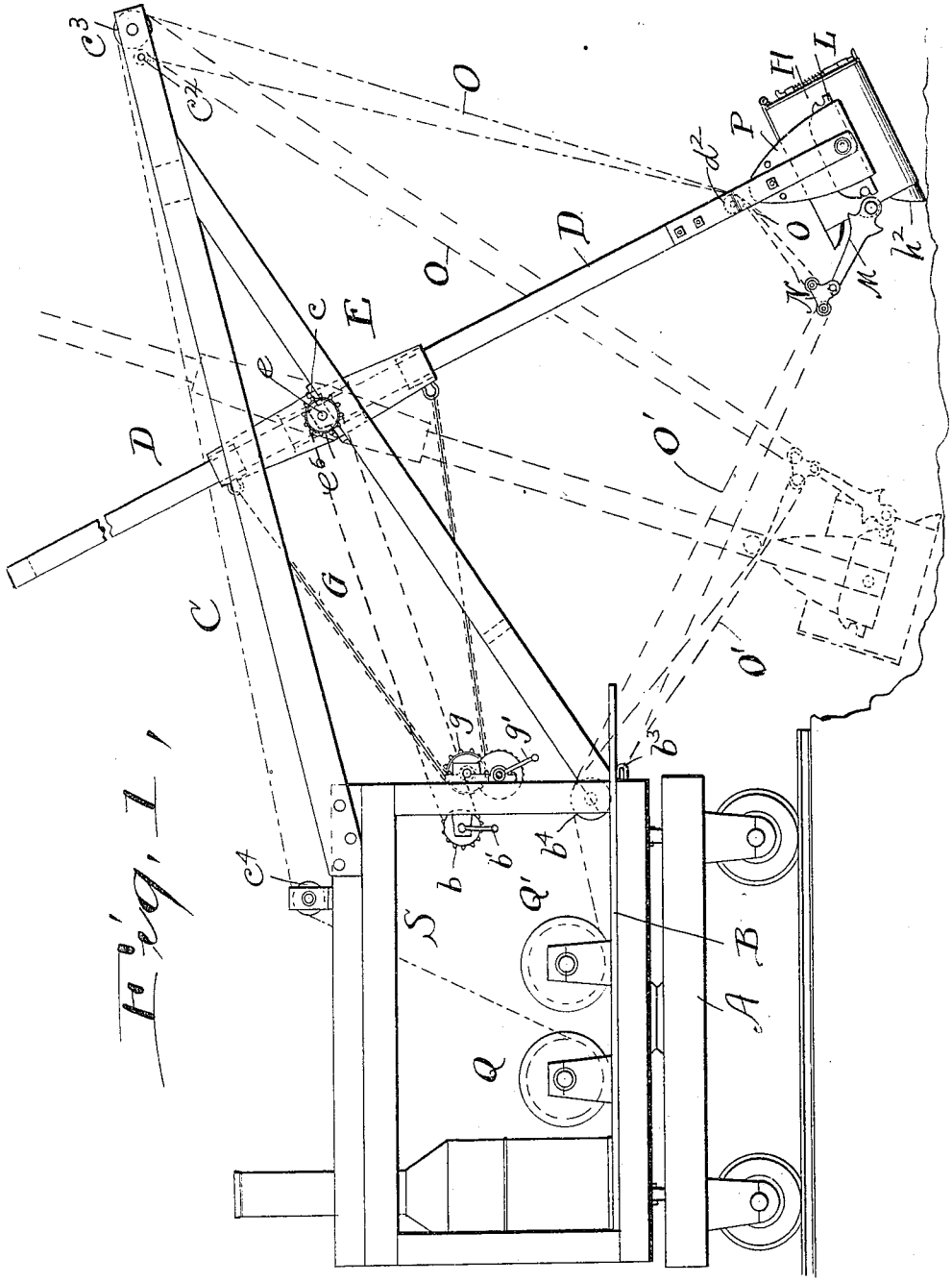
No. 670,210. Patented Mar. 19, 1901.

W. SHANNON.

EXCAVATOR.

