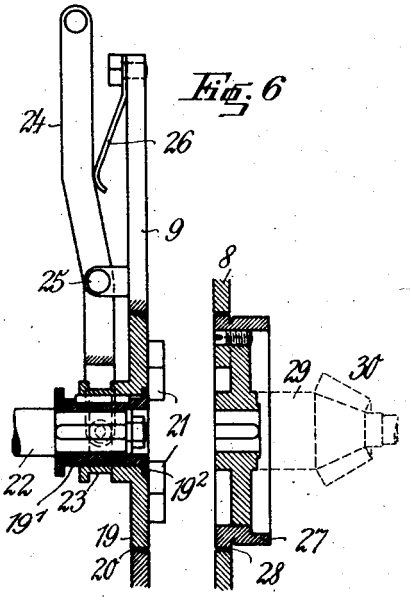

Fig. 5

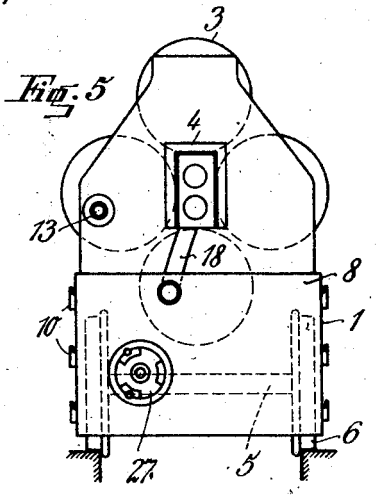

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Fig. 2

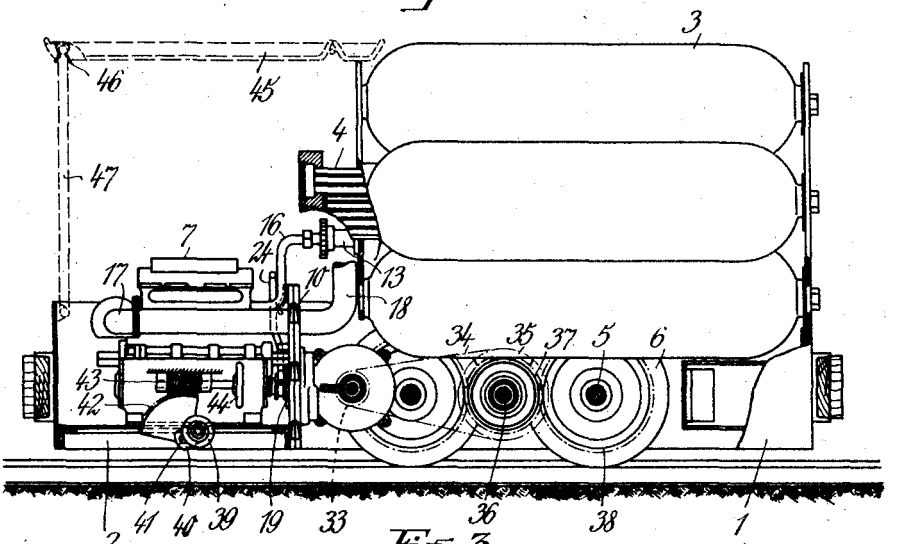


Fig. 3

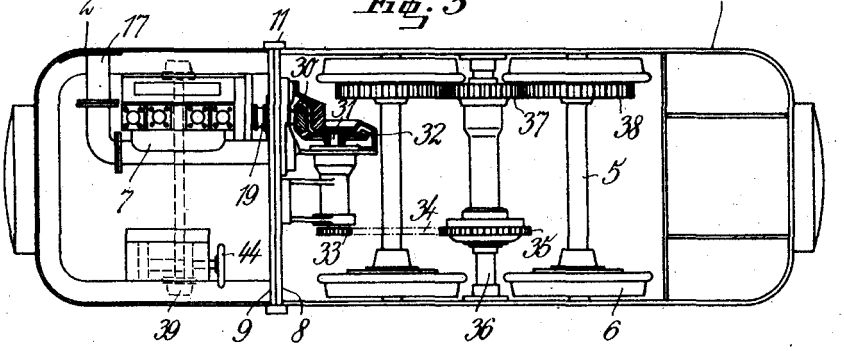
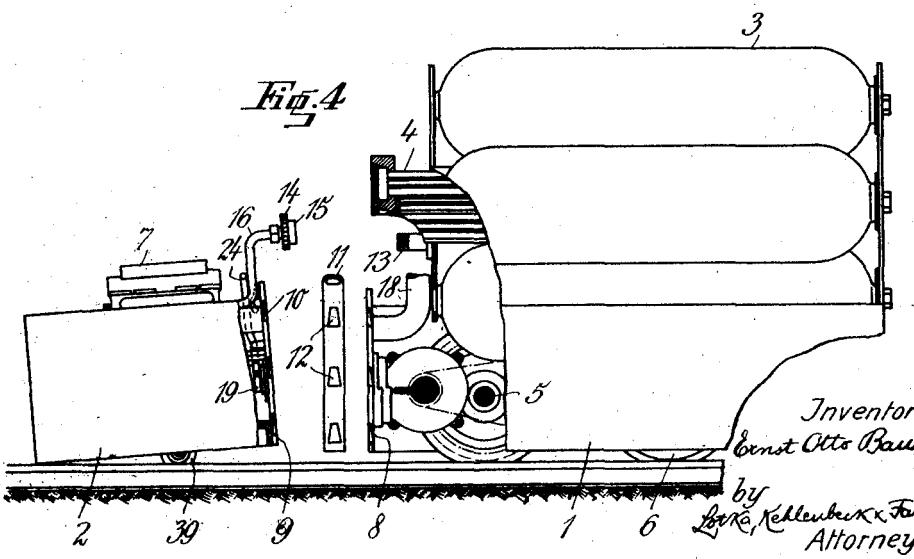


