

991,194.

Patented May 2, 1911.

Fig. 2.

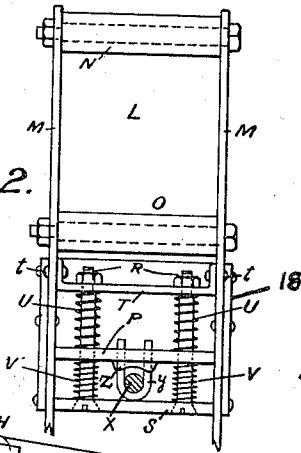


Fig. 3.

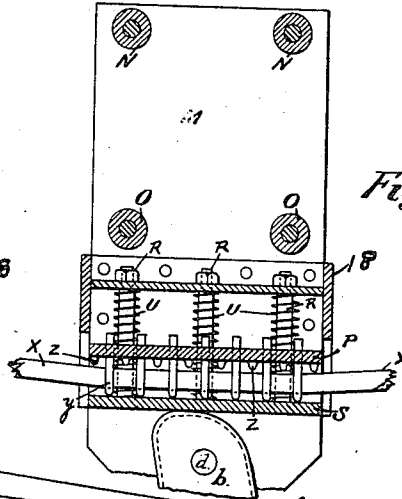
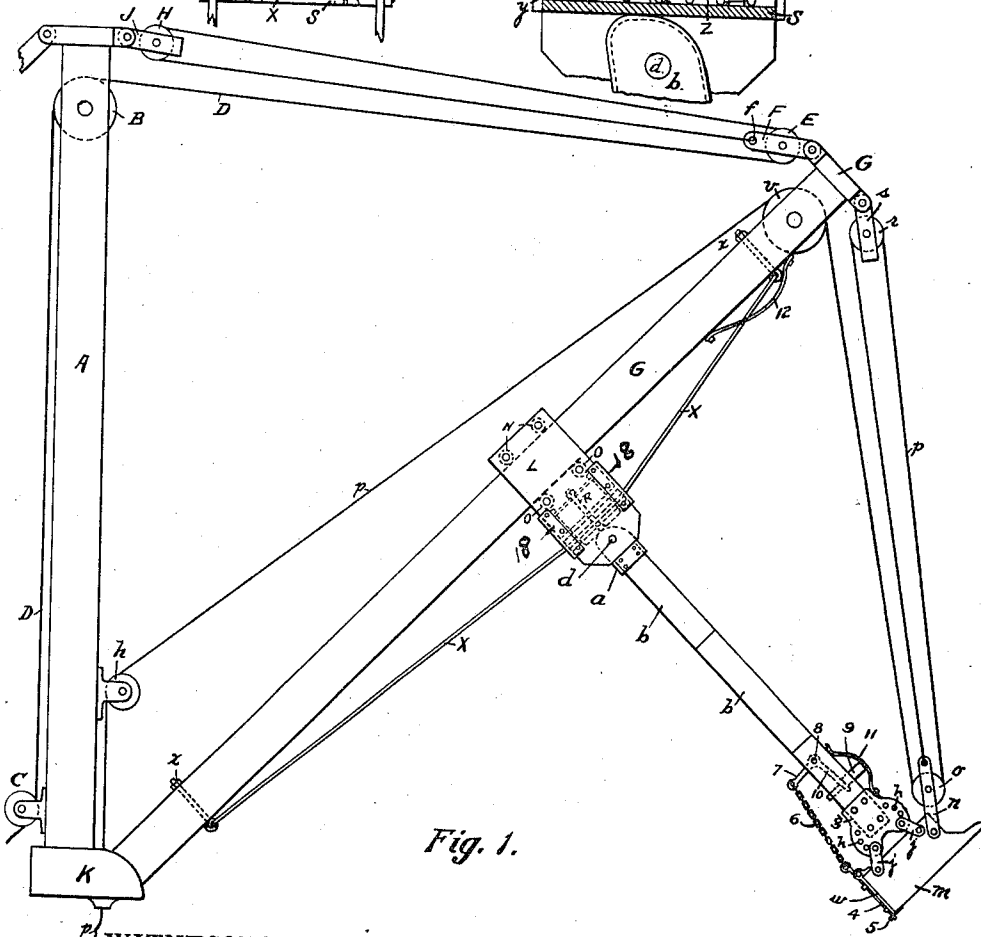


Fig. 1.