(Application filed June 14, 1900.)

(No Model.) 3 Sheets—Sheet 1.



Witnesses
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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(No Model.) 3 Sheets—Sheet 2.

Fig. 2.

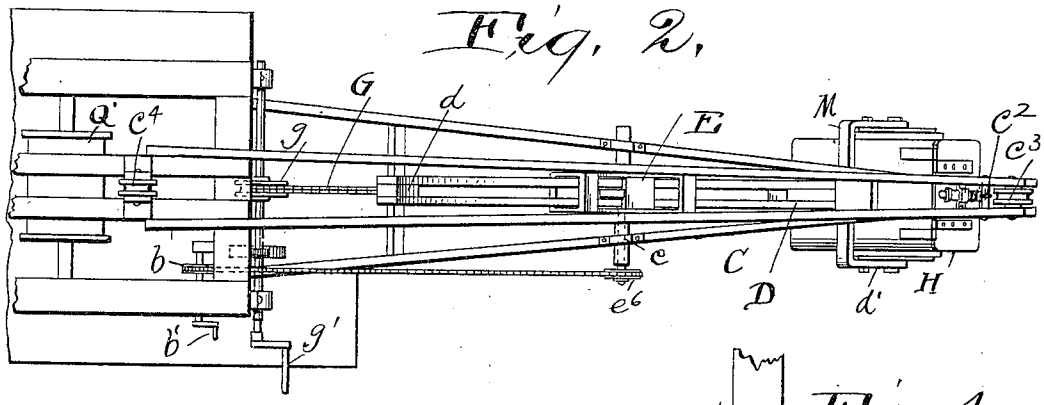


Fig. 3.

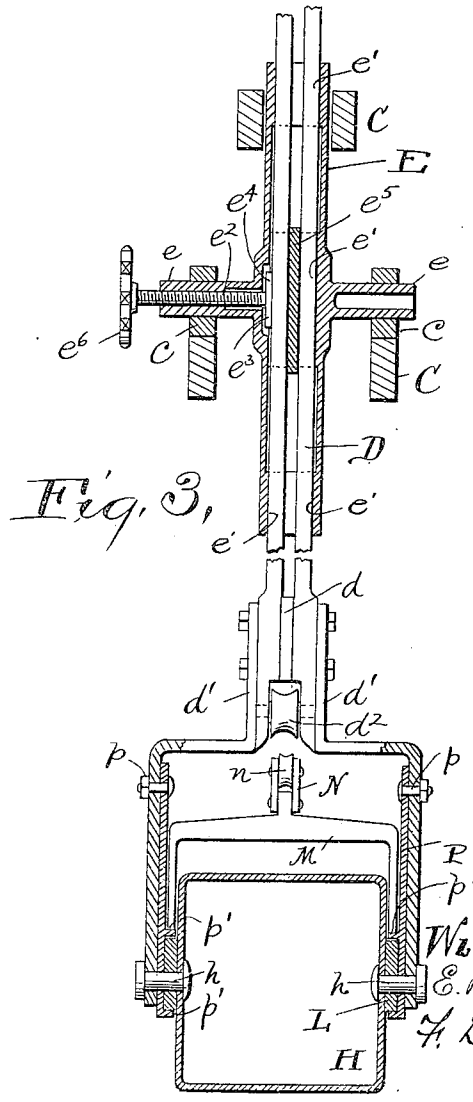


Fig. 4.

