

EXCAVATOR BUCKET.

Patented Nov. 22, 1910.

2 SHEETS—SHEET 1.

976,742.



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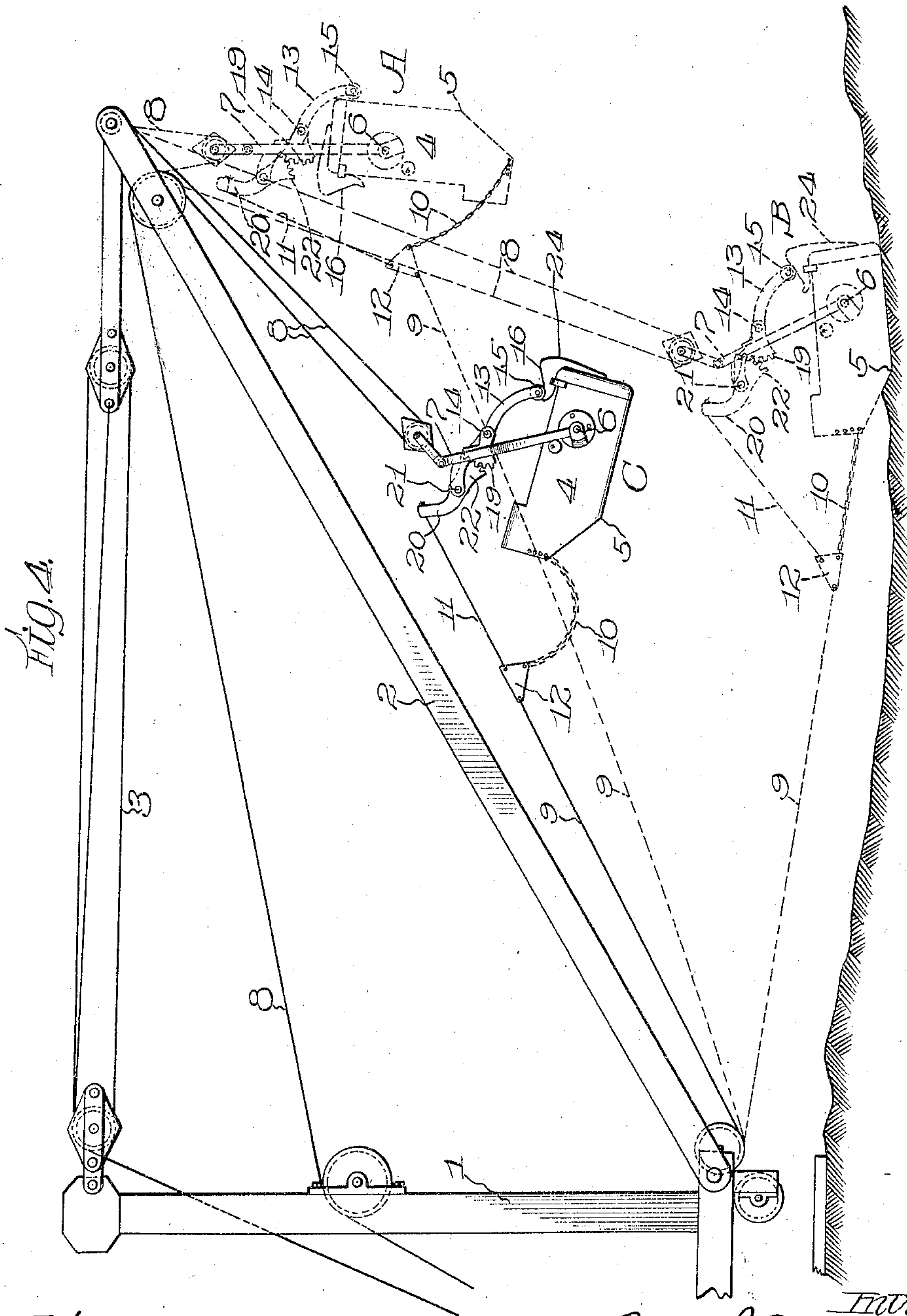
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2 SHEETS—SHEET 2.

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UNITED STATES PATENT OFFICE.

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EXCAVATOR-BUCKET.

976,742.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, OSCAR J. MARTINSON, a citizen of the United States of America, and a resident of Chicago, county of Cook, State of Illinois, have invented certain new and useful Improvements in Excavator-Buckets, of which the following is a specification.

