May 23, 1939. E. B. ROYLE 2,159,180

LOADING MACHINE

Filed May 28, 1937 2 Sheets-Sheet 1

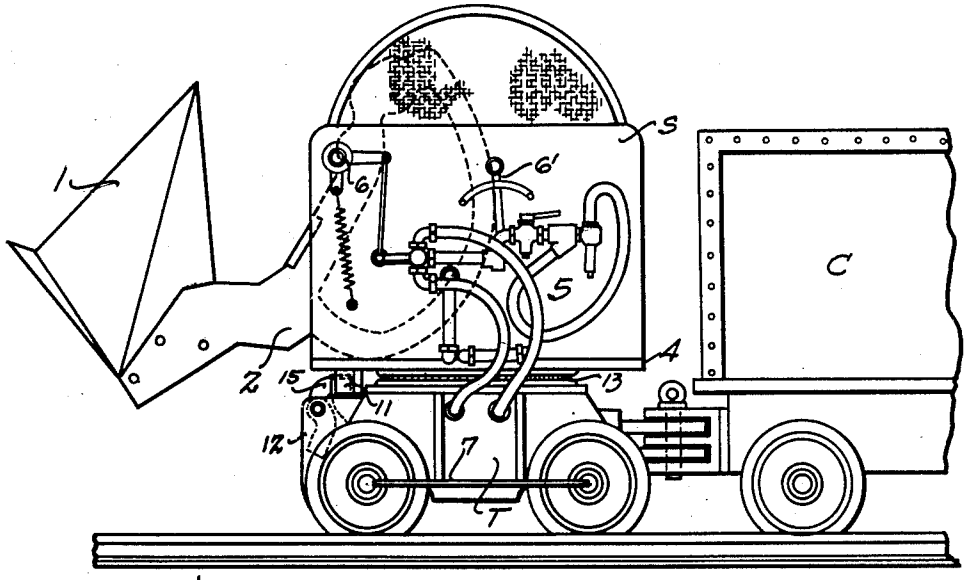



Fig. 1

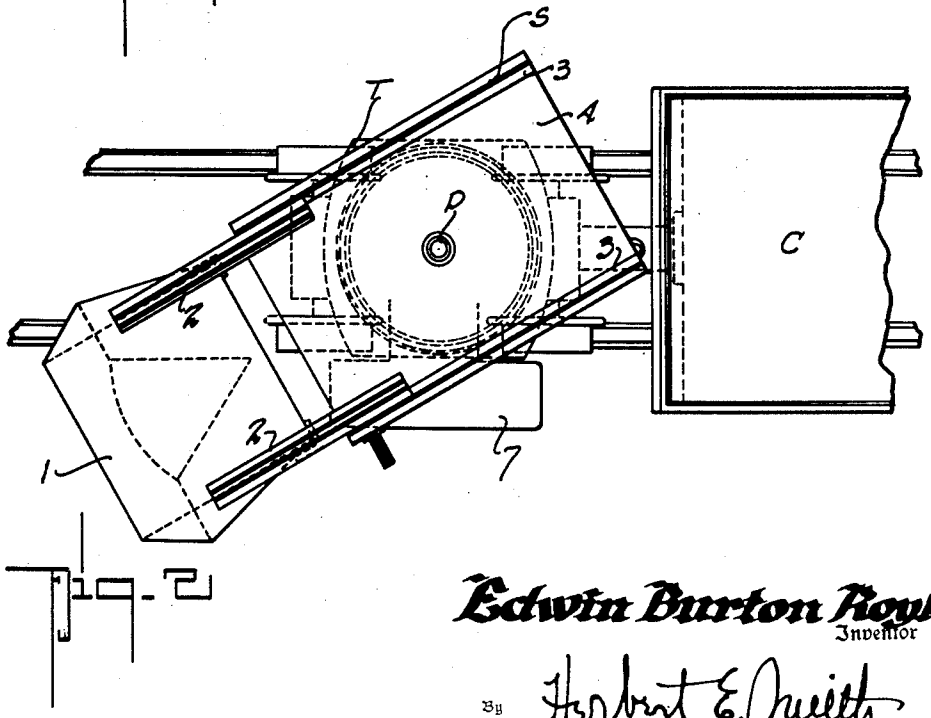



Fig. 2

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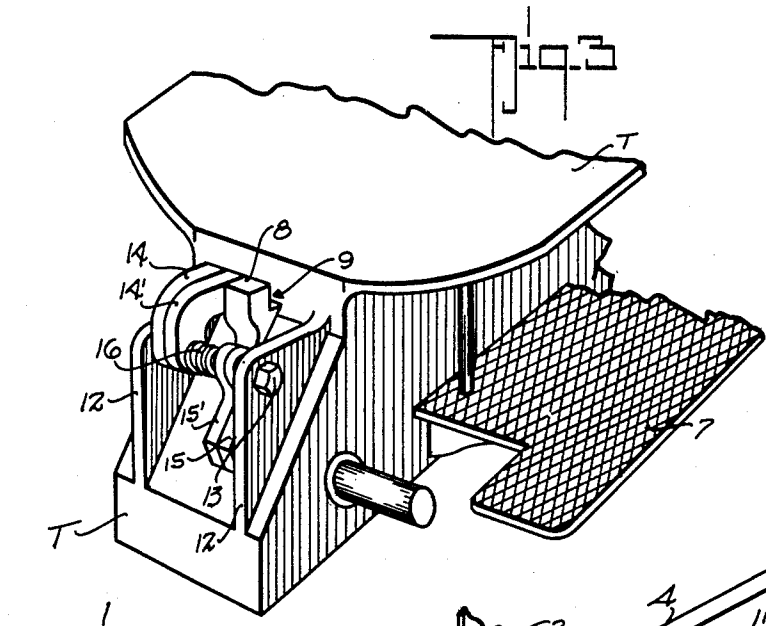
