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POST PULLING MACHINE

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2 Sheets-Sheet 1

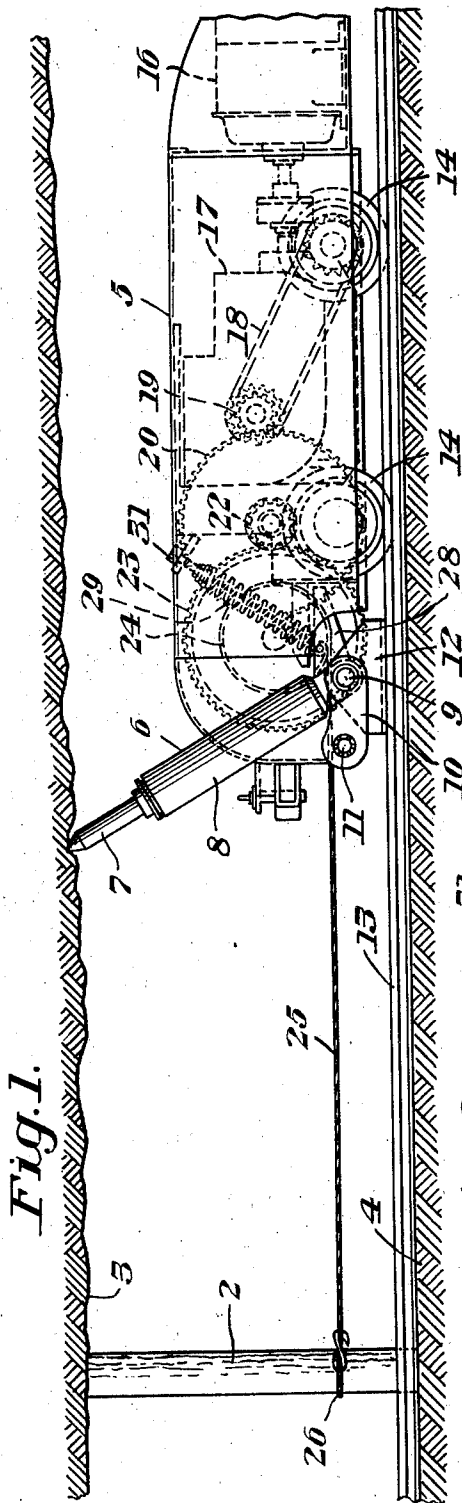


Fig. 1.

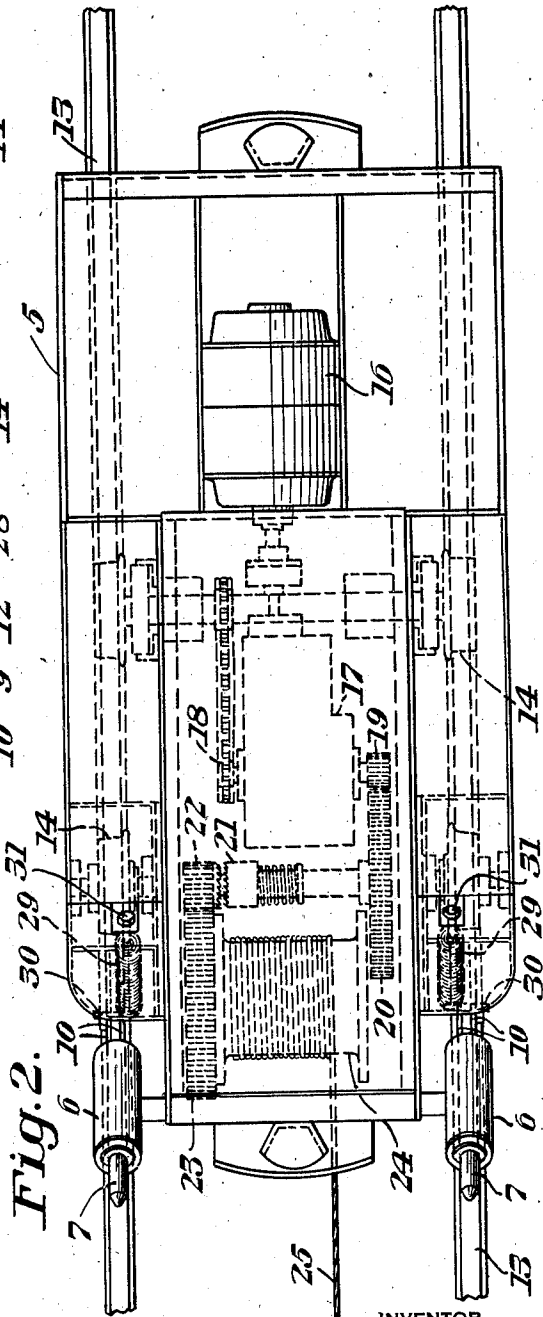


Fig. 2.