Fig. 4



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UNITED STATES PATENT OFFICE.

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COMPRESSED-AIR LOCOMOTIVE.

Application filed August 2, 1924, Serial No. 729,712, and in Germany August 10, 1923.

My invention relates to improvements in compressed air locomotives, and more particularly in locomotives designed for use in mines, and the object of the improvements is to provide a locomotive which can be readily taken apart into sections adapted to be carried from one driftway through narrow connecting shafts to another driftway for being reassembled and used therein. Another object of the improvements is to provide a locomotive which carries compressed air tanks of large capacity within a minimum of space, so that it is adapted to develop power for a long time and to be used in driftways of small cross-sectional area. With these objects in view my invention consists in constructing the frame of the locomotive in two sections detachably connected with each other along a transverse plane, and one carrying the compressed air tanks and driving wheels, and the other the motor, the gearing intermediate the motor and driving wheels and the pipe intermediate the motor and tanks including joints adapted to be readily uncoupled or detached when taking the locomotive apart.

Another object of the improvements is to provide a subsidiary car in connection with the locomotive for carrying further compressed air tanks, which subsidiary car is simple in construction and which is supported with a part of its weight on the locomotive so as to increase the adhesion of the driving wheels.

For the purpose of explaining the invention two examples embodying the same have been shown in the accompanying drawings in which the same reference characters have been used in all the views to indicate corresponding parts. In said drawings,

Fig. 1, is a diagrammatical elevation showing the locomotive,

Fig. 2, is an elevation partly in section, showing the locomotive on a larger scale,

Fig. 3, is a top plan view of the frame of the locomotive and the wheels,

Fig. 4, is an elevation showing the sections of the locomotive taken apart,

Fig. 5, is an end view of the section of the locomotive carrying the compressed air tanks,

Fig. 6, is a sectional elevation showing the clutch connecting the motor and the gearing driving the wheels, and

Fig. 7, is a diagrammatical elevation showing a modification.

In the construction shown in Figs. 1 to 6 the frame of the locomotive is made in two sections 1 and 2, the section 1 carrying the compressed air tanks 3 and a heater 4 and being supported on the driving axles 5 and wheels 6, and the section 2 carrying the compressed air motor 7. The sections 1 and 2 have end walls 8 and 9 each provided at opposite sides with hooks 10, the hooks of the end walls corresponding to each other and being adapted to be fixed to each other by being engaged by slots 12 of bars 11. For assembling the parts the end plates are placed against each other and the bars are put from the sides over the hooks 10.

For supplying compressed air to the motor 7 a tubular member 13 located on the frame section 1 is connected with the compressed air tanks 3, which member includes a valve and is screw-threaded at its end for having a pipe 16 secured thereto by means of a nut 15 provided with a handwheel 14. The pipe 16 is connected with the motor 7 for supplying thereto air from the tanks 3 at reduced pressure. The exhaust pipe 17 of the motor ends in the end wall 9 in position for opening into a pipe 18 connected with the heater 4.

