

Jan. 22, 1946.

F. L. A. TURNER
AUTOMATIC LOADING DEVICE

2,393,432

Filed June 5, 1944

2 Sheets-Sheet 1

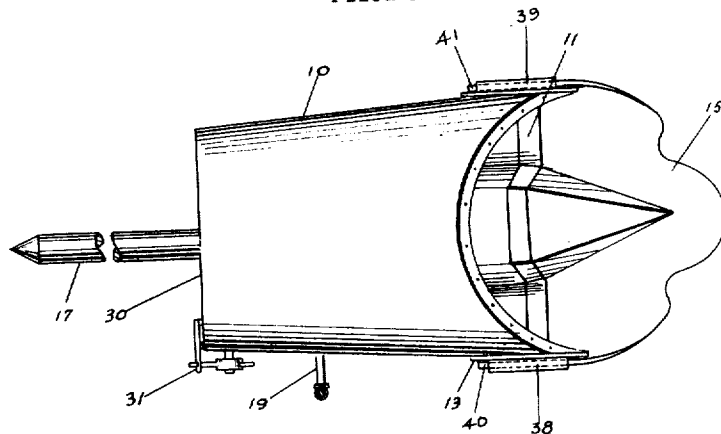


FIG. 1

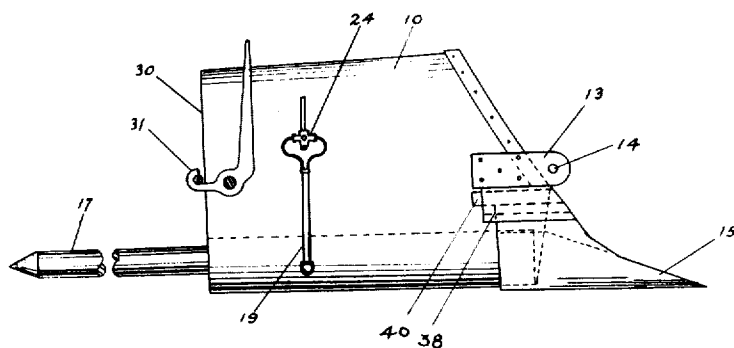


FIG. 2

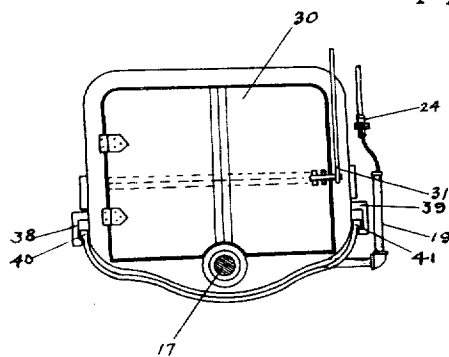


FIG. 3

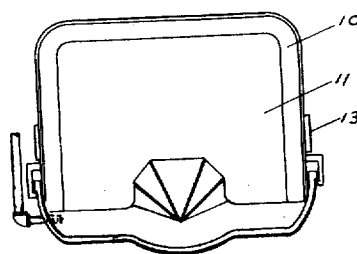


FIG. 4

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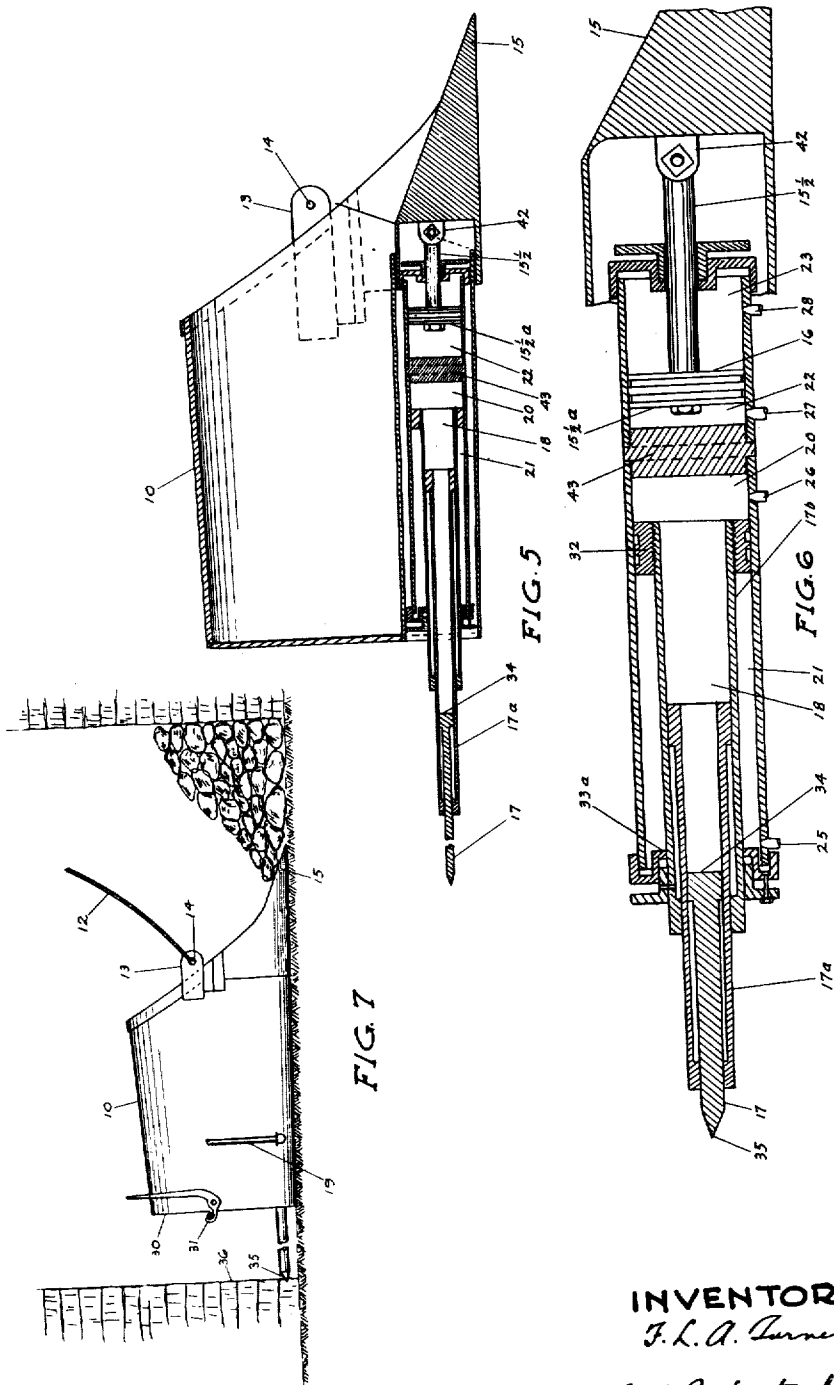
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2,393,432

AUTOMATIC LOADING DEVICE

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3 Claims. (Cl. 214-116)

The invention relates to improvements in automatic loading devices, as described in the present specification and illustrated in the accompanying drawings that form a part of the same.

The invention consists essentially of the novel features of construction as pointed out broadly and specifically in the claims for novelty following a description containing an explanation in detail of an acceptable form of the invention.

The objects of the invention are to devise a method of loading and raising aggregate at the base of a mine shaft or pit or inferior level up to the surface, or ground level, by means of a loading device in the form of a bucket; to create a means of loading the bucket by loosening the aggregate and causing it to enter the bucket; to enable the loading operation of the bucket to be performed with a minimum of manual labor, and easily controlled both in the actual filling of the bucket and in the emptying of the same; to create a means of loading and raising the aggregate, thereby eliminating considerable danger to miners or workmen; to furnish a more speedy method of bringing aggregate to the ground level; to create a loading device which will automatically perform the functions of loosening the aggregate and causing it to be fed into the bucket; and generally to provide a loading device that will be durable in construction and efficient for its purpose.

In the drawings:

Figure 1 is a plan view of the loading device.

Figure 2 is a side view of the loading device.