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Fig. 3.

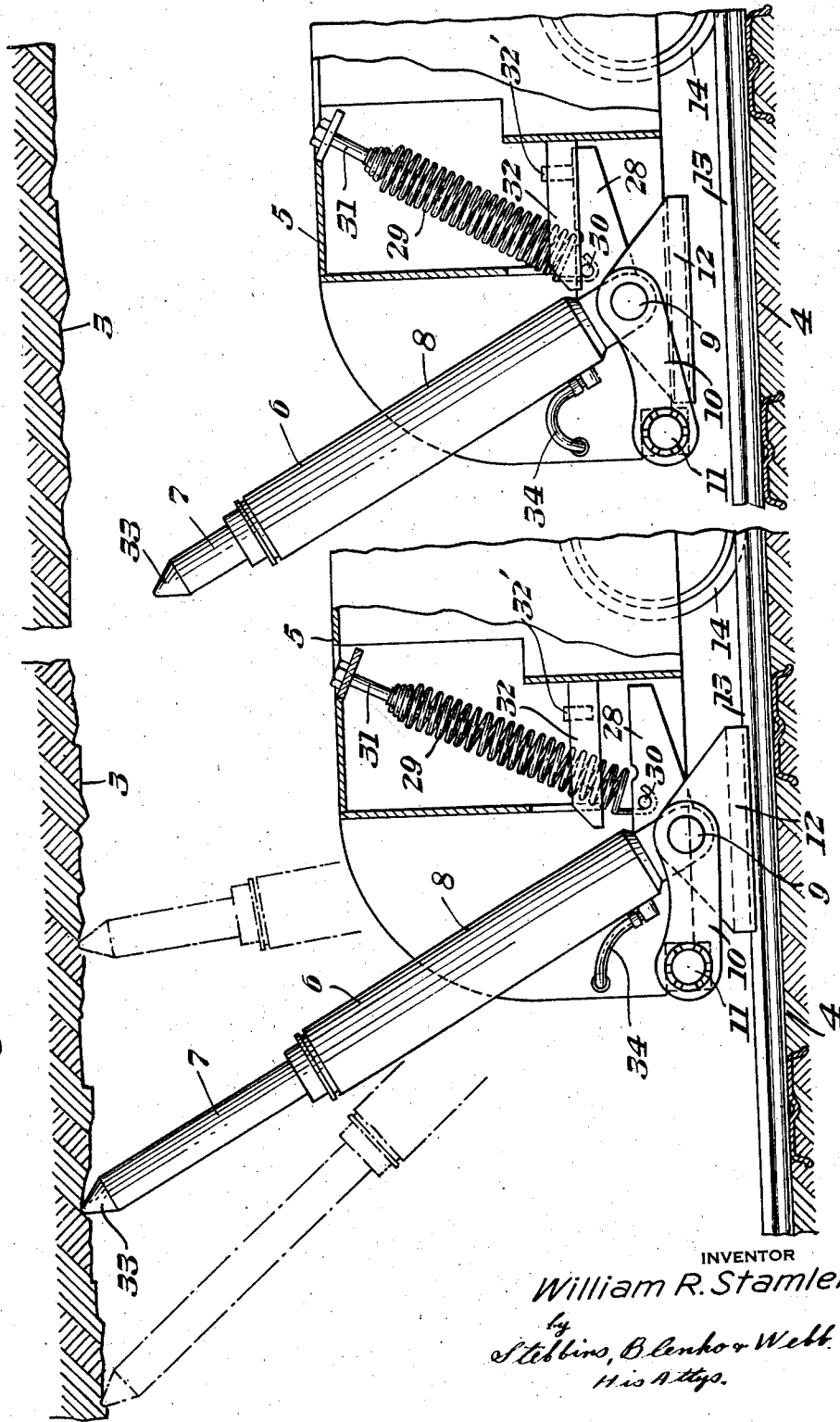


Fig. 4.

