June 19, 1934. J. P. RUTH, JR 1,963,678

MINE LOCOMOTIVE

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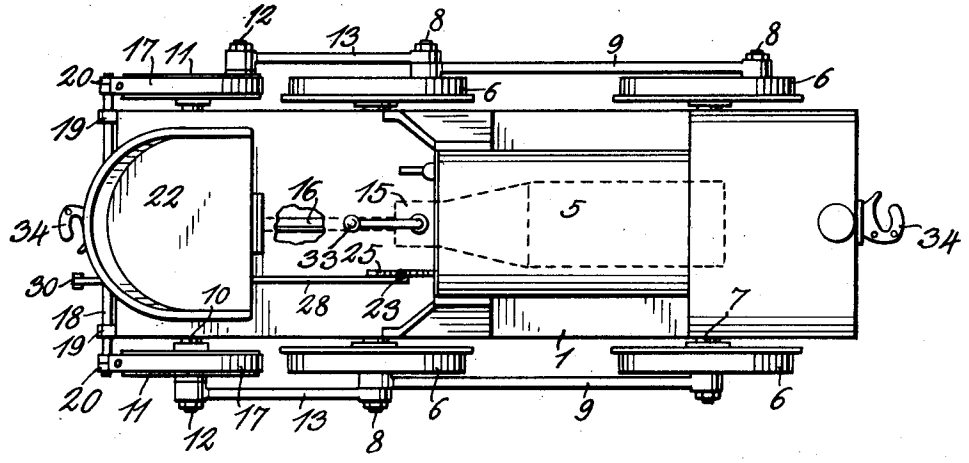

Fig. 1.

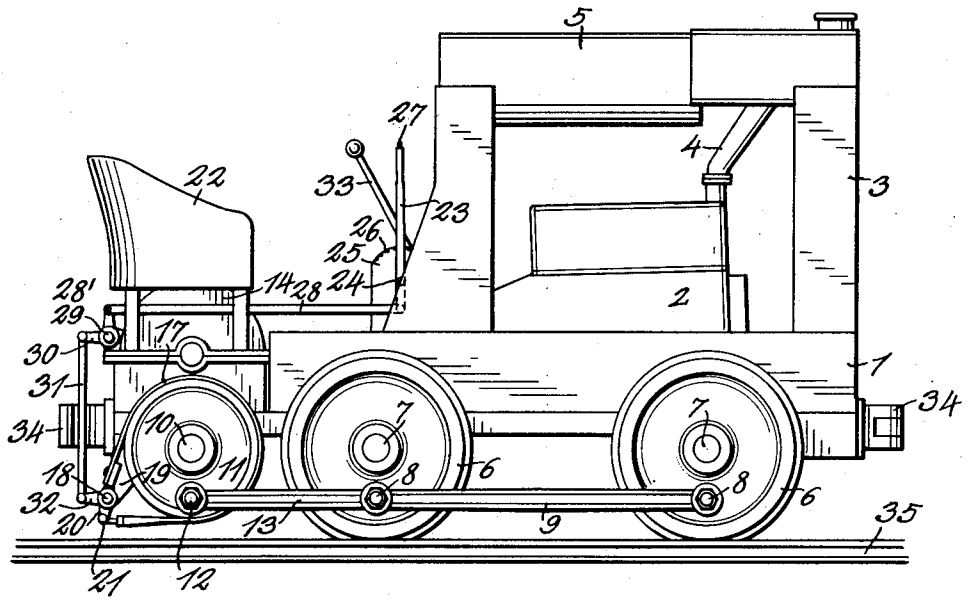

Fig. 2.

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MINE LOCOMOTIVE

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1 Claim. (Cl. 105—62)

This invention relates to improvements in mine locomotives of the type employed in connection with metal and coal mines for handling mine cars.

It is the object of this invention to produce a simple and highly efficient locomotive that is operated by means of an internal combustion engine and which is so constructed that there is very little, if any, lost motion between the motor and the drive wheels.

Another object of this invention is to produce a mine locomotive in which the brakes, instead of being applied to the drive wheels in the usual manner, are applied to one or more brake drums secured to a crank shaft that is rotated directly from the internal combustion engine.

This invention, briefly described, consists of a frame that is supported on two pairs of drive wheels, each pair of which is secured to the opposite ends of a supporting axle that is mounted for rotation in suitable bearings in the frame. Secured to the frame and supported thereby is an internal combustion engine, with the radiator and gasoline tank. Located to the rear of the rearmost pair of drive wheels is a reduction gear located within a housing and this is driven from the engine through the medium of a transmission gear mechanism of the type employed in connection with automobiles. A crank shaft is journaled in the frame and is driven from the gear mechanism mentioned. This shaft is parallel with the supporting axles and has secured to each end a crank disk. The crank disks are each provided with a crank pin and the drive wheels are also provided with crank pins located at the same radial distance from the axes of the drive shafts as the crank pin on the crank shaft. The crank pins on the crank shaft are connected with the corresponding crank pins on the drive wheels by means of connecting rods. The crank pins on the crank shaft are located ninety degrees apart so as to prevent the formation of dead centers. Each of the crank disks are provided with a cylindrical surface around which is passed a brake band that can be controlled by means of a brake lever located in a position convenient to the driver's seat.

Having thus briefly described the invention, the same will now be described in detail and for this purpose reference will be had to the accompanying drawing in which the preferred embodiment thereof has been illustrated, and in which:

Fig. 1 is a top plan view of the improved locomotive; and

Fig. 2 is a side elevation of the same.