By Herbert E. Smith

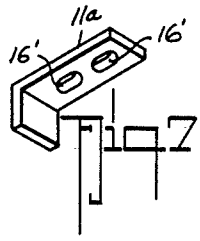
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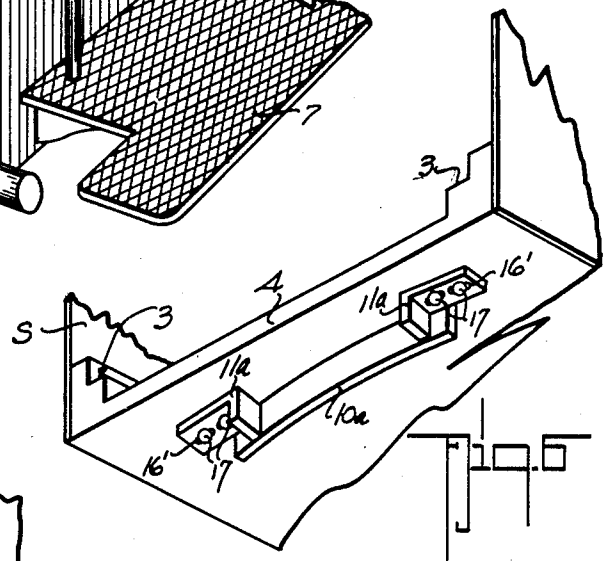
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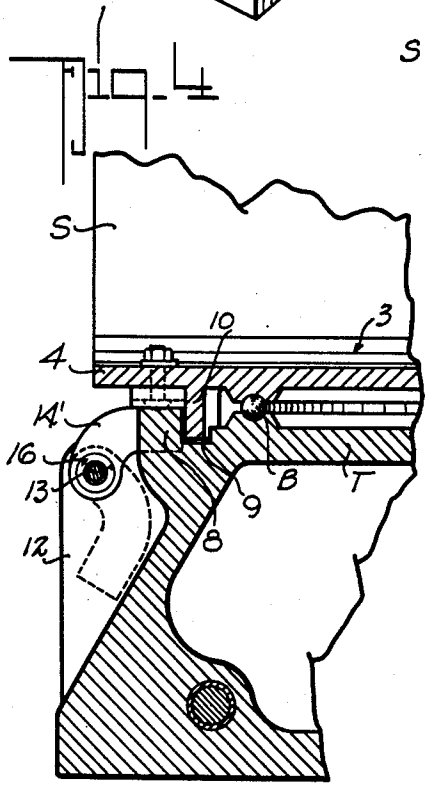
LOADING MACHINE

