

No. 825,549.

PATENTED JULY 10, 1906.

W. E. MAGIE.
EXCAVATOR.

APPLICATION FILED OCT. 20, 1905.

2 SHEETS—SHEET 1.

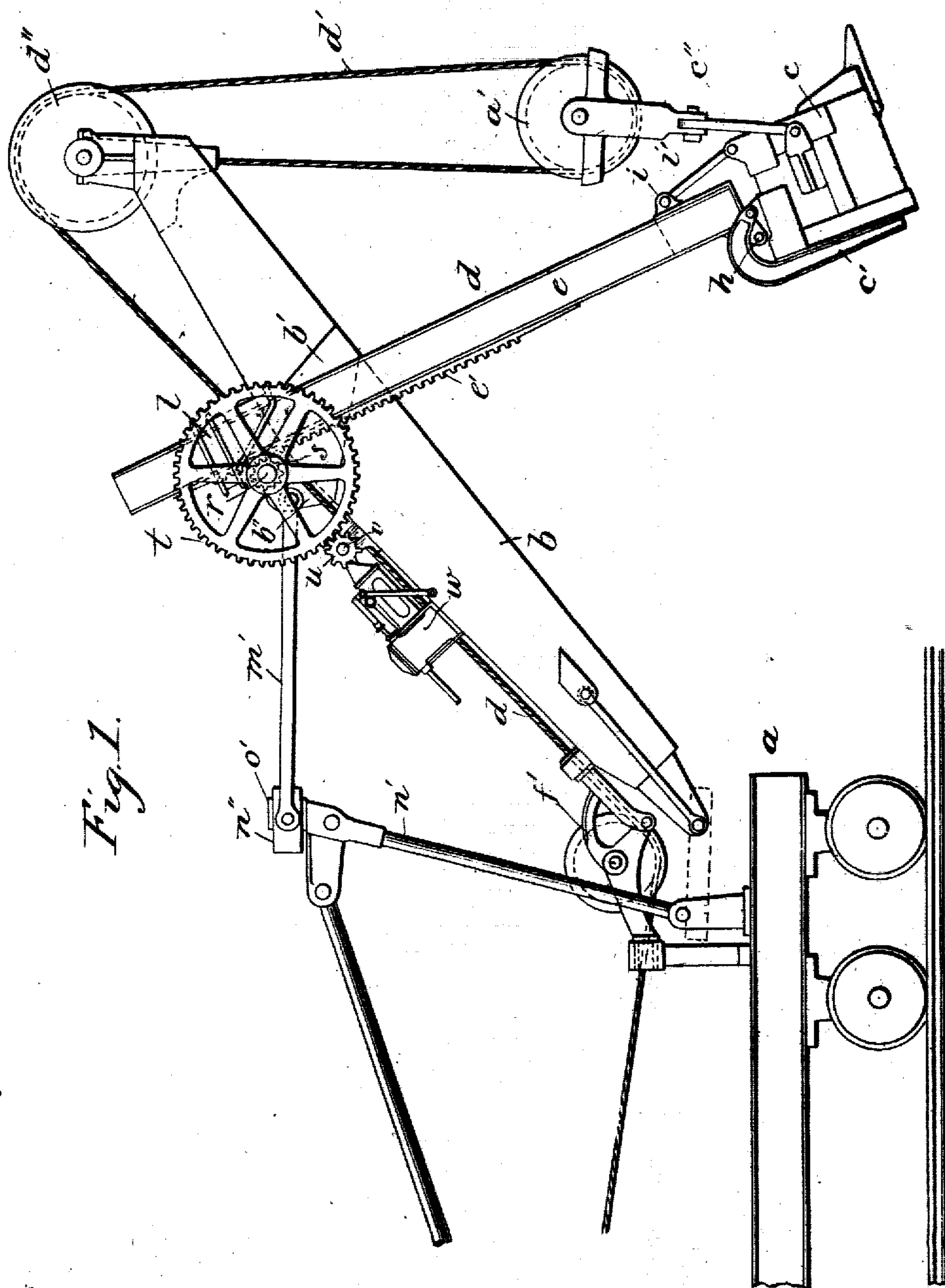


Fig. 1.

