

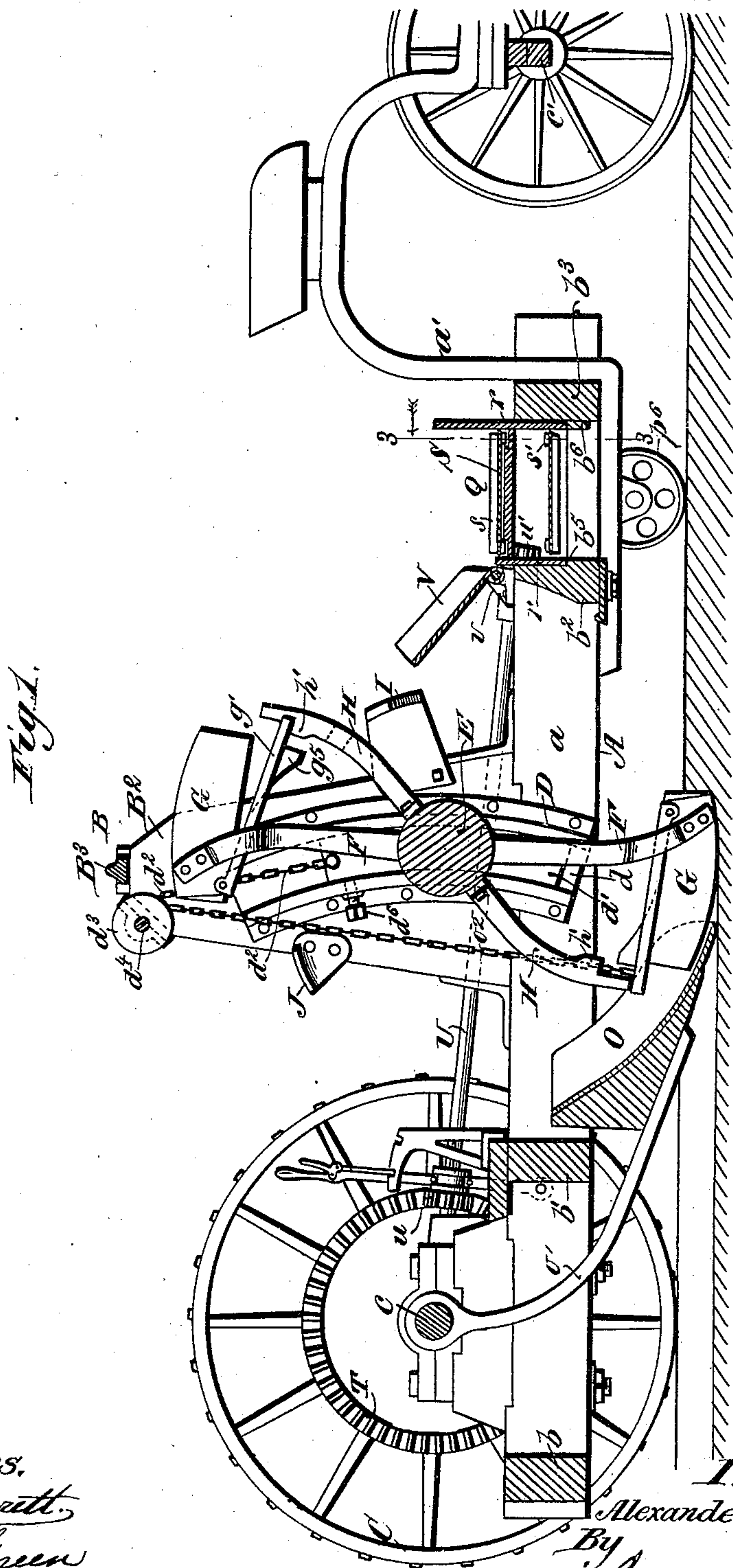
(No Model.)

3 Sheets—Sheet 1.


A. BARHITE.  
EXCAVATOR.

No. 534,241.

Patented Feb. 12, 1895.



