April 14, 1953 H. L. TEDROW 2,634,873

DEVICE FOR SETTING TIMBERS AND THE LIKE

Filed Aug. 5, 1948 3 Sheets-Sheet 1

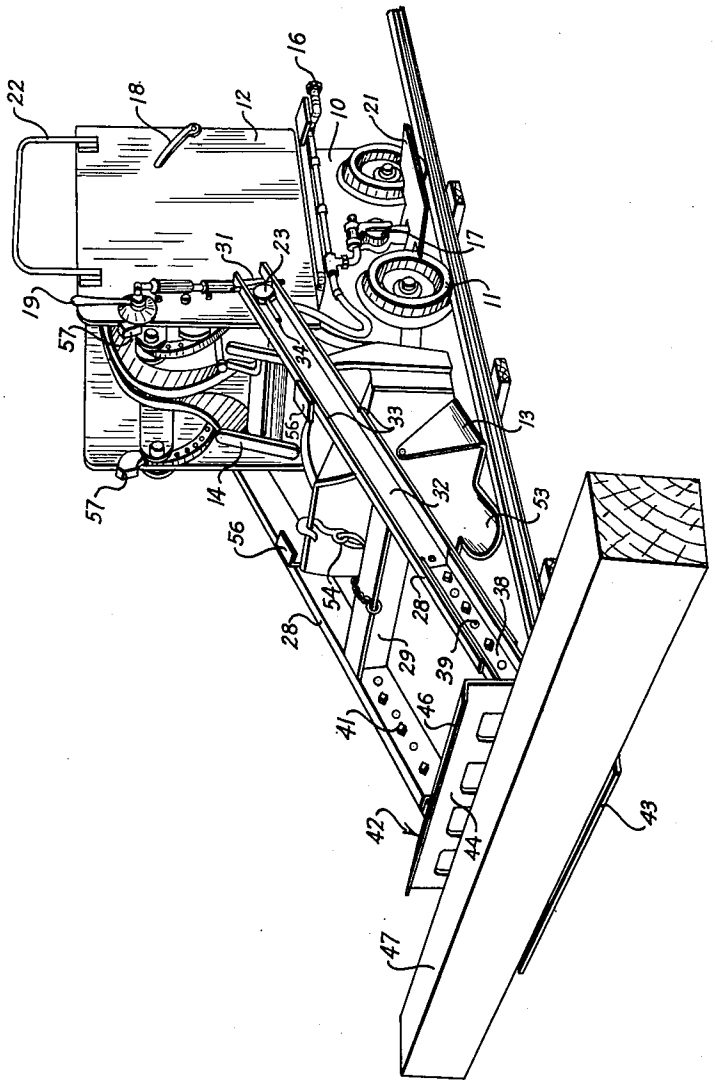

FIG. - 1

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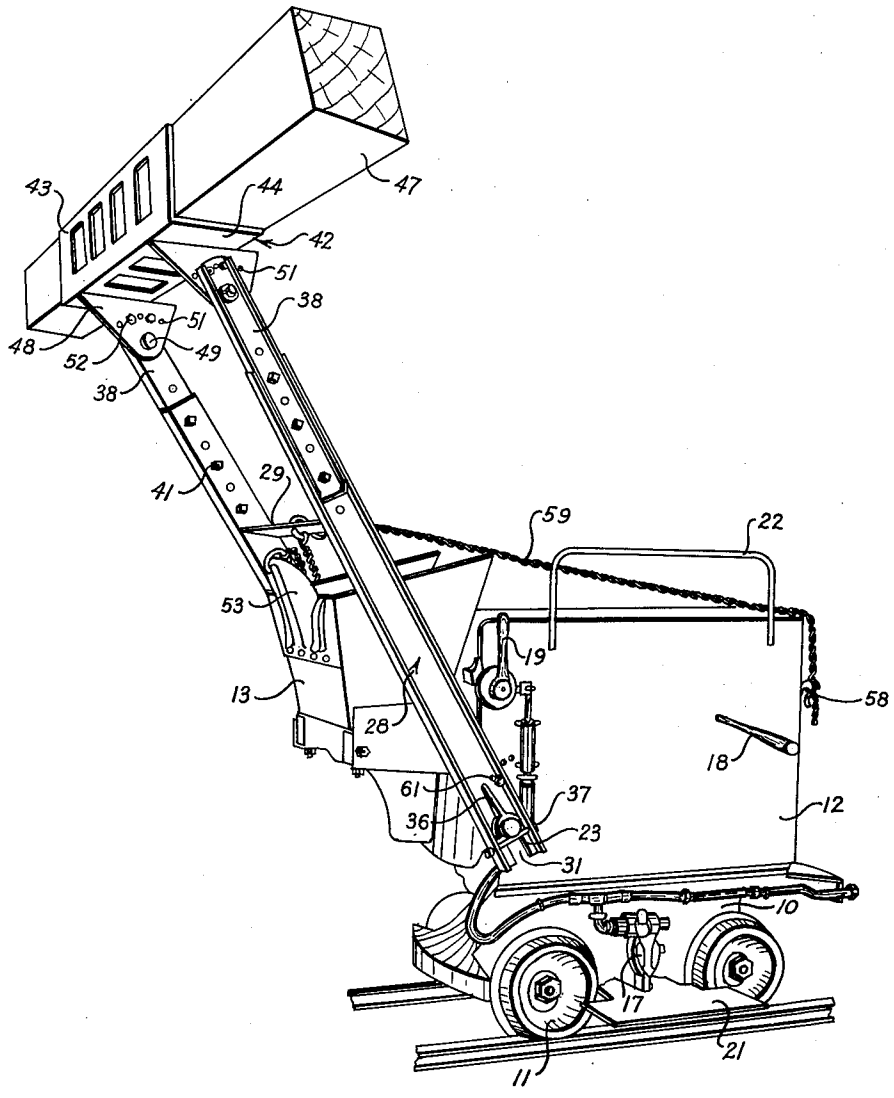