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UNITED STATES PATENT OFFICE

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POST PULLING MACHINE

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6 Claims. (Cl. 254—166)

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This invention relates to a post pulling machine for pulling posts and other timbers from the working places from which the coal has been removed. Briefly described, the post pulling machine comprises a mobile frame or car adapted to be run into the mine in which the posts to be pulled are located. The frame or car has a winding drum mounted on it so that a rope or cable may have one end connected to the post to be pulled and the cable may then be wound on the drum to pull the post. The mobile frame or carriage has two jacks indirectly mounted on it, each of the jacks having a lifting head at its upper end and a shoe at its lower end so that when the lifting head is in contact with the mine roof and the shoe is in contact with the rail or floor of the mine, the jacks maintain the frame in fixed position so that pull is exerted through the rope on the post to be pulled when the rope is wound on the winding drum. Each of the jacks is mounted on a link which is pivoted to the frame in such manner that the axial pressure exerted by the jack in maintaining its position against the rope pull is exerted directly between the roof and rail, or floor, without being transmitted through the machine frame.

In the accompanying drawings which illustrate a preferred embodiment of the invention,

Figure 1 is a longitudinal vertical section through a portion of a mine, the post pulling machine and post to be pulled being shown in elevation;

Figure 2 is a plan view of the post pulling machine; and

Figures 3 and 4 are side elevations of a portion of the post pulling machine. Figure 3 shows the jack in its inoperative position with the shoe raised from the rail, this position being the one which the parts assume when the frame or carriage is being run into or out of the mine. Figure 4 shows the jack in operative position with the shoe in contact with the rail. In this position the jack holds the frame in fixed position so that the post can be pulled upon rotation of the winding drum.

Referring more particularly to the accompanying drawings, the post 2 to be pulled extends between the mine roof 3 and the mine floor 4. The post pulling machine is designated generally by the reference numeral 5. A jack indicated generally by the reference numeral 6 has a lifting head 7 which when the jack is in operative position contacts the roof of the mine. The jack has a body 8, the lower end of which is pivoted to a pin 9 carried by a link 10. The left-hand end of the

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link is pivoted to a pin 11 mounted in the frame. A shoe 12 is pivoted to the pin 9 and is adapted to contact a rail 13 on which the wheels 14 of the car run. In cases where there are no rails on the mine floor the shoe may be provided with a pad which contacts the floor directly. There are two jacks 6, links 10 and shoes 12, one of each being located at the right side of the carriage and the other at the left side of the carriage. The construction of each jack and associated mechanism is the same.

The frame of the post pulling machine supports a motor 16 which operates through a speed reducer 17, suitable gearing and a driving chain 18 to drive the wheels 14 of the carriage. The speed reducer is connected by gears 19 and 20, clutch 21 and gears 22 and 23 to a winding drum 24. A rope 25 is connected at the end 26 to the post 2 and at its other end to the winding drum. Upon operating the winding drum, the carriage being maintained in fixed position by the jacks 6, the post is pulled.

The construction of the jacks and associated mechanism to which the present invention particularly refers, is shown in detail in Figures 3 and 4. In the embodiment shown the jacks 6 are of the hydraulic type having a body or cylinder 8 and a lifting head 7, but may be of any other suitable type. In Figure 3 the parts are shown in the positions they assume when the jacks are in their inoperative positions, as when the carriage is being moved to or from its post pulling position. The link 10 is pivoted at its left-hand end on a pin 11 supported by the frame of the carriage. The body 8 of the jack is pivoted to a pin 9 mounted in the right-hand end of the link 10. The shoe 12 is pivoted to the pin 9. An arm 28 is formed integrally with or rigidly connected to the lower portion of the body 8 of the jack. A spring 29 is connected at its lower end to a pin 30 secured to the arm 28, and the upper end of the spring is connected to a bolt 31 secured to the frame. Stops 32 and 32' limit the upward movement of arm 28 caused by spring 29 when the jack is in the inoperative position. These stops 32 and 32', by contact of pin 30 and arm 28 respectively, maintain the jack at the correct angle for the proper jack set up. This arrangement of the arm 28, pin 30 and stops 32 and 32' is important in that it makes possible the operation of the machine by inexperienced men who might otherwise not set the jacks at the proper angle. If any attempt were made to hold them rigidly at the proper angle, they might be damaged when in action because they were

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not able to align themselves with the points of pressure against the roof and the floor. A flexible pipe 34 is provided for supplying fluid to the jack in order to raise the lifting head 7.