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Inventor:
W. E. Magie,
by Lemuel Goldsmith
att'y.

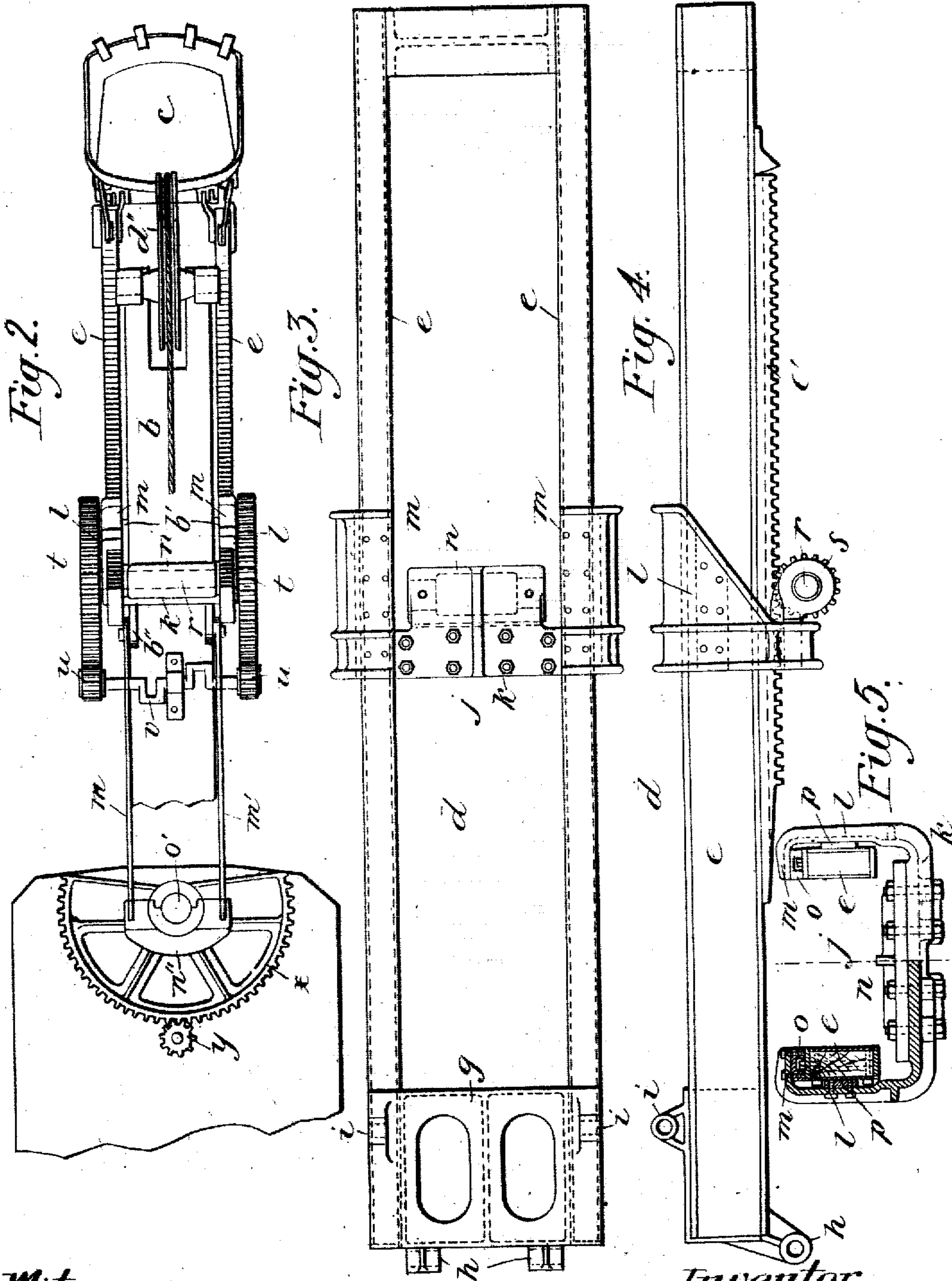
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2 SHEETS—SHEET 2.