FIG. 2

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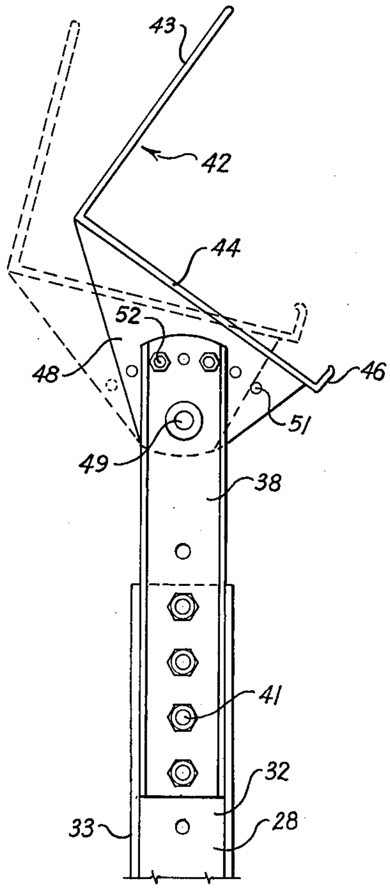

FIG. — 3

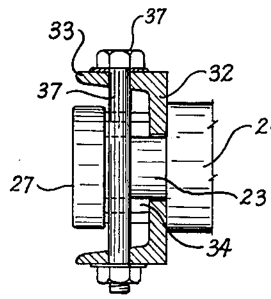

FIG. — 4

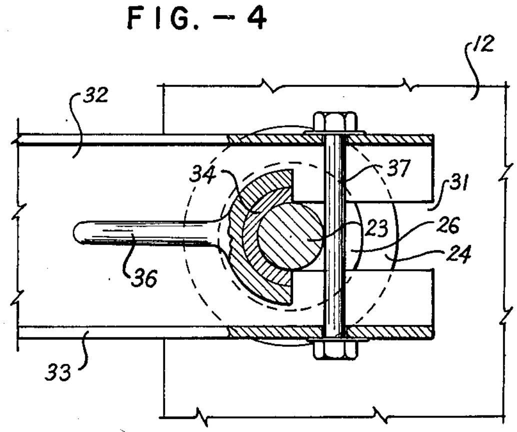

FIG. — 5

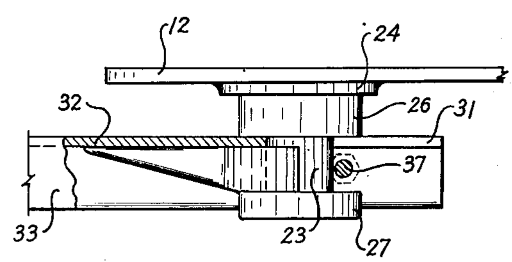

FIG. — 6

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Patented Apr. 14, 1953

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UNITED STATES PATENT OFFICE

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DEVICE FOR SETTING TIMBERS AND THE LIKE

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Application August 5, 1948, Serial No. 42,621

9 Claims. (Cl. 214—130)

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My invention is directed in general to load-lifting devices and refers particularly to timber-setting apparatus for mine car loaders.