Witnesses,  
Robert Everett,  
Thos. A. Green

 *Inventor.*  
*Alexander Barhite.*  
*By James L. Norrig.*  
*Atty.*

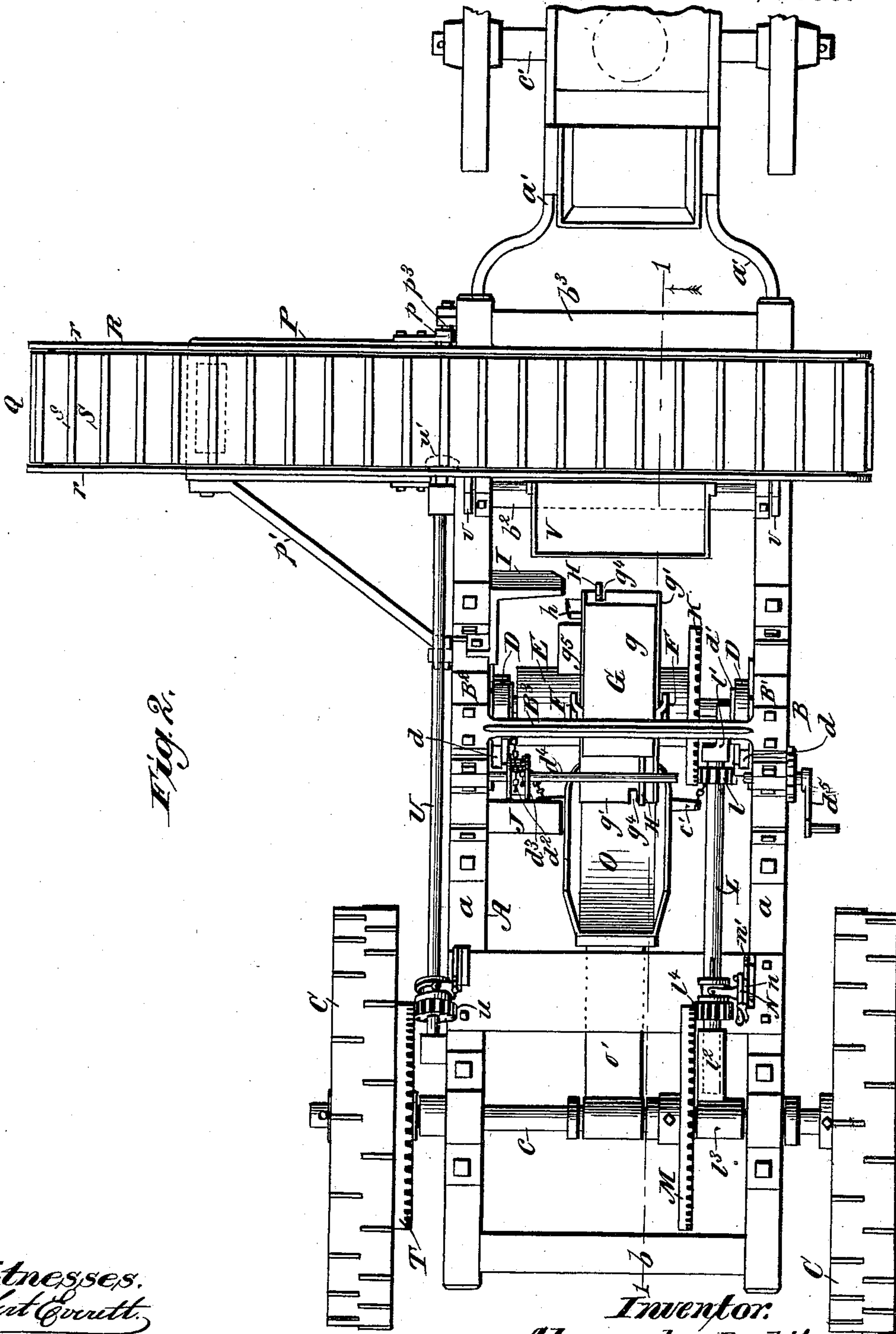
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*Fig. 2.*