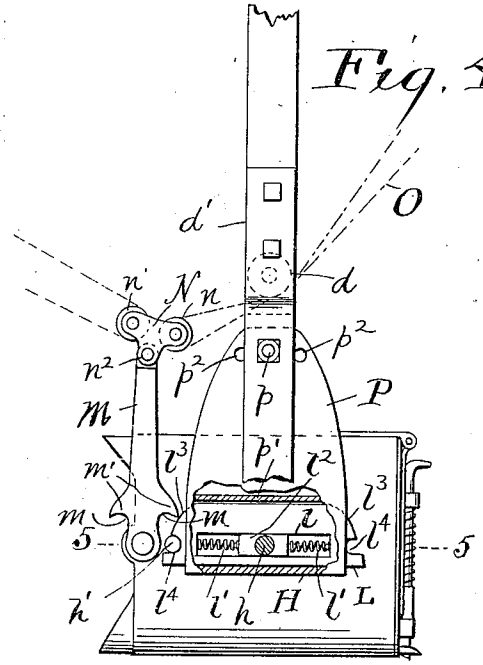
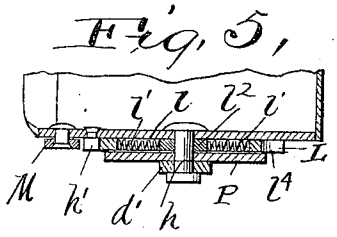


Fig. 5.



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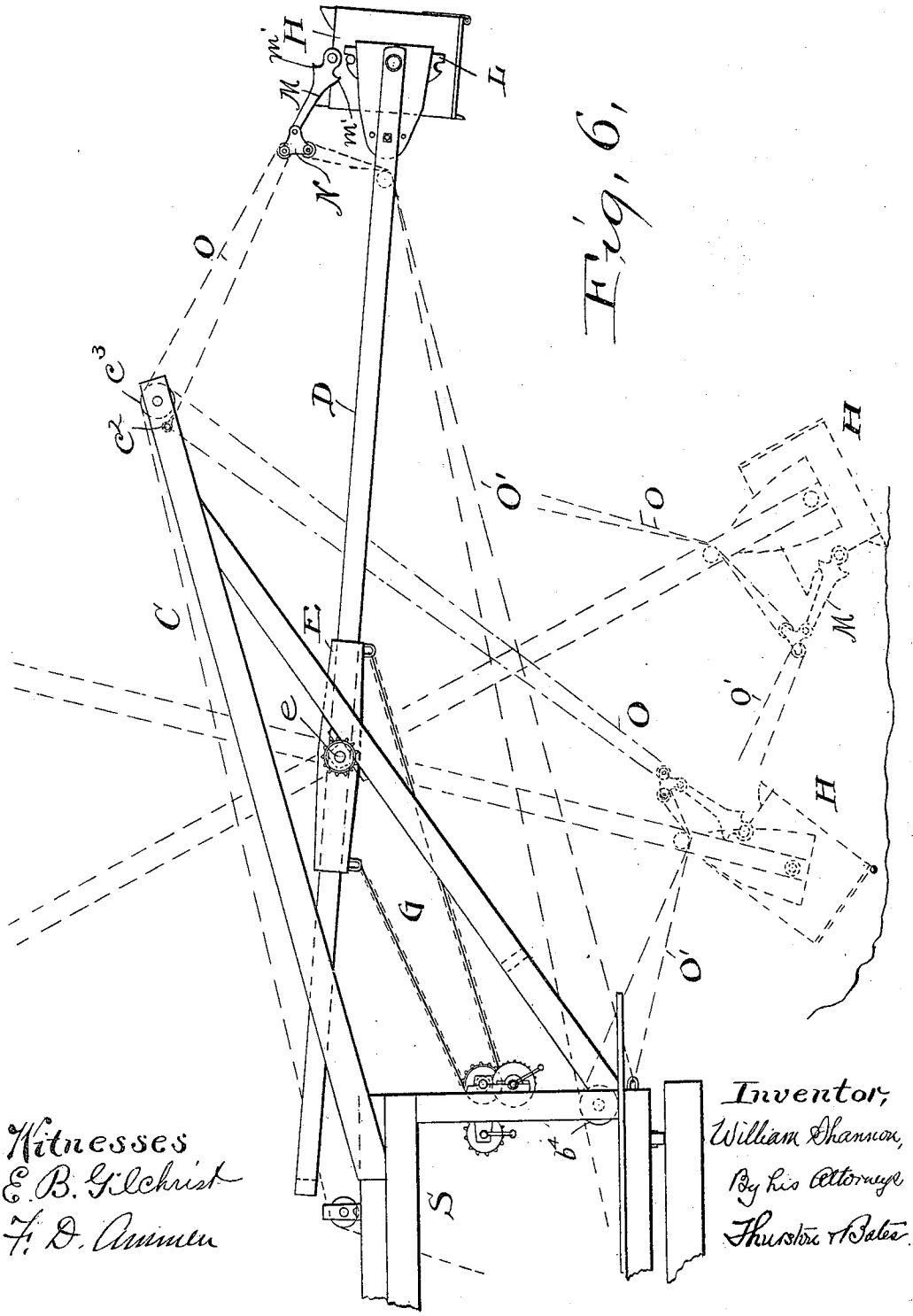