In the drawing reference numeral 1 designates the frame. This may be made of cast iron and is preferably rectangular in shape. Supported on the frame is an internal combustion engine 2 that is provided with a water cooling jacket that is connected to the radiator 3 by means of tubes 4. A gasoline tank 5 is located above the engine and connected with the carburetor in the usual way. Since the engine radiator and tank form no part of my invention except in so far as they are elements of the combination, and since it is my intention to employ a well known make of engine for this purpose, the construction of the engine will not be described with any greater detail. The frame is supported on two pair of drive wheels 6. Each pair is supported or secured to the opposite ends of a supporting axle 7. These axles are parallel and are mounted for rotation in suitable bearings that are attached to the under side of the frame. Each of the drive wheels is provided with a crank pin 8 and these are connected by means of connecting rods 9. Rotatably secured to the frame at the rear of the rearmost pair of drive wheels is a crank shaft 10. Secured to opposite ends of this crank shaft are crank disks 11. Each disk is provided with a crank pin 12 and this is connected to the crank pin on the adjacent drive wheel by means of a connecting rod 13. The crank pins 8 and 12 are spaced the same distance from their axis of rotation and the crank pins 12 that are connected with the crank shaft are spaced ninety degrees apart as shown in Fig. 1 so as to prevent the formation of dead center positions. The crank shaft is driven by the internal combustion engine through the intermediary of a gear train located within the housing 14, and this in turn is connected with the ordinary transmission gears of the engine which are located in the housing 15 by means of a shaft 16. The construction of the different gears will not be described herein because they are more or less conventional and are employed merely for the purpose of speed reduction and for obtaining a reversal of the direction of travel.

The crank disks 11 have their peripheral surfaces cylindrical so as to form brake drums and each is enclosed by a brake band 17. One end of each band is pivotally connected to a shaft 18 which is journalled in bearings 19 and which is extended entirely across the frame in the manner shown in Fig. 1. Secured to each of the ends of shaft 18 is a bell crank lever 20. One end of the brake bands are pivotally connected with

the free end of one of the arms of the crank lever as indicated by reference numeral 21. A seat 22 is provided for the operator and located in front of this seat is a brake handle 23 that is pivotally attached at 24 to a quadrant 25. This quadrant is provided with teeth 26 and the lever is provided with a pawl that cooperates with these teeth. The pawl is operated by means of a push button 27. A connecting rod 28 is pivotally secured to the lower end of the brake lever and has its other end connected to the free end of a bell crank lever 28'. This bell crank lever is pivoted at 29 and pivotally secured to the arm 30 of this lever is a connecting rod 31 whose other end is pivotally connected to the end of the bell crank lever arm 32. When the brake handle 23 is moved in a counterclockwise direction about its pivot, it will tighten the two brake bands about the brake drums. The transmission gears are controlled by means of a lever or handle 33. The engine is provided at its front and rear ends with car couplers 34 in the usual manner. When the engine is operating and the transmission gears are in such position that shaft 16 will be rotated, the crank shaft 10 will turn and rotate the crank disks 11. Since the crank disks are connected with the drive wheels by means of connecting rods, these will also rotate, and the locomotive will travel on the rails 35. When the locomotive is to be stopped, the brake bands are tightened by the means above described. It will be observed that power is transmitted to the drive wheels through the intermediary of connecting rods 13 that are placed at an angular relationship of ninety degrees with respect to each other and since these connecting rods are provided with the usual boxings that can be adjusted for wear there is no appreciable lost motion and therefore there is no jerking of the engine as would take place if sprocket wheels or similar devices were employed.

I want to call particular attention to the method of transmitting power from the gears in the housing 14 to the drive wheels and to the location of the brake bands because by this arrangement a very simple, yet a substantial construction is obtained that can be manufactured at smaller cost than when the ordinary designs are employed. The location of the brake bands with relation to the crank disks is considered to be of importance because in the first place locating the brake bands in this position removes the excessive torque strains that would otherwise be applied to the crank shaft and then by having the brake bands accessible, the operator is always in position to see that they are properly adjusted and they will therefore be kept in operative condition more effectively than if they were enclosed or located in some inaccessible place.

Another advantage of this location is that it is more simple and cheaper than brakes applied directly to the drive wheels because when brakes of the latter type are used, it is impossible to employ brake bands of the type illustrated.

From the above description it will be apparent that I have produced a simple and substantial locomotive that is especially well adapted for use in mines of all kinds and by contractors where muck is to be removed from excavations and where dump cars and mining cars are to be switched, as is often necessary in mines and on construction work.

Although the locomotive has been shown as of a narrow gauge type, I want it understood that it can be easily made standard gauge and can then be used for switching ordinary freight cars around factories and mines, as well as for other purposes of a similar nature.

Having described the invention what is claimed as new is:

In a locomotive of the type having a frame supported on a plurality of axles, a drive wheel at the end of each axle, a crank shaft rotatably secured to the frame near one end thereof, said shaft having a brake drum and a crank pin at each end, the crank pins being spaced ninety degrees apart, and a connecting rod extending from each crank pin to the drive wheels on the same side, a seat located above the crank shaft, an anchor secured to the frame at the rear of each brake drum, a brake band encircling each brake drum, a bell crank lever pivotally connected to the anchor, one end of the brake band being pivotally attached to one end of the bell crank lever, a second bell crank lever pivoted to the frame above the first bell crank lever, a rod connecting the free end of the first bell crank lever with one end of the other bell crank lever, a brake lever located in front of the seat and pivoted to move about a transversely extending axis, and a rod connecting the free end of the second bell crank lever with the brake lever whereby the brake can be operated by the lever.

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