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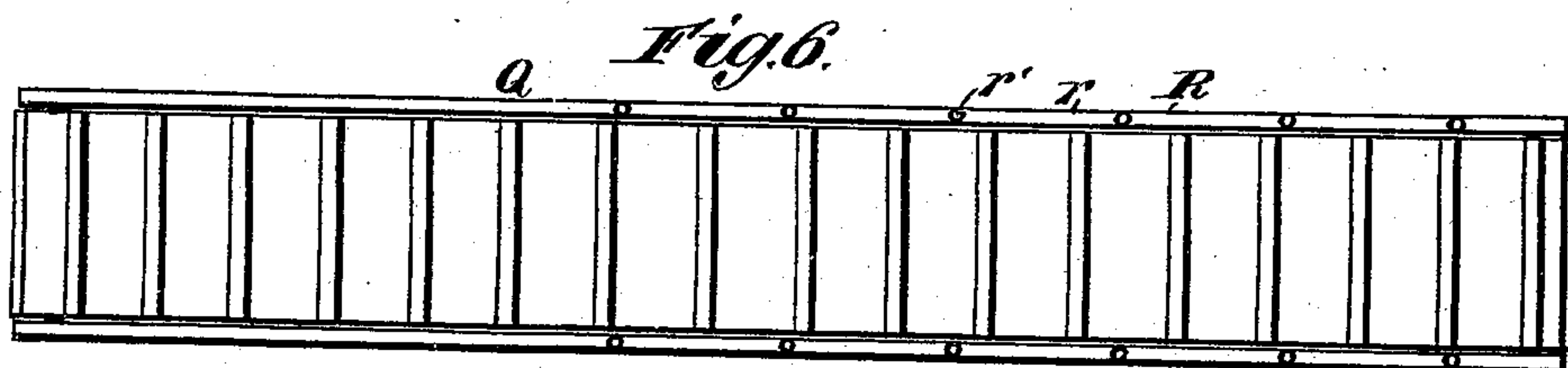
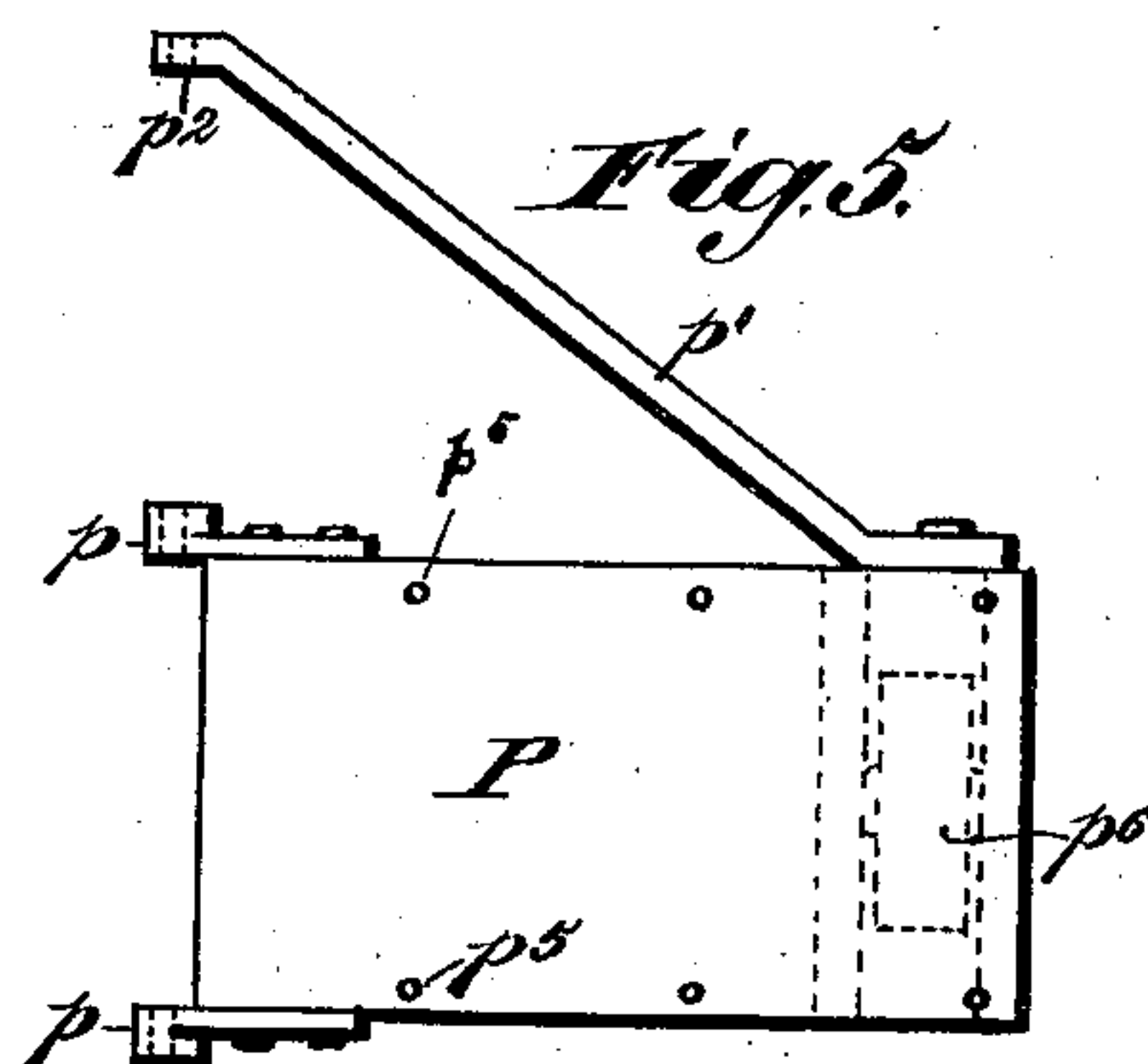
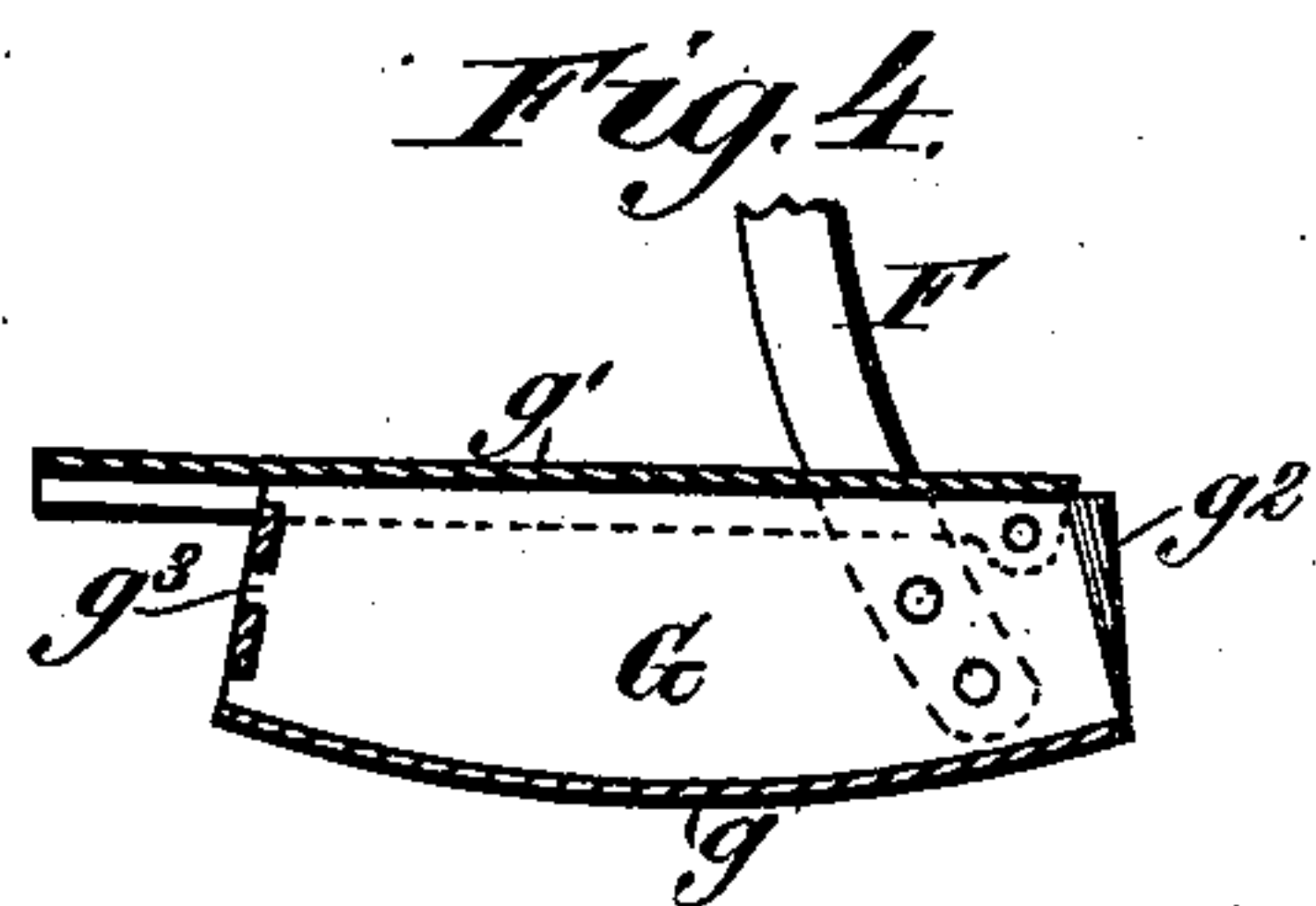