Fig. 6.

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UNITED STATES PATENT OFFICE.

WILLIAM SHANNON, OF CLEVELAND, OHIO.

EXCAVATOR.

SPECIFICATION forming part of Letters Patent No. 670,210, dated March 19, 1901.

Application filed June 14, 1900. Serial No. 20,236. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM SHANNON, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Excavators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

The invention relates to excavators of that class in which the excavation is effected by a bucket or scoop mounted upon a movable arm.

My object is to provide efficient means for digging either toward or from the machine, as desired, and for elevating and shifting the bucket, with its load.

The invention can be best applied to that type of excavator in which the bucket-arm is carried by a boom overhanging from a revoluble frame mounted on a wheeled truck; and the invention resides in the method of guiding and controlling the movement of the bucket-arm and in the construction and mode of operation of the bucket, all of which will be more fully described hereinafter, and definitely set forth in the claims.

In the drawings, which fully illustrate the invention, Figure 1 is a side elevation of an excavator embodying my invention, the full lines showing the bucket digging toward the machine, or rearward, and the dotted lines showing it digging forward. Fig. 2 is a plan showing the boom end of such an excavator, part of the other end being broken away. Fig. 3 is an enlarged section through the bucket and part of the beam-controlling mechanism, this section being taken in a plane parallel with the bucket-beam and showing the bucket with its axis at right angles to the beam, as in Fig. 1, the beam being shown broken. Fig. 4 is a side elevation of the bucket and the end of the bucket-beam with a part broken away to expose the details of the connection between them. Fig. 5 is a section of the bucket and its supporting-brackets, taken on the line 5 5 of Fig. 4. Fig. 6 is a side elevation of the forward part of the excavator, illustrating various positions of digging, raising, and dumping.

Referring to the drawings by letters, A represents a truck mounted on a temporary track, as often used in connection with excavators of this class.

B represents a floor revolubly mounted upon the truck. This floor carries a superstructure or frame S of any suitable construction, carries the operating-drums, &c., and has a boom C projecting from one end thereof. As stated, this boom supports the bucket arm or beam, and to accommodate itself thereto it is preferably constructed, as shown, of beams placed side by side, but slightly apart, the bucket-beam D and encompassing guide E working between them. The bucket-beam D passes through the guide or sleeve E, which is provided with means for locking the bucket-beam against movement through it when desired, and, being pivoted to the boom, is capable of angular movement in the vertical plane of the boom and is provided with means for giving it such angular movement and holding it in any desired position. As shown, the means for locking the guide E to the bucket-beam is frictional, and the bucket-beam is formed of two members (preferably of rectangular section) placed parallel a short distance apart, with distance-pieces d between them at their ends, through which they are bolted together, the guide E consisting of a sleeve surrounding the bucket-beam and having flat faces on its inner side contacting with the sides of the bucket-beam members, as shown clearly in Fig. 3. The guide-sleeve E carries trunnions e, mounted in bearings c on the boom C. One of the trunnions e may be hollow and internally threaded, carrying a screw e^2, on the inner end of which screw is mounted a disk e^3, adapted to press against the side of the bucket-beam, the sleeve being recessed, as at e^4, to receive it. To give a backing for the pressure between the disk e and the face e' opposite, I place a shoe or distance-piece e^5 in the sleeve between these two points, as shown in Fig. 3. This shoe may be held within the sleeve in any suitable manner, allowance being made for some lateral play. Any means for turning the screw e^2 may be employed—such as a sprocket-wheel e^6, mounted on its outer end, a chain F passing over it and leading to a similar sprocket-wheel b, mounted on the framing of the excavator, and a crank b' placed upon the shaft thereof. The opera-

tion of this crank then controls the grasp of the guiding-sleeve E upon the bucket-beam.