It is frequently necessary in underground mining operations to support the roof of a drift, tunnel, or similar excavation by heavy balks or timbers, usually consisting principally of posts disposed near the side walls and supporting a cap or horizontal cross member bearing against the roof. These timbers are necessarily heavy, often being from ten to sixteen inches square and several feet long, since the weight they must support is of considerable magnitude. Elevating and positioning these heavy members, particularly the cap, within the narrow confines of a drift is a difficult and sometimes dangerous task, being often attempted without the use of equipment.

The timber-setting devices currently employed are not only heavy and cumbersome, but many of them are primarily modified forms of jacks, having but little flexibility of use.

The primary object of my invention is to provide apparatus particularly adapted for use in underground mining operations for positioning heavy objects such as timbers in elevated locations.

Other important objects of my invention include the provision of such device which may be removably attached to a mine car loader and utilize the motor of such loader for hoisting, which is adjustable, which is capable of movement from place to place without dismantling, which may be employed to hold objects, such as timbers, at a desired angle about a horizontal axis, and which provides a convenient elevated working platform.

Other important objects, as well as many of the advantages of my invention will be disclosed in the course of the following detailed description and in the appended drawings in which:

Fig. 1 is a perspective view of a mine car loader with my timber setting device attached thereto in loader position;

Fig. 2 is a perspective view showing a mine car loader with my timber setting apparatus attached in elevated position;

Fig. 3 is a partial side view of the lifting arms;

Fig. 4 is a partially sectioned end view of a pivot;

Fig. 5 is a partially sectioned elevation of a pivot; and

Fig. 6 is a partially sectioned plan view of the pivot.

In brief, my apparatus includes a pair of longitudinally adjustable arms pivoted to the frame

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of a mine car loader and reinforced by a cross member, which may be secured as by a chain or the like to the scoop of the loader. A timber support is pivotally fixed across the outer ends of the arms, stops being provided to limit the arcuate movement. The scoop may thus be moved in its accustomed path in a vertical plane, forcing the arms upwardly and elevating the timber support to the desired position. When elevated, the arms may be locked in position and the loader moved if and as necessary to place the cap member on posts. The arms may then be lowered to an intermediate position where the timber support forms a stable platform for a workman placing lagging or performing some similar task, usually requiring the use of a ladder.

There are, of course, several types of mine car loaders in actual use, and several additional forms have been proposed. My timber-setting attachment is applicable to the type of loaders having a member such as a scoop driven in a vertical plane in such manner that the arms can be moved in the desired arcuate path by attachment to the scoop. These mine car loaders are usually powered by compressed air, although certain types may utilize electric power. Certain models are capable of rotation about a vertical axis, some by the proper application of power and others by hand rotation. Substantially all of the loaders which employ a scoop movable in a vertical plane also employ suitable gearing for driving the scoop forward, as well as for moving the scoop in a vertical arc to load a mine car, usually secured to the rear of the loader.

A typical mine car loader is illustrated in Fig. 1 and comprises a truck 10 having rail wheels 11 and supporting a frame 12 which extends upwardly from the truck 10. The frame 12 is open at the front or scoop end to permit positioning of a suitable scoop 13 at track level, if desired. The scoop 13 is supported by arms 14 suitably geared to an air motor or the like, not shown, for movement in a vertical plane. A compressed air line may be attached to the loader by a coupling 16 and is led through a distributor valve 17 to the air motor. A control handle 18 is provided to control the arcuate movement of the scoop 13 in a vertical plane and a similar control handle 19 is also mounted on the frame to control the forward and rearward movement of the scoop. A platform 21 is provided for the operator near the level of the wheels 11 as is a hand rail usually secured to the frame 12.

The structure thus far described is intended only to illustrate generally the construction of mine car loaders to which my timber-setting attachment is applicable, it being understood that the structure may be varied within wide limits and does not alone constitute a part of my invention. To opposite sides of the frame 12 I secure horizontally aligned shafts 23 at or near the front or shovel end of the loader and preferably near the level of the truck 10. Attachment is preferably accomplished by welding to the frame 12 a plate 24 to which the shaft 23 is in turn welded. The shaft 23 includes inner and outer collars 26 and 27 respectively, which may be formed integrally with the shaft 23, if desired. Spaced arms 28, reinforced by transverse cross member 29 secured to the arms 28 intermediate their ends, are slotted as at 31 to slip endwise over the shafts 23. I prefer to form these arms 28 of channel members having a web 32 and flanges 33.