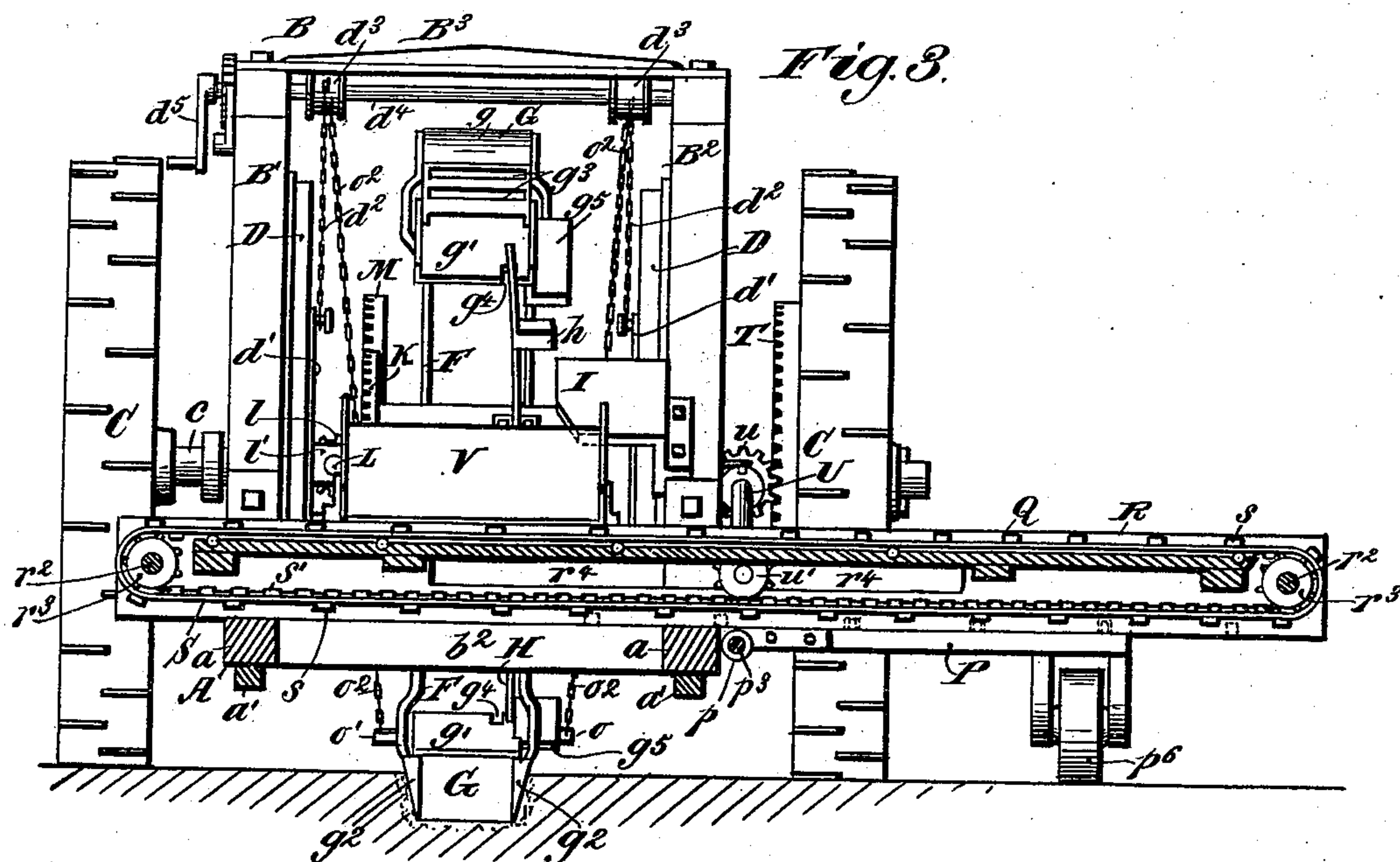
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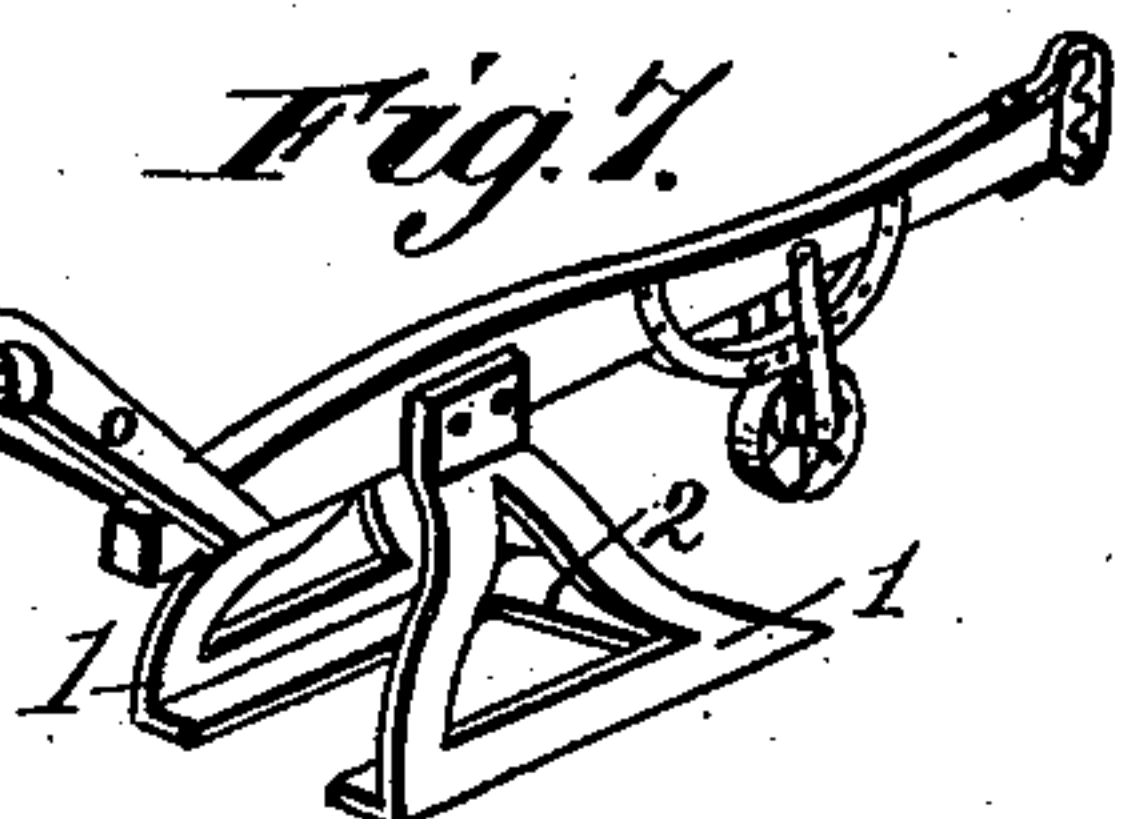
3 Sheets—Sheet 3.