The means for swinging or holding the sleeve E in any position may consist simply of a chain G, having its ends fast to the sleeve, preferably at the ends thereof, and passing over a sprocket-wheel g, which is suitably rotated, as illustrated by the back gearing and operating-crank g' shown.

The bucket H is carried by trunnions h, which are mounted in offset brackets d', bolted to the foot of the bucket-beam. The bucket H has a hinged bottom, and is preferably of the form shown. It is capable in certain positions of being locked against movement with respect to the bucket-beam. This result is accomplished as follows:

Bracket-plates P are fastened on the inner sides of the brackets d' by bolts p at their upper ends and have eyes through which the trunnions h pass at their lower ends. A guideway is formed across the lower end of at least one, and preferably both, of the plates P, by forming flanges p' on their inner faces. A lock L fits between these flanges and is guided by them. It has a longitudinal rectangular slot or opening l, parallel with the guiding-flanges p', and protrusile springs l' are housed within this slot, pressing with their outer ends against the outer ends of the slot, while their inner ends press on a block l^2, which is loosely held in the slot l and loosely surrounds the trunnion. Thus the lock is normally held in central position, but free to be moved to either side by a sufficient force. Its ends are rounded on their upper corners, as at l^3, and in each end, near the lower edge, is formed a recess l^4. The bucket carries a pin h', which when the bucket is upright is directly above the trunnion h, and if the bucket is now revolved on its trunnions this pin impinges the edge l^3 and presses the lock L to one side and comes into juxtaposition with the recess l^4, when the lock springs back to its normal position and holds the pin within the recess, effectually locking the bucket against rotation on its trunnions.

To give several adjustments, so that the angle of the locked bucket may be varied, the upper end of the plate P is provided with holes p^2, placed on either side of its center line. They are so placed that any one of them may coincide with the hole in the bracket occupied by the bolt p if the plate is turned about the trunnion h. Hence if this bolt should be removed and reapplied in the new position of the plate the locking position of the bucket will be changed.

A bail M is pivoted to the bucket directly over the trunnions and close to the fixed pin h'. It has recesses m, into which the pin h' may take in extreme positions of the bail, and beyond these recesses it has projecting toes m'.

Fig. 4 shows the bucket in locked position and about to be released. It is evident that if the bail M be forced to the right from the position in which it is shown a toe m' will force the lock L to the right, so that the pin h' is released from the recess l^4, and the continued movement of the bail will bring the bucket to an upright position. The bucket being held by its inertia and load, however, rotation of the bucket about its trunnions will not begin until the recess m has engaged the pin h', the bail in that inclined position passing readily under the brackets d' and the pins h' forming positive stops for the bail. The bail M is under the control of draw-lines running, respectively, to the end of the boom C and to the operator's position on the floor B. To facilitate the operation, a block N is pivoted at n^2 to the bail in the central plane of the bucket, which block carries sheaves n and n'. The arrangement of the draw-lines may be varied to suit the character of the work to be done. Under ordinary conditions the outer draw-line O will have one end anchored in the end of the boom C, as at c^2, thence leading down around the sheave n, and returning over the sheave c^3, back along the boom, passing over the sheave c^4, down to the operating-drum Q, mounted on the floor B. The rear draw-line O′ is anchored at b^3, below the floor B, leads over the sheave n', back over the sheave b^4, and thence to the operating-drum Q′. Either of these draw-lines may bear against the guide-sheave d^2 at the foot of the beam D, according to the position of the bail.