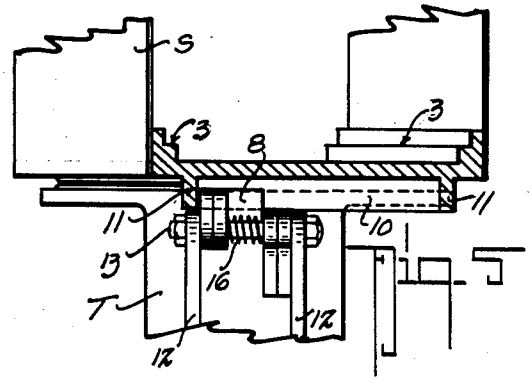
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Patented May 23, 1939 2,159,180

# UNITED STATES PATENT OFFICE

2,159,180

## LOADING MACHINE

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Application May 28, 1937, Serial No. 145,292

8 Claims. (Cl. 214—132)

My present invention relates to improvements in loading machines of the type illustrated in my co-pending application for patent Ser. No. 145,291, filed May 28, 1937, now Patent No. 2,134,582, granted Oct. 25, 1938, which employs a carriage or motor-truck, and a superstructure mounted on the carriage and oscillatable in a horizontal plane. The device of my invention is particularly directed to means for limiting the lateral swing of the oscillatable superstructure to vary the maximum digging-width of the loading machine. These motor-operated machines, which embody a vertical swinging shovel-assembly mounted on the oscillatable superstructure, are especially adapted to travel on a railway in a mine drift or passage, and in digging or shovel-filling operations, the machine is propelled forward to plunge the shovel into the muck-pile, either directly in front of the machine, or at either side of the railway.

For lateral work, the oscillatable superstructure, with its shovel, is usually turned within a maximum range of thirty degrees at either side of the railway, i. e. the superstructure may be swung within a range of sixty degrees at angles to the longitudinal axis of the motor truck or carriage. When working at one of these lateral angles the thrust of the machine is imposed on the shovel assembly and the strain tends to unduly swing the superstructure toward its standard limits. If the drift is narrower than this standard range of oscillation of the superstructure, the shovel is likely to dig into the unbroken material forming the wall of the drift, or to scrape against the timber lining the sides of the wall, with resulting damage.

By the use of my invention the maximum lateral swing of the superstructure and the shovel-assembly may be varied within the standard limits, thus adapting the shovel for work within narrow confines, and affording a substantial abutment to receive shocks caused by thrusts of the shovel in digging when the shovel is in lateral position, at either one or the other side of the railway.

The invention consists in certain novel combinations and arrangements of parts on the motor-truck or carriage and the oscillatable superstructure as will hereinafter be more fully set forth and claimed. In the accompanying drawings I have illustrated one complete example and a modification of the physical embodiment of my invention, wherein the parts are combined and arranged according to the principles of my invention.

Figure 1 is a view in side elevation showing a loading machine in which my invention is embodied, with the shovel in loaded position and ready to be swung to dumping position with relation to the mine-car attached or coupled to the motor truck.

Figure 2 is a top plan view with parts omitted, showing the oscillatable superstructure and shovel-assembly swung laterally of the motor truck, for digging into a muck-pile at the left side of the railway.

Figure 3 is an enlarged, fragmentary, perspective view at the forward end of the motor-truck or carriage, showing the stop devices mounted thereon.