The motor 7 is connected with the driving axles 5 by a clutch shown in detail in Fig. 6. One of the clutch members 19 is mounted on the section 2 of the frame and within a cut-out portion 20 of the end wall 9, the jaws 21 of the said member projecting rearwardly from the said end wall. The said clutch member is mounted on a sleeve 19^1 secured to the motor shaft 22 and it is adapted to be axially shifted on said sleeve by means of a lever 24 engaging in a circumferential groove of the hub 23 of the said member and having rocking support on a bolt 25 secured to the end wall 9. The upwardly directed arm of the lever 24 is engaged by a leaf spring 26 secured to the end wall 9 and tending to shift the clutch

member 20 rearwardly and into the position shown in Fig. 6 in which the jaws 21 project beyond the end wall 9, the movement of the clutch member being arrested by a flange 19^2 of the sleeve 19^1 secured to the shaft 22 and having the clutch member 19 axially slidable thereon.

The other clutch member 27 is disposed within a cut-out portion 28 of the end wall 8 of the section 1 and on a shaft 29 carrying a bevel gear 30. The latter is in mesh with a bevel gear wheel 32 keyed to a transverse shaft 31 connected with a transverse shaft 36 by a chain and sprocket gearing 33, 34, 35. A gear wheel 37 keyed to the shaft 36 is in mesh with gear wheels 38 keyed to the axles 5.

To permit the section 2 to be moved on the rails independently of the section 1, vertically movable wheels 39 are disposed at either side of the said section 2. As shown the said wheels are mounted on arms 40 secured to a rock shaft 41 disposed on the frame section 2 and carrying a toothed sector 42 engaged by a worm 43 adapted to be rotated by means of a hand wheel 44.

If it is desired to use the locomotive in a driftway the parts are taken apart and each section is brought to the said driftway separately, whereupon the parts are assembled by moving the section 2 with the wheels 39 in lowered position towards the section 1 so that the end walls 8 and 9 cover each other, bolts and holes (not shown) being provided for guiding the parts to the correct positions. This will bring corresponding hooks 10 beside each other as shown in Fig. 2, the end of the exhaust pipe 17 is opposite to the pipe 18 connected with the heater, the nut 15 of the pipe 16 is in front of the tubular member 13, and the clutch member 19 in front of the clutch member 27. Now the bars 11 are placed with their slots 12 on the hooks 10, so that both sections 1 and 2 are rigidly connected with each other.

If by accident the position of the clutch members is such that the jaws 21 engage in the corresponding sockets of the member 27, the axle 29 and the wheels 6 are directly rotated when starting the motor. If, however, the said jaws and sockets are not in register, the clutch member 19 is slightly forced into the section 2 when moving the section 2 towards the section 1. If now the motor 7 is started the leaf spring 26 rocks the lever 24 so that the jaws and sockets get into engagement with each other as soon as the member 19 has been turned by the motor so far that the jaws and notches are in alignment. Therefore the clutch is thrown in automatically in both cases, and it is not necessary for the engineer to pay attention to the clutch when assembling the locomotive.

The compressed air pipe 16 is connected to the tanks 3 by screwing the nut 15 on the screw-threaded end of the tubular member 13. Now the locomotive is ready for operation. Ordinarily the wheels 39 are lifted away from the rails by turning the hand wheel 44, in order to increase the pressure on the driving wheels and the adhesion thereof on the rails.

For transporting the locomotive through a narrow shaft and to another driftway the sections 1 and 2 are again taken apart after lowering the wheels 39, by unscrewing the nut 15 and removing the bars 11. Now both parts can be separately carried through the narrow shaft and assembled within the other driftway. The locomotive can be disconnected and reassembled within a short period of time, so that little time is wasted when carrying the same from one driftway to another. The power of the locomotive is large because, by mounting the motor 7 on the section 2 on which the engineer has his place, nearly the whole cross-sectional area of the driftway can be used for accommodating compressed air tanks. As appears from Fig. 5 one of the tanks 3 can be disposed on the truck of the section 1 and partly between the driving wheels.

To protect the motor and the engineer against injury by falling rocks I provide a roof 45 on the section 1 which can be folded on that section, as is shown in Fig. 2 in dotted lines. The roof extends forwardly and above the section 2, and it is provided at its free end with clamps 46 adapted for engagement with a stay 47 mounted on the section 2 and adapted to be folded downwardly.

In the modification shown in Fig. 7 a locomotive is shown which is similar in construction to the one described with reference to Figs. 1 to 6, which, however, is provided with a subsidiary car or trailer 48 carrying compressed air tanks 3 for increasing the power of the motor 7. The said car is provided at its rear with wheels 49, the center of gravity of the car and its load being in front of the said wheels. At its front end the car is provided with a vertical bolt 50 bearing on a socketed bearing plate 51 provided at the rear end of the part 1 of the locomotive. Therefore the major part of the weight of the car 48 is transmitted to the locomotive, so that the adhesion of the wheels is materially increased. Therefore the tractive power of the locomotive is increased by a part of the weight of the car 48 without materially reducing the adhesion of the train. Further, the car 48 is compact in construction, special driving means being dispensed with.