In operation suppose the excavator to be in the position shown in full lines in Fig. 1, which is the forward dotted position in Fig. 6. The operators now lock the bucket-beam against movement through its guide with the mechanism already described. The rear draw-line O′ is then hauled in and the line O is played out, whereby the bucket is drawn toward the operators, the bucket-beam revolving about its trunnions e and scooping up the material. After this scooping operation is completed (the bucket-beam being in the rearmost position in Fig. 6) the operators, through the medium of the chain G and its mechanism, hold the guide E against movement, when the draw-line O is pulled and O′ let out, which operates to unlock the bucket and turn it over on its trunnions into a position in a line pointing toward the sheave c^3. This is the rearmost dotted position of Fig. 6. The hold of the chain G is now freed and the draw-line O drawn in, swinging the bucket-beam forward. Then the grasp of the guide E upon the beam is loosened, allowing the weight of the load to draw the beam as desired. Then the guide is again locked, and the hauling on the draw-line O raises the bucket to a convenient height, as shown in full lines in Fig. 6, so that it may be swung with the floor for dumping. The dumping is effected through the hinged bottom, which is provided with any common form of latch.

From the description it is evident that this excavator can be used to dig either toward

or away from the operators, as desired, the bucket being provided with opposite lips h^2 for that purpose. The dotted lines of Fig. 1 show it digging forward, and the operation of the draw-lines therefor will be readily understood without further explanation.

Having described my invention, I claim—

1. In an excavator, in combination, a bucket-beam, a scoop-bucket pivotally carried thereby, means for locking said bucket rigid with said beam, and means for automatically unlocking it and allowing it to turn on its pivot during the operation of the excavator, substantially as described.

2. In an excavator, in combination, a bucket-beam, a bucket carried thereby, means for locking said bucket in a plurality of positions rigid with said beam, and means for automatically unlocking it in one position and locking it in another during the operation of said excavator, substantially as described.

3. In an excavator, the combination of a bucket-beam, a bucket pivotally carried thereby, and means for locking said bucket to said beam with its mouth on either side of said beam, substantially as described.

4. In an excavator, the combination of a bucket having a pair of opposite lips, trunnions carried by said bucket, a bucket-beam, and means for locking said bucket to said beam with its mouth on either side of said beam as desired, substantially as described.

5. In an excavator, the combination of a bucket-beam, a bucket carried thereby, a bail fastened to said bucket, means whereby said bucket may be locked against movement with respect to said beam, and means whereby the movement of said bail may release said lock, substantially as described.

6. In an excavator, the combination of a bucket-beam, bracket-arms depending therefrom, a bucket pivoted thereto, means whereby said bucket may be locked substantially at right angles to said beam, a bail on said bucket, and means whereby a force applied to said bail may release said lock, substantially as described.

7. In an excavator, the combination of a pivoted bucket, a lock, one of said members having a projection, the other a coöperating recess, a spring actuating said lock whereby the turning of said bucket on its pivot may move said lock and bring said recess and said projection into engagement, substantially as described.

8. In an excavator, the combination of a bracket, a bucket pivoted thereto, a lock carried by said bracket and having a recess, a spring actuating said lock, said bucket having a projection which may engage said recess, a bail pivoted to said bucket, and means whereby the operation of said bail may release said lock, substantially as described.

9. In an excavator, the combination of a bucket-beam, a bucket pivotally carried thereby, a lock carried by said bucket-beam and having a recess, a spring actuating said lock, a laterally-projecting pin on said bucket which may take into said recess, a bail pivoted near said pin and having a projecting toe which may contact with said lock and move it to release said pin, substantially as described.

10. In an excavator, the combination of a bucket-beam, a bucket, a lock having a recess carried by said bucket-beam, a projecting pin on said bucket, which may occupy said recess, a pivoted bail near said pin having a projecting toe which may engage said lock and force it out of engagement with said pin, the bail thereupon engaging said pin and being stopped thereby, substantially as described.

11. In an excavator, the combination of a bucket-beam, a lock carried thereby, a spring actuating said lock, said lock having a recess and an inclined edge, a bucket pivotally carried by said bucket-beam and having a projection, which in the rotation of said bucket contacts said inclined edge, moves said lock and engages said recess, substantially as described.