Figure 3 is a rear end view of the loading device.

Figure 4 is a front end view of the loading device.

Figure 5 is an enlarged side sectional view of the loading device.

Figure 6 is an enlarged sectional detail of the actuating mechanism.

Figure 7 is a side view of the loading device as applied to a mine shaft and the aggregate to be loaded.

Like numerals of reference indicate corresponding parts in the various figures.

Referring to the drawings:

The container which is in the bucket, as indicated by the numeral 10, consists of a type of shovel scoop which is completely enclosed except for the mouth or opening 11, into which the aggregate finds entrance. Attached to, and forming a part of the bucket 10, is an operating mechanism.

The lowering and raising of the bucket is performed by means of a suitable and acceptable hoisting arrangement with pulleys and cable. The cable 12 is attached to the body of the bucket by lugs or extension ears 13, having openings 14

through which the cable is inserted and made secure.

At the base of the opening 11 of the bucket 10 is located an actuating tongue or lip 15 which extends to the full width of the opening, and this lip works independently of the operating mechanism for the bucket as it is connected to the actuating piston 16 of the casing which is secured to the bucket and encloses the operating mechanism.

The actuating or oscillating lip 15 is a separate slidable member from the bucket 10 and extends completely across the mouth of the bucket and is provided with upwardly extending side flanges 38 and 39 which engage with the guide members 40 and 41, the latter being secured to the bucket 10. The lip is oscillated through the movement of the piston rod 15½ which is suitably secured to the underside of the lip by means of brackets 42 and this piston rod is secured at its other end to the piston 16.

At the rear of the bucket 10 is located a propelling rod 17 which protrudes or is caused to protrude as it is controlled by the propelling section 18 of the operating mechanism. This propelling section is equipped with a double telescopic covering extension 17a and 17b for the propelling rod 17 and permits the rod to reach and be extended to the necessary protruding distance.

The bucket 10 is also equipped with an intake pipe 19 which is connected to a hose or pipe line leading to the ground level. A passage of air to the air chambers is controlled by a three-way valve 24 which directs the compressed air into its chambers by four tributary channels, 25, 26, 27 and 28. The valve in position one allows the air to passage 26, as well as to oscillating valve which is attached to oscillating cylinder. The valve which operates the oscillating cylinder (and of which is not shown on the accompanying drawings) allows the air to enter and exhaust from ports 27 and 28. The control valve 24, being in position 2, only allows the air to port 25, which retracts 17, 17a, and 17b. A header 43 is suitably placed between the two piston chambers.

The operating mechanism is controlled by air pressure which is forced internally to the air chamber and permits the compressed air to force into air passage 20 by means of the tributary channel 26 so that the telescopic extension 17b is automatically caused to move outwards, taking with it the telescopic extension 17a, as well as the propelling rod 17 until the connecting shoulder 32 of the telescopic extension 17b comes to a stop against the end wall 33a. As a result the compressed air acts against the only remaining moveable opposition, namely the abutted end 34 of the propelling rod 17 to be forced in a con-

tinued outward direction until the point 35 has reached an acceptable limit or shaft wall 36.

At the rear end of the bucket is installed a large swinging door 30, which is held closed or opened by means of an acceptable type of lever catch 31.

Referring now to the actuating piston 16 of the operating mechanism, the compressed air is controlled by an oscillating valve thus allowing the air to be forced through the tributary channels 27 and 28 into air chambers 22 and 23, thus the air will push against and impell the inside of piston 16 and the outside of piston 15½, so that it will be forced in an outward direction causing the lip itself 15 to be propelled outwardly and towards an object in front of it, such as a quantity of aggregate as depicted by numeral 37, as well as, force back to its original position, namely inwards, causing the lip 15 itself to retreat so to speak, and when the air pressure is directed into air chambers 22 and 23 through the oscillating valve, the action is a rapid succession of quick jogging vibratory movements, thus causing the lip 15 to loosen any contacted aggregate, as well as, assist the movement back into the bucket 10, working simultaneously with the advancement of the said bucket caused by the propelling rods 17, 17a, and 17b which are against the wall 36. The lip 15 is forced under the loosened aggregate and gradually towards it until a sufficient amount of aggregate has found entrance into the bucket through the opening 11.