No. 534,241.

Patented Feb. 12, 1895.



Witnesses:  
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Thos. A. Green



*Inventor:*  
*Alexander Barkite.*  
*By*  
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*Atty.*



# UNITED STATES PATENT OFFICE.

ALEXANDER BARHITE, OF TORONTO, CANADA.

## EXCAVATOR.

SPECIFICATION forming part of Letters Patent No. 534,241, dated February 12, 1895.

Application filed May 10, 1894. Serial No. 510,758. (No model.)

*To all whom it may concern:*

Be it known that I, ALEXANDER BARHITE, a citizen of the United States, residing at Toronto, in the Province of Ontario, Canada, have invented new and useful Improvements in Excavators, of which the following is a specification.

My invention relates to certain new and useful improvements in excavators, and more particularly to that class that are designed to be employed in making ditches, the object of the invention being to produce a machine of the character designated, which shall combine simplicity and cheapness of construction with durability and efficiency in use.

To these ends my invention consists in the novel construction, arrangement and combination of parts hereinafter fully described and definitely pointed out in the claims following the description, due reference being had to the accompanying drawings forming a part of this specification, wherein—

Figure 1 is a vertical longitudinal section of my improved machine taken on the line 1, 1 of Fig. 2. Fig. 2 is a top plan view thereof. Fig. 3 is a transverse section taken on the line 3, 3, of Fig. 1. Fig. 4 is a longitudinal section of one of the scoops; Fig. 5 a plan view of the conveyer supporting frame; Fig. 6, a similar view of the conveyer frame; and Fig. 7 a perspective view of a cutter adapted to be used in conjunction with the excavator.