WITNESSES:

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STORRS M. BISHOP, OF SCHENECTADY, NEW YORK.

POWER-SHOVEL.

991,194.

Specification of Letters Patent.

Patented May 2, 1911.

Application filed February 17, 1911. Serial No. 609,117.

To all whom it may concern:

Be it known that I, STORRS M. BISHOP, a citizen of the United States of America, residing at No. 9 Parkwood Boulevard, Schenectady, in the county of Schenectady and State of New York, have invented certain new and useful Improvements in Power-Shovels, of which the following is a specification.

My invention relates to power shovels, and the object of my invention is to provide an apparatus for automatically filling, raising and dumping a bucket; together with such elements and combinations as are hereinafter more particularly described and claimed. I accomplish these objects by means of the mechanism illustrated in the accompanying drawing, in which:

Figure 1 is a side elevation. Fig. 2 is a front elevation of the carriage. Fig. 3 is a side elevation with parts broken away, showing a portion of the cable passing through it. Similar letters refer to similar parts throughout the several views.

The mast, A, carries suitable pulleys, B, C, over which the chain or rope, D, passes, at one end of which may be applied a power used for operating the mechanism, not shown. The chain or rope, D, passes over a pulley, E, in the block, F, attached to the head of the boom, G, and also over a pulley, H, in the block, J, attached to the mast, A, and at last is secured to a ring in the block, F. I do not, however, limit myself to this method or manner of connecting up the mast, A, with the boom, G, as any convenient method for applying the power to raise or lower the boom to and from the mast may be used without departing from the spirit of my invention.

The boom, G, is hinged at, K, in connection with the mast, A, in any suitable manner so that when the chain or rope, D, draws the end of the boom, G, up the boom will move on the hinge at K. On the boom, G, I place a carriage, L, composed of two like plates, M, M, on each side and open at the ends. In the plates, M, M, I mount two sets of rollers, N and O, so arranged that the boom, G, will contact with each set of rollers, being placed between the two sets as shown in Fig. 1.

The carriage, L, is provided with a plate, P, through which passes the bolts, R, the bolts also passing through the plates, S and T; the plate, T, being secured by suitable

bolts or rivets, *t, t*, to the plates, M, M, while the plates, P and S, are capable of movement along the bolts, R. Between the plate, P, and the plate, T, on the bolts, R, I place the heavy springs, U, U, while between the plate, P, and the plate, S, I place the lighter springs, V, V. Between the plates, S and P, the cable, X, passes guided and retained in its position therein by a series of U-shaped staples, Y, and a series of concavo-convex blocks, Z in any suitable manner. The cable, X, is attached to the boom, G, by means of bolts, *w*, or in any suitable manner.

Between the plates, M, M, and below the plate, S, I secure a casting, *a*. Within the casting, *a*, I pivot one end of the dipper arm, *b*, at *d*. The end of the dipper arm, being cam-shaped as shown in Figs. 1 and 3, is adapted to press against the plate, S; the cam shaped end of the dipper arm being so formed that that side of the arm which when in its operative position, as shown in Fig. 1, faces toward the foot of the mast, A, extends above the opposite side of the cam-shaped end of the dipper arm, so that when the dipper arm is moved on the pivot, *d*, under the operation of the lifting cables, as soon as it is lifted and rotated on said pivot it will release its pressure against the plate, S, of the carriage.

At the lower end of the dipper arm, I place a casting, *g*, provided with a series of bolt holes, *h*, by means of which the links, *j*, may be secured to the casting, using bolts or pins, *k*, therefor, the links, *j*, being attached to the bucket or shovel, *m*. The nose of the bucket or shovel, *m*, is connected with the block, *n*, carrying the pulley, *o*, about which the cable, *p*, passes, which cable also passes over the pulley, *r*, in the block, *s*, attached to the head of the boom, G, and also over the pulley, *v*, in the boom, G, and pulley, *h*, in the mast, A.