When the point 35 of the propelling rod 17 comes in contact with any stubborn object, such as the wall of the mine shaft 36, the propelling rod 17 will have the effect of pushing the bucket 10, to which it is attached and forms a part, away from the wall and towards any accumulated aggregate 37 until the actuating lip 15 comes in contact with the aggregate.

A reversal of the air pressure from air-chamber 20 to air-chamber 21, through the tributary channel 25, will cause the compressed air pressure to force the shoulder 32 of the outer telescopic extension 17b to be drawn inwardly or away from the end wall 33a, carrying with it the whole of the telescopic extension equipment 17a, as well as the propelling rod 17, so that the point 35 is brought back into the body of the operating mechanism.

It will, of course, be understood that whilst the point of the propelling rod comes in contact with a hard surface, other types of points or stop arrangements in the form of a shoe plate may be devised without in any way departing from the essential features of the invention.

In the operation of the invention, the bucket being first lowered to the base of the shaft or pit by means of a suitable hoisting and lowering device and coming to rest at a pre-arranged spot, between the wall of the shaft or pit and the aggregate to be raised, the bucket is then ready to be filled. Controlled by an operator at the ground level, the compressed air from an acceptable form and type of air compressing machine is forced into the desired air chambers of the operating mechanism by means of suitable and acceptable pipe or hose lines, so that the propelling rod functions and shoves the bucket towards the aggregate whilst, at the same time, the actuating lip vibrates and loosens the aggregate so that the aggregate involuntarily enters the

bucket until a desired capacity load has been reached. An attendant workman then operates the three-way control valve causing the propelling rod to be withdrawn inside the operating mechanism and out of the way; and, at the same time, the actuating lip is arrested in its jogging movements and the bucket is then raised by the acceptable hoisting device to the ground surface, with the mouth of the bucket uppermost by virtue of the position of the attached cable lug being off center, that is, nearer the open end of the bucket. Another attendant workman then releases the lever catch which holds the door at the now underside of the bucket, and the contents are released and dumped in an appointed place.

In this way it will be seen that an efficient type of bucket with an operating mechanism and an advantageous method of loading is provided for loading and raising all types of aggregate from one location to another, particularly valuable when it is used in mine shafts for raising coal and ore because it supplies a speedy means of loading in, and transportation from a congested and difficult area and, consequently, eliminates the necessity of workmen being crowded together and thus decreasing, to a certain degree, the chances of possible injury and accidents to all concerned.

What I claim is:

1. In automatic loading devices for aggregate, a bucket having a mouth, a casing secured to the underside of said bucket, telescopic members in said casing and adapted to be extended rearwardly from said casing to engage with an exterior resistance surface to propel said bucket into direct contact with the aggregate and force such aggregate to enter the bucket, actuating means in said casing, a lip extending forwardly from the mouth of said bucket and moveably operated by said actuating means, and air pressure means for driving said operating and actuating mechanisms.

2. In automatic loading devices for aggregate, a bucket, having a mouth, a casing secured to the underside of said bucket, a plurality of plunger rods having plunger heads reciprocally mounted in said casing and adapted to co-operate with one another in pushing forward said bucket into contact with the aggregate and causing the aggregate to enter into said bucket, actuating means in said casing, a lip extending forwardly from the mouth of said bucket and moveably operated by said actuating means, and air pressure means for driving said operating and actuating mechanisms.

3. In automatic loading devices for aggregate, a bucket having a mouth, a casing secured to the underside of said bucket, a plurality of plunger rods having plunger heads reciprocally mounted in said casing and adapted to co-operate with one another in pushing forward said bucket into contact with the aggregate and causing the aggregate to enter into said bucket, a lip rod in said casing, a lip extending outwardly from said bucket and connected to said lip rod and adapted to be actuated to loosen the aggregate prior to its introduction into the buckets, and air pressure means for driving said plunger rods and said lip rod.

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