The main frame A of the machine consists of two side bars  $a, a$ , and transverse beams  $b, b', b^2, b^3$ , the rear end of said frame being suspended from an axle  $c$  mounted on wheels C, and the forward end being supported upon the front axle  $c'$  by means of arched bar  $a'$ . To the frame A, and about midway its length, is secured an auxiliary frame B consisting of uprights  $B', B^2$ , connected at their upper ends by a cross brace  $B^3$ . To the inner side of the uprights  $B', B^2$ , are secured arc-shaped guide ways D provided with dovetailed grooves  $d$  within which are fitted and free to slide arc-shaped journal blocks  $d'$ . Said journal blocks are suspended by chains  $d^2$  that wind about pulleys  $d^3$  mounted on a shaft  $d^4$  journaled in the upper portions of the uprights  $B', B^2$ , and provided with a crank  $d^5$ , by which means the journal blocks may be raised and lowered, for the purpose hereinafter described, a set screw

$d^6$  tapped through each of said guide ways being employed to lock the journal blocks in their adjusted positions. Journaled in the journal blocks  $d'$  is a shaft E carrying radial arms F between the ends of which are rigidly secured scoops G, each of said scoops consisting of a metallic receptacle provided with solid or closed side walls and a similar outer wall  $g$ , the latter being convex or arc-shaped, and a hinged inner wall  $g'$ , the free end of which projects beyond the end of the scoop for the purpose hereinafter made apparent. The front end of the scoop is open and its side edges made outwardly flaring and gradually tapering from the top to the bottom, as more clearly shown at  $g^2$ , Figs. 3 and 4, and the rear end of said scoop is slotted, as at  $g^3$ , (see Figs. 3 and 4) to permit the escape of water and the like when operating upon marshy ground or in clearing out existing ditches.

Secured to the shaft E in rear of the arms F are arms H which normally rest upon the rear ends of the hinged lids  $g'$  and serve to maintain the same closed. The rear edge of each of said lids is recessed, as at  $g^4$  to permit the lid to drop over the end of the arm H, when the latter is deflected to one side for the purpose, to discharge the contents of the scoop, and to this end the arms H are made resilient and are provided with laterally projecting lugs  $h$ , slightly beveled upon their edges and which are adapted to abut against a beveled cam I secured to the upright  $B^2$  which forces the arms H to one side as they come opposite said cam and causes them to register with the recesses  $g^4$  in the hinged lids  $g'$  upon which the latter drop by gravity and discharge the contents of the scoops. Each of the arms H is provided with a stop or projection  $h'$  which arrests the downward movement of the hinged lid. Upon the rear side of the upright  $B^2$  is also secured a cam J which, as the scoops G pass over it, abuts against beveled lugs  $g^5$  which project laterally from one side of the hinged lids  $g'$  and raise or close the latter, and at the moment the lids close the recesses  $g^4$  are disengaged from the ends of the arms H and the latter spring back into their normal position against the lids and hold them in their closed position.

For the purpose of communicating rotary motion to the scoops I provide the following



mechanism: To the shaft E is rigidly secured a crown wheel K with which gears a pinion  $l$  secured upon one end of a shaft L journaled in a bearing  $l'$  secured to one of the journal blocks  $d'$ , the other end of said shaft being journaled in a socket bearing  $l^2$  provided with a sleeve  $l^3$  loosely embracing the axle  $c$ . Upon the shaft L is mounted by a spline and feather a pinion  $l^4$  that gears with a crown wheel M keyed to the axle  $c$ , the said pinion being capable of being moved longitudinally upon the shaft L to throw the mechanism in and out of gear, and for this purpose is engaged in the usual manner by a hand lever N provided with a spring pawl  $n$  that is adapted to engage one of the notches of a segment  $n'$ .

O indicates a curved shovel plow that is carried by an arm  $o$  journaled on the axle  $c$ , said plow being provided upon its opposite edges with projections  $o'$  to which are secured chains  $o^2$  that are wound about the pulleys  $d^3$  that are employed for raising and lowering the scoops G. Said plow follows immediately in the path of the scoops and in close proximity thereto, and serves to take up any earth left by the plows. By winding the chains  $o^2$  about the pulleys  $d^3$  the plow and scoops are adjusted simultaneously and equally, the two thus always maintaining the same relative position toward each other.

To the forward portion of the frame A, and to one side thereof, is secured a conveyer support P. Said support consists of a rectangular frame provided at one end with two hinge butts  $p$  and with a brace rod  $p'$  secured at one end to the outer end of the frame P and at its other end provided with an eye  $p^2$  said support being pivotally secured to the side of the frame A by means of a rod  $p^3$  which passes through the hinge butts  $p$  and eye  $p^2$  and through eye-bolts  $p^4$  secured to the side of the frame, said rod  $p^3$  being headed at one end and at its other end provided with a nut for detachably securing it in place. To the under, outer side of the conveyer support P is secured a caster wheel  $p^6$  that prevents the support from sagging under the weight of the conveyer. Resting between the beams  $b^2, b^3$ , of the frame A and supported by shoulders  $b^5, b^6$ , and the support P is a transverse endless conveyer Q. Said conveyer consists of an elongated rectangular frame R (see Fig. 6) the side bars  $r$  of which are provided upon their under sides at equi-distances apart with apertures  $r'$ , and in the opposite ends of said frame are journaled shafts  $r^2$  carrying sprocket wheels  $r^3$  about which the endless conveyer passes. The endless conveyer consists of an apron S, of canvas or any similar or suitable material, having secured to its outer surface a series of transverse strips or battens  $s$ , while the inner surface of the apron, and near its opposite edges are secured drive chains  $s'$  which engage and travel about the sprocket wheels  $r^3$ .