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D. W. Edlin.
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Inventor:
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UNITED STATES PATENT OFFICE.

WILLIAM ELSTON MAGIE, OF SOUTH MILWAUKEE, WISCONSIN, ASSIGNOR
TO THE BUCYRUS COMPANY, OF SOUTH MILWAUKEE, WISCONSIN, A
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EXCAVATOR.

No. 825,549.

Specification of Letters Patent.

Patented July 10, 1906.

Application filed October 20, 1905. Serial No. 283,642.

To all whom it may concern:

Be it known that I, WILLIAM ELSTON MAGIE, a citizen of the United States, residing at South Milwaukee, county of Milwaukee, State of Wisconsin, have invented certain new and useful Improvements in Excavators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention relates to improvements in steam-shovels and like excavators, and has for its object to provide a simple and efficient form of saddle-block to be employed in connection with a two-piece dipper-handle which straddles the boom, to provide a novel arrangement of thrusting-gear, and to provide a novel arrangement of boom-guys.

In the accompanying drawings, Figure 1 is a side elevation of the forward end of a steam-shovel embodying the various features of this invention. Fig. 2 is a plan view thereof, certain parts of the mechanism being omitted for the sake of clearness. Fig. 3 is a plan view of the dipper-handle and saddle-block. Fig. 4 is a side elevation thereof. Fig. 5 is an end view, partly in section, of the dipper-handle and saddle-block.

Referring to the drawings, *a* indicates the car-body upon which the steam-shovel is mounted. It will be understood, of course, that any other suitable support may be provided in lieu of the car-body in accordance with the exigencies of engineering practice.

b represents the boom, which is mounted upon the usual swinging table *x*, pivoted upon the car-body or other support to permit the boom and appurtenant parts carried thereby to be swung to the right and left of the axial line of the machine by means of a power-driven gear *y*, meshing with teeth on the edge of the circular swinging table. The boom *b* carries a dipper *c*, which is of the usual form provided with the pivoted dumping-bottom *c'*. Dipper *c* is secured to the end of the dipper-handle *d*, which consists of two parallel beams *e e*, which are connected at one end by a spacer block or tie *f* and at the other end by a casting *g*, said casting *g* being provided with ears or lugs *h* on its

lower forward edge, in which the dipper is hung, and on its upper face with lugs *i*, to which the dipper brace-rods are connected. Each of the beams *e* is provided on its lower edge with a rack *e'*, which racks engage suitable thrusting-pinions *s s*, mounted upon a shipper-shaft *r*, which in turn is mounted in suitable supporting brackets or plates *b'*, attached to the boom sides.

In order to properly guide the two members of the dipper-handle *e e* and to hold the same close to the sides of the boom as they are run in and out in the digging operation, there is provided a special form of saddle-block, which consists of a base-piece *k* and two upwardly-extending generally triangular-shaped lateral arms *l*, provided with inwardly-projecting flanges *m*. To the base-piece *k* is secured a sleeve *n*, which embraces the shipper-shaft *r*, hereinbefore referred to. The horizontal flanges *m* are preferably provided with removable liners *o*, against which the upper edge of the beams *e e*, forming the parallel members of the dipper-handle, bear, and the lateral arms *l* are also preferably provided with removable liners *p*, which are engaged by the sides of the members *e e*. It will be noted that this construction insures the two members of the dipper-handle being held in accurate parallelism with each other and in close proximity to the sides of the boom, and also secures an accurate meshing engagement between the racks *e'* on the lower sides of the members *e e* with the revolving thrusting-pinions *s s* for all positions of the dipper-handle, and that the saddle-block may be swung down opposite the sides of the boom without in any way interfering therewith or with the operation of the thrusting-gearing or the hoisting cable.