12. In an excavator, the combination of a bucket-beam, a bucket pivotally carried thereby, a lock carried by said beam and having a recess at each end, a projection carried by said bucket, which projection may contact and move either end of said lock and engage the recess therein, substantially as described.

13. In an excavator, the combination of a bucket-beam, bracket-arms carried thereby, a bucket, trunnions connecting the same with the bracket-arms, a lock carried by one of said bracket-arms and having a recess at each end and inclined edges above said recesses, a laterally-projecting pin carried by said bucket which may contact said inclined edges, move said lock and engage either of said recesses, substantially as described.

14. In an excavator, the combination of a bucket, a bucket-beam, brackets carried thereby, bracket-plates carried by said brackets, and means for locking said bucket to said bracket-plates during the operation of said excavator, substantially as described.

15. In an excavator, the combination of a bucket, a bucket-beam, brackets carried thereby, trunnions carried by said bucket, bracket-plates having eyes pivoting on said trunnions, means for adjustably locking the bracket-plates to the brackets, and means for locking the bucket with bracket-plates, whereby the position of the locked bucket with reference to the beam is varied according to the adjustment of the bracket-plates, substantially as described.

16. In an excavator, the combination of a pivoted bucket, a bracket-plate, a lock laterally guided by said bracket-plate, springs normally holding said lock against lateral movement, said lock having a recess in each end and inclined edges above said recesses,

a laterally-projecting pin carried by said bucket, which pin may contact said inclined edges, move said lock and engage either of said recesses, substantially as described.

17. In an excavator, the combination of a bucket, supported on trunnions, a suitably-guided lock coöperating therewith, said lock having a longitudinal slot embracing one of said trunnions, and having a recess in each end and inclined edges above said recesses, springs normally holding said lock against lateral displacement, a laterally-projecting pin which may contact said inclined edges, move said lock and engage one of said recesses, substantially as described.

18. In an excavator, in combination, a bucket, a bucket-beam, a bracket-plate rigid therewith, trunnions carried by said bucket, said bracket-plate having lateral guides, a lock guided thereby, and having a slot taking around one of said trunnions, a recess in one end of said lock and an inclined edge above said recess, a block mounted in said slot and fitting against said trunnion, a helical spring lying in said slot and bearing against said block and one end of said slot, a laterally-projecting pin carried by said bucket, which pin may contact said inclined edge, move said lock and engage one of said recesses, substantially as described.

19. In an excavator, in combination, a bucket-beam, a bracket rigid therewith, a bracket-plate fastened upon the inner side of said bracket, trunnions carried by said bucket and passing through said bracket and bracket-plate, said bracket-plate having lateral guide-flanges projecting toward said bucket, a lock guided thereby and having a recess in each end and inclined edges above said recesses, springs actuating said lock to a central position, a laterally-projecting pin which may contact said edges, move said lock and engage either of said recesses, substantially as described.

20. In an excavator, in combination, a boom, a guide pivotally carried thereby, a bucket-beam slidable through said guide, a bucket pivotally carried at the lower end of said beam, a bail for said bucket, and draw-lines running from said bail both forward and rearward, whereby the pull on the draw-lines may turn the bucket over to face either forward or rearward, substantially as described.

21. In an excavator, in combination, a frame, a boom carried thereby, a guide pivotally carried by said boom, a bucket-beam slidable through said guide, a bucket pivotally carried at the lower end of said beam, means for locking said bucket in either direction at substantially right angles to the beam, draw-lines leading from said bucket both forward and rearward, whereby the bucket may dig in either direction, substantially as described.

22. In an excavator, in combination, a frame, a boom carried thereby, a guide pivotally carried by said boom, a bucket-beam slidable through said guide, a bucket pivotally carried at the lower end of said beam, a lock adapted to lock said bucket in a plurality of positions, a bail for said bucket adapted in certain positions to disengage said lock, and draw-lines leading from said bail one rearward to the frame and the other forward over a sheave at the forward end of the boom, and thence to the frame, substantially as described.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

WILLIAM SHANNON.

Witnesses:
F. D. AMMEN,
ALBERT H. BATES.