For conveying motion to the conveyer I employ the following mechanism: To one of

the rear wheels C, I secure a crown wheel T with which meshes a pinion  $u$  mounted and longitudinally adjustable on a shaft U secured in suitable bearings on the side beam  $a$  of the frame A, said shaft at its forward end projecting through an elongated slot  $r^4$  formed in one of the side bars of the conveyer frame R and at its extreme end provided with a sprocket wheel  $u'$  that engages one of the chains  $s'$  and by which the endless conveyer is driven. The sprocket wheel  $u$  is provided with a hand lever and segment similar in all respects to that employed in connection with the pinion  $l^4$  on the shaft L before described. The conveyer support P is provided with a series of tenons  $p^5$  that are adapted to fit within the apertures  $r'$  in the under side of the conveyer frame R. By slightly lifting up the conveyer frame so as to disengage the tenons from the apertures the said frame and the conveyer may be moved in and out relative to the frame A so as to deposit the earth at any suitable distance from the machine. To the upper edge of the beam  $b^2$  is hinged a chute V provided upon its under side with a stop  $v$  that serves to limit the downward or rearward movement of the chute, said chute serving to receive the earth as it is discharged from the scoops and direct it onto the conveyer.

In digging ditches or trenches it is always desirable to first run a plow along the proposed route to be followed, to loosen up the earth, and in Fig. 7 I have shown one form of plow that serves admirably for the purpose. As therein shown said plow consists of two substantially vertical cutters 1, 1, united at their bottoms by a horizontal cutter 2, the said plow being designed to be run ahead of the excavating machine to cut and loosen the earth.

From the foregoing description the operation of my improved machine will be readily understood. The journal blocks being adjusted to the proper height to give to the scoops the depth of penetration desired, the plow O being lowered into position, and the conveyer moved out to one side of the frame to deposit the earth at the desired distance the machine is driven over the route first traversed by the plow illustrated in Fig. 7, or such other form of plow as may have been used for the purpose. The rear axle and wheel C actuate the shaft E and the conveyer, as before described, and as the shaft E revolves the scoops G are successively caused to dip into the loosened earth with a downward and then an upward sweeping motion which fills the scoops. As they continue to revolve the scoops successively strike and raise the chute V to permit their passage past the latter, the chute falling back into position as each scoop passes it. After each scoop passes the chute V and reaches the position shown in Fig. 1 the lug  $h$  on the arm H will abut against the cam I and force said arm to one side to permit the hinged lid  $g'$  to drop,



thus discharging the contents of the scoop onto the chute V which conveys it onto the endless carrier S, the latter carrying it to one side of the machine and depositing it. As each scoop in turn passes over the cam J, after having discharged its contents, the beveled lug  $g^5$  on the hinged lid  $g'$  abuts against said cam which raises and closes said lid and at the same time causes the lid to disengage the end of the arm H which, owing to its resiliency, is immediately deflected slightly to one side and bearing against the surface of the lid holds the same in its closed position, and puts the scoop in condition for taking up its next load. As before described the shovel plow O follows immediately in the path of and in close proximity to the scoops and serves to take up any earth left by the scoops, and the latter in their revolution and before they enter the earth, scoop out and take up from the plow the earth it accumulates.

To prepare the machine for transportation the mechanism for actuating the scoops and the conveyer is thrown out of gear in the manner before described, the scoops elevated to clear the ground by winding up the chains  $d^2$ , and the plow O is swung up about its hinge and supported in any suitable manner. If desired the conveyer support P may be instantly detached from the machine by unshipping the bolt rod  $p^3$  and placed upon top of the conveyer or other suitable portion of the machine, when the entire machine may be readily conveyed from place to place without taking up more room than an ordinary vehicle.

In the drawings I have for the sake of clearness shown only two scoops, but it will be readily understood that any suitable number of scoops may be secured to the axle D, the number depending in a great measure upon the size of the machine and the scoops.

I wish it to be understood that I do not confine myself to any particular construction of plow, as any form found preferable or desired may be employed without departing from the spirit of my invention.

Having described my invention, what I claim is—

1. In an excavating machine, the combination with a wheeled carriage, of a rotary excavating wheel carrying scoops provided upon their inner peripheral sides with hinged lids, that open downwardly, means for automatically opening and closing said lids, and a chute arranged in front of said wheel for receiving the contents of said scoops, substantially as described.

2. In an excavating machine, the combination with a wheeled carriage, of a vertically adjustable rotary excavating wheel carrying scoops provided upon their inner peripheral sides with hinged lips opening downwardly, means for automatically opening and closing said lids, and a chute arranged in front of said wheel for receiving the contents of said scoop, substantially as described.

3. In an excavating machine, the combination with a wheeled carriage, of a rotary excavating wheel carrying scoops provided upon their inner peripheral sides with downwardly opening hinged lids, spring arms provided with shoulders bearing against said lids to hold them closed, a cam for deflecting said arms to one side to cause said shoulders to disengage said lids, and a cam for closing the lids, substantially as described.