While in describing the invention reference has been made to particular examples embodying the same I wish it to be under-

stood that my invention is not limited to the constructions shown in the drawings, and that various changes may be made in the general arrangement of the locomotive and the construction of its parts without departing from the invention. While in the specific embodiments illustrated the source of power carried by one of the sections of the locomotive is a store of compressed air, and the motor carried by the other section is a compressed air motor, I desire it to be understood that I do not wish to restrict myself to sources of power and motors of the compressed air type.

I claim:

1. A compressed air locomotive, comprising a front frame section and a rear frame section both having vertical end walls adapted for close contact and detachably connected with each other, a compressed air tank mounted on one of said sections, a motor mounted on the other section, tubular means having a detachable joint and connecting said tank with said motor, driving wheels supporting the tank carrying section, and power transmitting means including a detachable joint and connecting said motor and driving wheels.

2. A compressed air locomotive, comprising a front frame section and a rear frame section detachably connected with each other, a compressed air tank mounted on one of said sections, a motor mounted on the other section, tubular means having a detachable joint and connecting said tank with said motor, driving wheels supporting the tank carrying section, wheels on said motor carrying section mounted for being moved into and out of engagement with the rails, and power transmitting means including a detachable joint and connecting said motor and driving wheels.

3. A compressed air locomotive, comprising a front frame section and a rear frame section detachably connected with each other, a compressed air tank mounted on one of said sections, a motor mounted on the other section, tubular means having a detachable joint and connecting said tank with said motor, driving wheels supporting the tank carrying section, power transmitting means including a detachable joint and connecting said motor and driving wheels, and a folding roof hinged to the tank carrying section and disposed above the motor carrying section.

4. A compressed air locomotive, comprising a front frame section and a rear frame section detachably connected with each other, a compressed air tank mounted on one of said sections, a motor mounted on the other section, tubular means having a detachable joint and connecting said tank with said motor, driving wheels supporting the tank carrying section, power transmitting means including a detachable joint and connecting said motor and driving wheels, a folding roof hinged to the tank carrying section and disposed above the motor carrying section, and a stay hinged to the motor carrying section in position for supporting said roof.

5. A compressed air locomotive, comprising a front frame section and a rear frame section detachably connected with each other, a compressed air tank mounted on one of said sections, a motor mounted on the other section, tubular means having a detachable joint and connecting said tank with said motor, driving wheels supporting the tank carrying section, power transmitting means including a detachable joint and connecting said motor and driving wheels, and a subsidiary wheeled car in part supported on said tank carrying section.

6. A compressed air locomotive comprising a section having driving wheels, a compressed air tank on said section, another section, a motor carried by said second section, connections by which said motor receives air from said tank and by which it operates said driving wheels, means for connecting said sections detachably, and wheels movable up and down on the motor-carrying section and normally raised to an inactive position, but adapted to be lowered so as to engage the ground to facilitate transportation of the motor-carrying section when detached.

7. A locomotive comprising a section having driving wheels, a source of power on said section, another section, a motor carried by said second section, connections by which said motor receives power from said source of power and by which it operates said driving wheels, means for connecting said sections detachably, and an auxiliary support movable up and down on the motor-carrying section and normally raised to an inactive position but adapted to be lowered so as to engage the ground to facilitate transportation of the motor-carrying section when detached.

8. A locomotive comprising a section and a motor thereon, another section and a source of power thereon, means for connecting said sections detachably, and an auxiliary support movable up and down on one of said sections and normally raised to an inactive position but adapted to be lowered so as to engage the ground to facilitate transportation of the section carrying such auxiliary support, when such section is detached.

9. A wheeled structure comprising two sections and means for connecting them detachably, and an auxiliary support movable up and down on one of said sections and normally raised to an inactive position so that said section is supported exclusively by the other section, said support being adapted to be lowered to engage the ground to facilitate transportation of such section when detached from the other section.

10. A wheeled structure comprising two detachably connected unit-forming sections arranged in tandem, and driving mechanism for said wheeled structure, comprising complementary portions carried by the respective sections, one of the latter having a running gear permanently in operative position, this section forming the sole support for the other when such sections are connected in normal operative position.

In testimony whereof I have signed this specification.

ERNST OTTO BAUM.