The main objects of this invention are to provide an improved form of operating mechanism for excavator buckets whereby the swinging of the bucket between its load carrying and dumping positions may be controlled by the tension on the hauling cable; and to provide mechanism of this kind in which the controlling line which connects the operating mechanism with the hauling line will have a straight lead without requiring it to pass over pulleys.

A specific construction illustrating the present invention is shown in the accompanying drawings, in which:—

Figure 1 is a side elevation of the bucket in its load carrying position. Fig. 2 is a fragmentary detail of a modified construction with the bucket represented in the position of Fig. 1. Fig. 3 is a rear elevation of the device shown in Fig. 1. Fig. 4 is a side elevation showing various positions of the bucket and its operating mechanism with respect to the derrick from which it is supported.

In the construction shown, the derrick is of usual type, and comprises a mast 1, a boom 2, and the upper end of the boom is supported by means of a cable 3 in the usual manner. The bucket 4 is open at the front, and is provided with a cutting edge 5 at the front of its bottom. The side walls are extended forward of the cutting edge, and their lower front corners are cut away, so that when the bucket is lowered to the ground, it will come to rest in such position that its cutting edge will cut into the surface of the ground when the bucket is pulled ahead by the hauling cable. The bucket is supported by trunnions 6, in a bail 7, which in turn is suspended by the hoisting cable 8. The hauling cable 9 is divided in front of the bucket so as to provide two parts 10, which are respectively connected to opposite sides of the front of the bucket 4, and a third part 11, which will hereinafter be referred to as the controlling line. The haul-

ing cable 9 is connected to the parts 10 and 11 by means of a triangular plate 12.

The angular position of the bucket with respect to the supporting bail is controlled by a lever 13, which is fulcrumed at 14 on the bail, and which has a rearwardly extending arm adapted to coact with the rear part of the bucket to prevent the same from tilting forward to its dumping position; there being, in the form shown in Fig. 1, a shoulder 15 in the form of an anti-friction roller on the lever, and a coacting cam track 16 on the bucket.

In the modified form shown in Fig. 2, the shoulder is on the bucket, and consists of the anti-friction roller 17, while the cam track is replaced by a cam surface 18 on the lever. In all other respects, the two specific forms herein shown are alike. The lever 13 has a part extending forward from its fulcrum 14, in the form of a gear sector 19, and there is a second lever 20 fulcrumed at 21 on the bail and having one arm in the form of a gear sector 22, meshing with the gear sector 19. The other arm of the lever 20 extends forward and upward, and is connected to the controlling line 11.

The operation of the device shown will be best understood from Fig. 4, in which the bucket is shown at A in its dumping position, at B in its loading position, and at C in its load carrying position. On account of the fact that the bail is pivoted to the bucket behind the center of gravity thereof, the bucket will be normally urged by gravity to that position with respect to its bail which is represented at A, provided there is no strain upon the hauling cable to render the controlling mechanism operative. While the bucket is suspended in this position, a strain upon the hauling cable will not tilt the bucket in the bail, and the bucket may therefore be guided by both the hauling and hoisting cables so as to be brought to the ground at any desired position.

When the hoisting cable is lowered so as to drop the bucket to the ground, the forwardly extending sides of the bucket cause it to settle so as to rest upon its bottom in the form shown at B in Fig. 4; and the bail and the controlling mechanism also assume the position shown at B, as soon as the slack is taken out of the hauling cable 9. During the act of loading the bucket, it is pulled

along the ground by hauling on the cable 9, while the hoisting cable 8 is slack. By exerting a strain on the hoisting cable, the bail 7 will be urged rearward, but such movement is prevented by the lever 13 through its connection with the lever 20 and the controlling line 11, and the strain on the cable 8 therefore tips the front edge of the bucket upward so that its cutting edge 5 is lifted out of the ground, and a continued strain upon the cable 8 causes the bucket to be lifted in the position represented at C in Fig. 4, in which case all of the strain on the hauling cable 9 will be resisted by the controlling line 11, and the parts 10 will be slack. If the hauling cable is now gradually paid out as the hoisting cable is hauled in, the bucket will be carried outward toward the end of the boom. If the strain on the cable 9 is then released, the lever 13 will no longer be capable of preventing the tipping of the bucket, and will be pushed upward, as the bucket swings on its trunnions to its dumping position, as represented at A.