4. In an excavating machine, the combination with a wheeled carriage, of a rotary excavating wheel carrying scoops G provided with hinged lids  $g'$  recessed as at  $g^4$ , resilient arms H normally bearing against said lids to hold them closed, a cam I for deflecting to one side said arms to release said lids, and a cam J for closing the lids, substantially as described.

5. In an excavating machine, the combination with a wheeled carriage, of a rotary excavating wheel carrying scoops G provided with hinged lids  $g'$  recessed as at  $g^4$ , and provided with beveled lugs  $g^5$ , resilient arms H normally bearing against said lids to hold them closed and provided with laterally projecting lugs  $h$ , a cam I arranged in the path of the lugs  $h$  for deflecting said arms to one side to release the lids, and a cam J arranged in the path of the lugs  $g^5$  for closing the lids, substantially as described.

6. In an excavating machine, the combination with a wheeled carriage, of a rotary excavating wheel carrying scoops G provided with hinged lids having rearwardly extended recessed ends and carrying beveled lugs  $g^5$ , resilient arms H normally bearing against said lids to hold them closed and provided with laterally projecting lugs  $h$  and shoulders or stops  $h'$ , a cam I arranged in the path of the lugs  $h$  for deflecting said arms to one side to release the lids, and a cam J arranged in the path of the lugs  $g^5$  for closing the lids, substantially as described.

7. In an excavating machine, the combination of a wheeled carriage, a rotary excavating wheel carrying scoops G each consisting of a metallic receptacle having closed vertical side walls, an arc shaped outer wall, a lid hinged over the inner peripheral opening of the scoop, a foraminous rear end and an open front end having outwardly flaring and downwardly tapering edges, and means for opening and closing said hinged lid, substantially as described.

8. In an excavating machine, the combination with a wheeled carriage, of a rotary excavating wheel carrying scoops provided upon their inner peripheral sides with hinged lids that open downwardly, a transverse conveyer, and a pivoted chute arranged in the path of the scoops and yielding to permit their passage therepast, substantially as described.

9. In an excavating machine, the combination with a wheeled carriage, of a rotary excavating wheel, a transverse laterally adjustable conveyer comprising a frame carrying an



- endless apron, one side of said frame being provided with an elongated slot, a driveshaft projecting through said slot and carrying a sprocket wheel for driving said apron and
- 5 carrying at its other end a pinion, a crown wheel carried by one of the rear wheels of the carriage and means for throwing said pinion in and out of gear with the crown wheel, substantially as described.
- 10 10. In an excavating machine, the combination with a wheeled carriage, of a rotary excavating wheel, a transverse adjustable laterally conveyer comprising a frame carrying an
- 15 endless apron, one side of said frame being provided with an elongated slot, a driven shaft projecting through said slot and carrying a sprocket wheel for driving said apron, the said conveyer frame being provided upon its under side with a series of apertures, a conveyer
- 20 support detachably hinged to the one side of the carriage and provided with a caster wheel and having tenons arranged upon its upper side adapted to register with the aperture in the conveyer frame, substantially as described.
- 25 11. In an excavating machine, the combination with a wheeled carriage, of the vertically adjustable excavating wheel, the crown wheel K carried by the excavating wheel, the shaft
- 30 L carrying at one end a pinion gearing with said crown wheel and at its other end journaled in a socket bearing  $l^2$  loosely mounted on the carriage axle, a crown wheel M keyed

to the rear axle of the carriage, a pinion  $l^4$ , and means for throwing said pinion in and out of gear with the crown wheel M, substantially as described. 35

12. In an excavating machine, the combination with a wheeled carriage, of the vertically adjustable excavating wheel carrying scoops 40 and the shovel plow hinged to the rear axle and arranged directly in rear of the path of the scoops and in close proximity thereto, substantially as described.

13. In an excavating machine, the combination with a wheeled carriage, of the vertically adjustable excavating wheel carrying scoops, the shovel plow hinged to the rear axle and arranged in the rear of the path of the scoops, and means for simultaneously raising and 50 lowering both the excavating wheel and plow, substantially as described.

14. In an excavating machine, the combination with a wheeled carriage, of the vertically adjustable excavating wheel carrying scoops, 55 and the shovel plow O, the arm  $o'$  journaled on the axle  $c$  of the carriage, and means for raising and lowering said plow, substantially as described.

In testimony whereof I have hereunto set 60 my hand and affixed my seal in presence of two subscribing witnesses.

ALEXANDER BARHITE. [L. S.]

Witnesses:

JAMES L. NORRIS,  
THOMAS A. GREEN.

It is hereby certified that Letters Patent No. 534,241, granted February 12, 1895, upon the application of Alexander Barhite, of Toronto, Canada, for an improvement in "Excavators," were erroneously issued to said Alexander Barhite as owner of said invention; whereas said Letters Patent should have been issued to *John N. Barhite, Buckeye, Iowa*, said John N. Barhite being assignee of the entire interest in said invention as shown by the assignments of record in this Office; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 19th day of February, A. D. 1895.

[SEAL.]

JNO. M. REYNOLDS,  
*Assistant Secretary of the Interior.*

Countersigned:

JOHN S. SEYMOUR,  
*Commissioner of Patents.*