The operation of the device in pulling a post is as follows. The carriage is driven into the mine by the motor 16, and the rope 25 is connected to the post 2. During travel of the carriage the jacks are in the raised position shown in Figure 3, the shoes 12 being raised from the rails 13 by the springs 29. The lifting head 7 of the jack is then raised by admitting fluid to the cylinder 8 of the jack. When the point 33 of the lifting head 7 contacts the roof 3 of the mine, continued extension of the jack moves arm 28 and pin 30 away from stops 32' and 22, thus eliminating the positioning effect of the arm, pin and stops and permits the jack to align itself as required. The body 8 of the jack moves downwardly and the shoe is lowered until it contacts the rail. Since the jack is pivoted on the pin 9 and the shoe likewise is pivoted on the pin 9, the jack and shoe are self-aligning whereby the point of the jack may take any convenient position so as to provide good engagement with the roof, and the shoe likewise aligns itself so as to provide good contact with the rail. The lowering of the body 8 of the jack and the shoe is accompanied by and is in opposition to the tensioning of the spring 29. Various positions which the jacks may assume are shown in chain lines in Figure 4. When the jack is in the operative position shown in Figure 4 so as to prevent the carriage from moving, the winding drum 24 is operated thereby putting tension on the rope and pulling down the post. The jack is then lowered out of contact with the roof, whereupon the spring 29 raises the shoe from the rail and re-engages the positioning devices so that the machine may be moved to another point without the necessity of further securing the jacks.

It will be seen that in the construction which has been described the pressure exerted by the jack is transmitted through the shoe 12 to the rail 13 without being transmitted through the frame of the machine. The jack is mounted indirectly on the frame by means of the link 10 thereby avoiding transmission of the force of the jack through the frame. In order to minimize any tendency of the machine to overturn when pulling a post, the pull on the rope 25 should be exerted in a plane passing through or which lies in the vicinity of the pivot point 11 as shown in Figure 1.

I have illustrated and described a preferred embodiment of the invention, but it is to be understood that the invention may be otherwise embodied or practiced within the scope of the following claims.

I claim:

1. A post pulling machine comprising a mobile frame, a post pulling mechanism mounted on the frame, a link pivoted to the frame, a jack pivoted adjacent its lower end to the link, a shoe pivotally connected to the lower end of the jack and means for raising the jack and shoe to inoperative position when the jack is not in use.

2. A post pulling machine comprising a mobile

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frame, a post pulling mechanism mounted on the frame, a link pivoted to the frame, a jack pivoted adjacent its lower end to the link, a shoe pivotally connected to the lower end of the jack, and a spring operatively connecting the frame and jack for raising the jack and shoe to inoperative position when the jack is not in use.

3. A post pulling machine comprising a mobile frame, a post pulling mechanism mounted on the frame, a link pivoted to the frame, a jack pivoted adjacent its lower end to the link, a shoe pivotally connected to the lower end of the jack, an arm rigidly connected to the jack, and a spring connecting the arm and frame for raising the jack and shoe to inoperative position when the jack is not in use.

4. A post pulling machine comprising a mobile frame, a post pulling mechanism mounted on the frame, a link pivoted to the frame, a jack pivoted adjacent its lower end to the link, a shoe pivotally connected to the lower end of the jack, an arm rigidly connected to the jack, a spring connecting the arm and frame for raising the jack and shoe to inoperative position when the jack is not in use, and a stop for limiting the upward movement of the arm.

5. A post pulling machine comprising a mobile frame, a post pulling mechanism mounted on the frame, a link pivoted to the frame, a jack pivoted adjacent its lower end to the link, a shoe pivotally connected to the lower end of the jack, an arm rigidly connected to the jack, a spring connecting the arm and frame for raising the jack and shoe to inoperative position when the jack is not in use, and a stop for limiting the upward movement of the arm, the stop limiting the upward movement of the arm at a plurality of points whereby the jack is maintained at the correct angle for the proper jack set up.

6. A post pulling machine comprising a mobile frame, a winding drum mounted on the frame, means mounted on the frame for rotating the drum, a rope adapted to be connected to the post to be pulled and to be wound on the drum, a link pivoted to the frame, a jack having a lifting head adapted to contact the roof of a mine, the body of the jack being pivoted to the link, and a shoe pivoted to the jack and adapted to contact the floor of a mine, whereby the pressure exerted by the jack is transmitted through the shoe to the floor without being transmitted through the frame, the reach of the rope between the post and drum being in a plane which lies close to the pivot point of the link on the frame.

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