The end of the bucket or shovel, *m*, is provided with a door, *w*, held closed by means of a bolt, *4*, passing through the top of the shovel and the catch plate, *5*, on the bottom thereof or in any suitable manner. The bolt, *4*, connected with chain, *6*, and the arm, *7*, on the bell crank lever and pivoted at *8*, to the dipper arm, *b*. A push bolt, *9*, passes through or connects with the other arm, *10*, of said lever and is protected by a spring, *11*, attached to the side of the dipper arm, *b*. On the side of the boom, G, I place

a striker, 12, which may be a block or piece of metal so arranged that when the dipper arm is raised the striker, 12, will engage the spring, 11, and press the push bolt, 9, raise the bolt, 4, and dump the shovel by releasing the door, *w*. As thus arranged, when the dipper arm is lowered and in the act of being filled the end of the dipper arm will press against the plate, S, which will compress the springs, V, V, and grip tightly the cable, X, holding the carriage firmly in place on the boom, G. When the shovel is raised the pressure of the plate, S, against the cable, X, is relieved somewhat, which will permit the carriage to move along the boom, but prevent it from too fast or too extended a motion along the boom by means of the cable, X, secured to the boom at the ends of the cable.

In order to prevent danger from a too sudden stoppage of the movement of the carriages which might result in breaking some of the parts, I provide for the relief of the strain by causing the plate, P, to move against the tension of the springs, U, U.

I do not wish to limit myself to the construction of a carriage with rollers in the manner described, as any departure therefrom which permits of the easy reciprocation of the carriage along the boom under the restraining and guiding influence of a cable or its equivalent will come within the spirit of my invention.

I do not wish to limit myself to the construction of the shovel in the exact form illustrated, nor to the precise manner of mounting the same, since any adjustment or arrangement of the shovel whereby it will be dumped by means of engagement with the boom would come within the spirit of my invention.

For the purpose of strengthening the carriage and preventing any injurious effect from the severe and sometimes racking strains upon that portion of the carriage nearest the cable, I place a reinforcing plate, 18, extending across from one plate, M, to the other and secured thereto in any suitable manner.

What I claim as my invention and desire to secure by Letters Patent is:

1. In a power shovel, a mast; a boom connected therewith; a carriage adapted to travel along said boom; a cable attached to the boom passing through said carriage; a means in said carriage for gripping said cable; a dipper arm having one end pivoted in said carriage; a shovel secured to said dipper arm; a swinging door in said shovel; a means for locking said door; a means on

said boom for unlocking said door when said shovel is raised.

2. In a power shovel, a boom suitably mounted; a carriage adapted to reciprocate along said boom; a means for regulating the movement of said carriage along said boom; a dipper arm mounted in said carriage; a means in said carriage whereby said dipper arm will operate said regulating means; a shovel attached to said dipper arm; a door for closing said shovel; a means on the boom for opening said door and dumping said shovel when the shovel has been raised to a predetermined degree.

3. In a power shovel, a boom suitably mounted; a carriage adapted to reciprocate along said boom; said carriage provided with two movable plates and one stationary plate slightly separated; bolts passing through said movable plates into the stationary plate; springs placed on said bolts between said movable plates; springs placed on said bolts between one of said movable plates and the adjacent stationary plate; a cable passing between said movable plates; guides attached to one of said movable plates for keeping said cable in position in reference thereto; a shovel; a dipper arm connecting said shovel with said carriage and having the end which engages said carriage of cam-shaped contour; a means for raising said shovel; a means on said shovel for dumping the same; a means on said boom for causing the dumping mechanism on said shovel to become operative, substantially as described.

4. A power shovel, comprising a mast; a boom; a shovel; a carriage adapted to reciprocate along said boom; a dipper arm connecting said shovel with said carriage; a movable plate in said carriage engaged by said dipper arm; a cable passing through said carriage engaging said movable plate in the carriage and secured at its end to said boom; a means in said shovel for dumping the same; a means for raising and lowering said shovel; a means on said dipper arm whereby when it is raised it will release its pressure upon said plate in the carriage; a means on said boom to cause the dumping means in said shovel to become operative upon engagement therewith, substantially as described.

In testimony whereof I have affixed my signature in presence of two witnesses.

STORRS M. BISHOP.

Witnesses:

LOTTIE PRIOR,
FREDERICK W. CAMERON.