Figure 4 is a detail, vertical, sectional view of parts of the carriage and superstructure, showing the stop device.

Figure 5 is a view partly in section looking at the front of the machine, and showing the superstructure swung to its adjusted, maximum position.

Figures 6 and 7 are detail perspective views showing a modified form of the adjustable or variable stop device for limiting the swing of the oscillatable shovel.

In order that the general arrangement and relation of parts may readily be understood I have shown in Figure 1 a loading machine comprising the motor truck or carriage T and its superstructure S which is oscillatable on a vertical axis or pin P mounted on the carriage or truck, and an annular ball bearing is indicated at B between the carriage and body S for the support of the latter.

The shovel 1 is mounted on and adapted to rock with the spaced rocker arms 2, 2 that roll back and forth on tracks 3, 3, of the base plate 4 of the superstructure S, and this shovel-assembly is power-operated to dig the material, and to dump the contents of the shovel into a mine-car C coupled to the rear end of the truck. An air-motor is usually provided to propel the motor-truck and to operate the shovel assembly, and the control mechanism is indicated at 5 in Figure 1, under control of the levers 6 and 6', in the hands of an attendant standing on the side-board or platform 7.

The oscillatable superstructure and shovel-assembly may be turned, laterally to digging or filling position, by hand, and the superstructure and filled shovel are re-turned into longitudinal alinement with the carriage by co-acting means actuated by movement of the swinging shovel as it moves toward dumping position.

To limit the lateral swing of the oscillatable superstructure within the standard range of sixty degrees at opposite sides of the longitudinal axis of the motor truck or carriage a substantial lug 8 is provided at the longitudinal center of the front wall of the truck T, and this is spaced from the truck to form a guide notch 9 into which an arcuate flange 10 integral with the under face of the base plate 4, fits and is guided as the oscillatable superstructure turns laterally. At its opposite ends the flange is provided with stop lugs 11, 11 against one of which the fixed central lug 8 comes in contact when the oscillatable superstructure has been swung to its standard limit of thirty degrees from the longitudinal axis of the motor truck. This lug 8 integral with the truck or carriage, and the arcuate flange 10 with its lugs 11 integral with the oscillatable superstructure provide for the standard maximum swing of the shovel.

To reduce this maximum standard swing of the shovel to varying conditions in the drift or mine passage, I provide the machine with auxiliary stops on the motor truck or carriage, in addition to the central stop lug 8 of the standard device.

For this purpose the front of the motor truck is fashioned with a pair of spaced upright supporting flanges 12, 12 in which a substantial bolt 13 is mounted in a horizontal plane slightly below and in front of the center lug 8. Two sets of angular dogs 14, 14' and 15, 15' are pivotally supported on the bolt and spaced in pairs at opposite sides of the longitudinal center of the truck, and a spring 16 is coiled about the bolt and interposed between the pairs of dogs to urge the pairs of dogs outwardly against the respective flanges 12, 12. To reduce the standard lateral swing to the left hand side of the railway (as in Figure 5) one of the dogs as 14' or the added dog 14 at the right hand side of the truck is turned upwardly to position in alinement with the center lug 8, and the right hand stop lug 11 of the flange 10 abuts against the outer dog 14 to limit the lateral swing of the superstructure and shovel to the left hand side of the motor truck or railway, assuming the observer to be standing at the rear of the machine.

To limit the right-hand swing of the shovel, the dogs 14, 14', if desired, may be turned down, by hand into the pocket between the two flanges 12, 12, or they may be left in position for a left hand operation and the two dogs (or one of them) 15, 15' are turned up on their pivot bolt for co-action with the lug 8 and the lug 11 of the superstructure.

It will be seen that the pair of dogs 14, 14' and 15, 15' are of the required width to neatly fit the space between the inner face of a flange 12 and the outer face of the lug 8 so that when a lug 11 contacts against a dog the latter provides a solid and substantial bumper or stop to limit the movement of the superstructure and to absorb the thrust of the shovel in its digging operations.