As may be seen from Figs. 1 and 2, the cam tracks 16 or 18 coact with the respective rollers 15 or 17, to permit of considerable angular tilting of the bucket with respect to its bail without letting go of the load. When the roller 15 passes the crest 23 of the cam surface 16, it is no longer capable of preventing the further swinging of the bucket, and it simply rides along the surface 24 and over the back end of the bucket. In the form shown in Fig. 2, there is a similar crest or heel 25, which determines the limiting angular position of the bucket, beyond which the lever 13 is no longer capable of preventing the dumping of the bucket. In this case, the heel 25 rides over the surface 26 of the shoe which carries the roller 17. This surface is preferably tangent to the periphery of the roller 17 so as to be in effect an unbroken continuation thereof.

Although the foregoing description and drawings have for the sake of clearness and conciseness been confined to but one specific embodiment of this invention and one modification, it will be understood that numerous other details of the construction shown may be altered or omitted without departing from the spirit of this invention, as defined by the following claims.

I claim:—

1. In an excavator, the combination of a bucket, a bail pivoted thereto back of the center of gravity, hoisting means connected to said bail for lifting the bucket, a hauling cable connected with the front of the bucket, a lever connected with said hauling cable and fulcrumed on said bail, means on said bucket providing a cam surface behind said bail and adapted to coact with said lever for controlling the relative angular positions of said bucket and bail.

2. In an excavator, the combination of a bucket, a bail pivoted thereto back of the center of gravity, hoisting means connected to said bail for lifting the bucket, a hauling cable connected with the front of the bucket, a lever connected with said hauling cable and fulcrumed on said bail, a roller carried by said lever, means on said bucket providing a cam surface behind said bail and adapted to coact with said roller for controlling the relative angular positions of said bucket and bail.

3. In an excavator, the combination of a bucket, a bail pivoted thereto back of the center of gravity, hoisting means connected with said bail for lifting said bucket, a hauling cable operatively connected to the front of said bucket, a gear sector journaled on said bail, means operatively connecting said sector with said hauling cable and adapted to control the angular position of said sector on its axis through the tension on said hauling cable, and a second gear sector meshing with the first and adapted to control the relative angular positions of said bucket and bail.

4. In an excavator, the combination of a bucket, a bail pivoted thereto at a point back of its center of gravity, a hauling cable operatively connected to the front of said bucket, hoisting means connected to said bail for lifting said bucket, a pair of levers separately fulcrumed on said bail and operatively connected, one of said levers being adapted to engage the rearward part of said bucket for controlling the angular movement thereof with respect to said bail and said other lever being connected to said hauling cable and adapted to control the movements of said first lever through variation of the strain on said hauling cable.

5. In an excavator, the combination of a bucket, a bail pivoted thereto at a point back of its center of gravity, a hauling cable operatively connected to the front of said bucket, hoisting means connected to said bail for lifting said bucket, a pair of levers separately fulcrumed on said bail and operatively connected, intermeshing gear sectors respectively connected to said levers, one of said levers having a forwardly extending arm connected to said hauling cable, and the other said lever having a rearwardly extending arm adapted to coact with the rearward part of the bucket for controlling the relative angular positions of said bucket and bail, whereby the tilting of the bucket may be controlled by the hauling cable.

6. In an excavator, the combination of a bucket, a bail pivoted thereto at a point back of its center of gravity, a hauling cable operatively connected to the front of said bucket, hoisting means connected to said bail for lifting said bucket, a pair of levers

separately fulcrumed on said bail and operatively connected, intermeshing gear sectors respectively connected to said levers, one of said levers having a forwardly extending arm connected to said hauling cable, and the other said lever having a rearwardly extending arm, means whereby relative angular positions of said bail and bucket may be controlled by said rearwardly extending arm, said means comprising a shoulder and a coacting cam surface, whereby said bucket may be secured against dumping throughout a considerable range of angular movement on its pivotal axis, and whereby the tilting of the bucket may be controlled by the hauling cable.

7. In an excavator, the combination of a bucket, a bail pivoted thereto at a point back of its center of gravity, a hauling cable operatively connected to the front of said bucket, hoisting means connected to said bail

for lifting said bucket, a pair of levers separately fulcrumed on said bail and operatively connected, intermeshing gear sectors respectively connected to said levers, one of said levers having a forwardly extending arm connected to said hauling cable, and the other said lever having a rearwardly extending arm, a shoulder on said rearwardly extending arm, and a cam surface on said bucket adapted to coact with said shoulder to prevent said bucket from swinging to its dumping position, said cam surface being of such form and extent as to control the tilting of said bucket throughout a considerable range of angular movement thereof.

Signed at Chicago this 22nd day of September 1910.

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Witnesses:

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