A semi-cylindrical bearing cap 34 is welded to each of the webs 32 near the closed end of the slot 31 in position to engage the shaft 23 and is reinforced by a triangular member 36 welded to the web 32 and to the bearing cap 34 to prevent displacement. The width of the bearing cap 34, plus the thickness of the web 32 is substantially equal to the distance between the inner and outer collars 26 and 27, which serve to prevent lateral movement of the arms 28. A locking bolt 37 extends through suitable openings in the flanges 33 in spaced relation to the bearing cap 34 and serves to prevent accidental withdrawal of the arms 28 from the shaft 23. The bolt 37 may be retained in position either by a cotter key or suitable nut and is not in ordinary operation required to resist strain.

Extension arms 38, also preferably formed of channels, slidably engage the free end of the arms 28 and are provided with a multiplicity of apertures 39 registerable with corresponding apertures formed in the web 32 to receive locking bolts 41. The effective length of the arms 28 may therefore be varied as necessary.

A timber support, generally designated 42, extends across the free ends of the arms 28 and preferably comprises a bed plate 43 normal to a backing plate 44. If desired, a flange 46 parallel to the bed 43 may be formed on the edge of the backing plate 44 to aid in holding a timber, indicated at 47. Spaced parallel depending flanges 48 are secured as by welding to the backing plate 44 and have aligned openings adapted to receive pivot pins 49, which also extend through the extension arms 38. A series of alignable openings 51 are also formed in each of the flanges 48 and arms 38 around the pivot 49 to receive locking bolts 52 for securing the timber support 42 in the desired angular position.

To elevate the timber support, if desired, I prefer to form an aperture in the scoop 13 and to removably attach thereto a chain 54 or the like, the other end of which is secured to the cross member 29, thus permitting the chain to elevate the arms 28 as the scoop 13 is driven upwardly. Since the scoop 13 is usually capable of movement past the rear of the loader, it is desirable to provide stop pads 56 disposed to engage stops 57 mounted on the frame 12, thus limiting the maximum angular position of the arms 28.

Several methods for locking the arms 28 in elevated position may be employed, one of the simplest and most effective being to weld a chain hook 58 on the back of the frame 12 a considerable distance down from the upper edge of the frame to receive a chain 59, the opposite end of which may be secured to the cross member 29. This type of locking device has the advantage of being able to secure the arms in substantially any desired position. If desired, however, an elongated pin 61 may be provided for positioning in apertures formed in the frame 12 and the arms 28 in several locations.

In operation, the loader is run along haulage tracks in a drift or the like to the desired location, which is usually at or near the working face. During this operation the arms 28 may be detached and carried on a mine car or the like coupled to the loader. As the loader fills the mine cars, they are taken away by a locomotive, or the like, except the last car filled, which is preferably allowed to remain coupled to the loader to prevent overbalancing when my timber-setting device is applied. If a car is not available, suitable track clamps, such as those used on railroad cranes may be employed. The loader is then moved to a position where it is desired to place timbers, and the posts are set, employing sills if necessary, ready to receive the cap. The bolts 37 are then removed from the arms 28 and the arms slipped over shaft 23, after which the bolts 37 are reinserted and locked. Chain 54 is then secured to the scoop 13 of the loader and the timber support 47 adjusted to the desired angular position by proper placement of the bolts 52. The length of the arms 28 is adjusted by suitably positioning the bolts 41 to bring the timber 47 into the desired position at an elevation slightly above the upper ends of the posts. The operator then moves control handle 16 causing the scoop 13 to rise in a vertical plane, carrying with it the arms 28, the timber support 42, and the timber 47. When the desired elevation has been attained, the chain 59 may be engaged with the hook 58 and the entire loader moved along the tracks to position the timber 47 directly over the posts. The chain 58 is then detached and the arms 28 lowered, allowing the timber cap 57 to rest on the posts.