To further assist in varying the working width or digging width of the shovel I may use the parts illustrated in Figures 6 and 7, where the arcuate flange 10a is integral with the under face of the superstructure, but the stops 11a, 11a are adjustable. These stops are in the form of angle plates, slotted at 16' and bolts 17 are passed through the slots and through bolt holes in the base plate 4 of the superstructure. The angle-stops may be adjusted toward or away from the longitudinal center of the superstructure, and then secured in adjusted position by the nuts 18 in Figure 4. These adjusted stops 11a co-act with the dogs 14 or 15 in lieu of the integral stop lugs 11.

When in operative position, it will be noted that the dogs, due to their angular shape, maintain their correct place under action of gravity, and the free ends of the dogs rest on the front wall of the truck with the rear face of the dog directly in front of the front face of the guide flange 10. The dogs may readily be turned down to inoperative position, by hand, and are then out of the way of the shovel operations.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a loading machine, the combination with a carriage having a central centering stop for an oscillatable superstructure mounted to turn laterally of the carriage, and a stop on the superstructure, of a pivoted stop mounted on the carriage for alinement with said central stop and adapted to be located in the path of movement of the stop on the superstructure.

2. The combination in a loading machine with a carriage, an oscillatable superstructure mounted to turn laterally on the carriage, and a stop fixed on the superstructure, of a stop pivotally mounted on the carriage and adapted to be swung into the path of the superstructure-stop, and means adjacent to and rigid with the superstructure-stop for retaining the carriage-stop in off-center, operative, position.

3. In a loading machine, the combination with a carriage having a central centering stop for an oscillating superstructure mounted to turn laterally on the carriage, and a stop on the superstructure, of a stop pivotally mounted on the carriage and adapted to be swung into the path of the superstructure-stop, and means whereby said carriage stop is retained in off-center position in the path of the superstructure-stop.

4. In a loading machine, the combination with a carriage having a central centering-stop for an oscillating superstructure mounted to turn laterally of the carriage, and a pair of spaced stops on the superstructure located one at each side of the centering-stop, of a pair of movable stops pivotally mounted on the carriage at opposite sides of the centering-stop and adapted to be swung into the path of movement of said spaced stops, and means for retaining said pivoted stops in operative position.

5. In a loading machine, the combination of a carriage having a fixed centering-stop, a pair of pivoted dogs mounted on each side of and adapted to be swung into alinement with said centering-stop, an intermediate spring-device for separating said spaced dogs, an oscillatable superstructure mounted to turn laterally of the carriage, and a pair of spaced stops rigid with the superstructure for co-action with said dogs.

6. In a loading machine, the combination with a carriage, an oscillatable superstructure mounted to turn laterally of the carriage, an arcuate flange rigid with the superstructure, and rigid stops at the ends of said flange, of a fixed centering stop on the carriage located between said rigid stops, a pair of angular stops pivotally mounted at opposite sides of the centering stop and adapted to be swung against said flange into the path of movement of the rigid stops, and each of said pivotal stops having a weight at its free end.

7. In a loading machine, the combination with a carriage having a central centering-stop for an oscillatable superstructure mounted to turn lat-

erally of the carriage, and a pair of spaced adjustable stops mounted on the superstructure one at each side of the centering stop, of a movable stop pivotally mounted on the carriage adjacent the centering stop and adapted to be swung into the path of the adjustable stops, and means for retaining the pivotally mounted stops in the path of movement of the adjustable stops.

8. In a loading machine, the combination with a carriage having a central fixed centering-stop, a pair of angular dogs pivotally mounted one at each side of said centering stop and adapted to be swung into alinement therewith, a weight on each dog for holding said dogs in off-center position alined with the centering-stop, and an intermediate spring-device for separating said dogs, of an oscillatable superstructure mounted to turn laterally on the carriage, and a pair of spaced stops mounted on the superstructure for co-action with said dogs when they are in alined position.

EDWIN B. ROYLE.