It is ordinarily expedient to lower the arms 28 only part way and to then lock them into position by engaging the chain 59 with the hook 58, since the timber support 42 forms an excellent stable working platform for workmen installing lagging between the cap timber and the roof. It is not always necessary that the loader be moved along the tracks to position the cap timber over the posts, since it is frequently possible to roll the timber or otherwise maneuver it into the desired position.

From the foregoing it may be seen that the use of my attachment converts a mine car loader into a dual-purpose machine without interfering in any manner with its normal functioning. The modification required to convert a conventional loader is very slight and the cost of fabricating the attachment is also negligible when compared to the cost of other timber setting devices in use today.

It is of course possible to vary certain of the structural details hereinbefore described without departing from the scope of my invention. For example, a chain bridle may be employed to secure the arms 28 to the scoop 13, or other types of bracing employed between the arms 28. I therefore do not wish to limit myself specifically to the hereinbefore described details, except insofar as defined by the appended claims.

I claim:

1. In a mine car loader of the type having a driven scoop movable in a vertical plane, the improvement which includes a pair of spaced arms removably pivoted to the loader frame and projecting forwardly beyond the scoop, a cross brace between the arms, a timber support pivoted to the free forward end of the arms, means for locking the timber support in position on the arms, and draft means for connection between the scoop and the arms.

2. In a mine car loader of the type having a driven scoop movable in a vertical plane, the improvement which includes a pair of spaced arms having slotted ends, bearing members on each of the arms at the ends of the slots, horizontally aligned shafts fixed to the frame of the loader for engagement with the bearing members, a timber support pivoted to the free end of the arms, means for locking the support, draft means for connection between the scoop and the arms and means for locking the arms in elevated position.

3. In a mine car loader of the type having a driven scoop movable in a vertical plane, the improvement which includes a pair of spaced arms having slotted ends, bearing caps fixed to the arms at the closed ends of the slots, horizontally aligned shafts fixed to the loader for engaging the bearing caps, spacers for restraining movement of the arms along the shafts, arm extensions adjustably secured to the arms, an angular timber support having spaced depending flanges, pins for pivotally securing the flanges to the arm extensions, means for locking the flanges against rotation, a chain for connecting the arms to the scoop and means for locking the arms in elevated position.

4. A timber-setting attachment for mine car loaders of the type having a scoop movable in a vertical plane by a motor, comprising a pair of arms each having bearing means on one end for engaging aligned shafts on a loader, a timber support on the other end of the arms forwardly beyond the scoop, and draft means for connecting the arms to the scoop.

5. A timber-setting attachment for mine car loaders of the type having a scoop movable in a vertical plane by a motor comprising a pair of spaced arms having slotted ends, cross bracing between the arms, a bearing cap fixed to each of the arms near the closed ends of the slots for engaging horizontally aligned shafts on the loader, a removable retaining pin extending through openings in each of the arms across the slotted portion and spaced from the bearing cap for preventing unintentional withdrawal of the arms from the shafts, a timber support on the free end of the arms and a chain on a cross member for attachment to the scoop.

6. The combination with a mine car loader of the type having a driven scoop for movement in a vertical plane of a pair of spaced forwardly projecting arms pivotally fastened to the loader for arcuate movement about a horizontal axis, a timber support on the free ends of the arms beyond the scoop, means for connecting the arms to the scoop for elevating the arms and locking means on the loader for holding the arms in an elevated position.

7. The combination with a mine car loader of the type having a driven scoop for movement in a vertical plane of a pair of forwardly extending spaced arms pivotally fastened to the loader for arcuate movement about a horizontal axis, a timber support on the free ends of the arms beyond the scoop, means for connecting the arms to the scoop for elevating the arms, stops on the arms for limiting the upward arcuate movement of the arms, and locking means on the loader for holding the arms in an elevated position.

8. The combination of a mine car loader having a driven scoop movable in a vertical plane of a timber-setting device comprising a pair of spaced extendable arms pivoted to the loader for movement in a generally vertical plane and projecting beyond the loader for a substantial distance beyond the scoop, a cross member between the arms, a timber support between the ends of the arms, and means for engaging the scoop with the cross member.

9. Apparatus for setting heavy timbers in elevated position against a hanging wall comprising a mine car loader, a scoop on the loader supported for movement in an upright plane, a pair of rigid parallel arms pivoted to the loader for movement in an upright plane, said arms projecting outwardly beyond the scoop, a timber support connecting the free ends of the arms, power means for driving the scoop, draft means for coupling the arms to the scoop, and means for locking the arms against arcuate movement.

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