The shipper-shaft *r* may either be fixed in its two supporting-plates *b'*, mounted on opposite sides of the boom, so that the saddle-block will oscillate freely thereon, or said shipper-shaft may be fixed to the saddle-block and rotate in its bearings in the plates *b'* aforesaid. In either case the shipper-shaft does not (as in the ordinary construction of steam-shovels) rotate with the thrusting-pinions in order to run the dipper-handle in and out, as each thrusting-pinion *s* is made in

one piece with or bolted firmly to the corresponding gear t , the two sets of gears thus connected rotating upon the shipper-shaft and the respective gears t being on the outside overhanging and entirely clear of the members of the dipper-handle, while the pinions s s extend underneath the saddle-block to engage the racks e' e' on the lower sides of the members of the dipper-handle. This arrangement of the gears t and pinions s constitutes a valuable improvement, as it entirely dispenses with the necessity of securing the shipper-shaft pinions to the shaft by means of keys or other devices, which occasion much trouble by working loose, wearing unduly, or breaking off. Both the shipper-shaft gears t and the thrusting-pinions s are driven at the same rate of speed and in fixed relation with each other by means of gears u , keyed to the ends of the crank-shaft v of the engine w , mounted upon the boom.

It will be apparent, of course, that instead of the engine w any other suitable type of motor may be employed, provided, of course, the latter is appropriately connected to drive two gears which mesh with the respective gears t t in order to run the latter and the thrusting-pinions secured thereto at the same rate of speed.

The dipper c is provided with the usual form of bail c'' , to which is connected a block a' , under which the hoisting-rope d' runs. Said hoisting-rope d' is connected at one end to the boom, and after running under the block a' passes over a guide-sheave d'' on the end of the boom, thence along the boom and under a suitable fairlead f' to the hoisting-drum mounted on the car-body.

In order to support the boom, there is provided the usual form of A-frame consisting of the two legs n' , which are connected to the A-frame head o' , upon which is swiveled the usual type of yoke n'' . Connected to opposite sides of the yoke n'' are two parallel guy-rods, which instead of passing above the thrusting-gearing and finding their attachment at the end of the boom are connected to an extension b'' of the side plates b' on the boom. This brings the boom attachment of the guys below the thrusting-pinions, and therefore below the sweep of the dipper-handle. This arrangement also makes it possible to locate the boom-guys horizontally, which avoids the usual vertical component of the stresses imposed upon the A-frame head, and permits of the use of the cross-tie f , joining the upper ends of the dipper-handle members e e , as will be apparent from an inspection of Figs. 1 and 2. This latter feature is of much importance, as the two sides of the dipper-handle are held rigidly in accurate parallelism and in proper position to engage the thrusting-pinions, and it also enables the dipper-handle to withstand much greater

torsional strains than would be possible were the two ends not attached to each other.

What I claim is—

1. In an excavator, the combination of a swinging boom, a handled dipper operatively supported thereby, and guys attached to said boom below the sweep of the dipper-handle.

2. In an excavator, the combination of a swinging boom, a handled dipper operatively supported thereby, and guys attached to said boom by the shipper-shaft brackets.

3. In an excavator, the combination of a swinging boom, a dipper-handle comprising two parallel members straddling the boom and provided with a cross-tie at the upper end, and guys attached to said boom below the sweep of said dipper-handle.

4. In an excavator, the combination of a swinging boom, a dipper-handle comprising two parallel members straddling the boom, and a saddle-block comprising a sleeve mounted on the shipper-shaft and two lateral arms in which the parallel members of the dipper-handle are guided.

5. In an excavator, the combination of a swinging boom, a dipper-handle comprising two parallel members straddling the boom, and a saddle-block comprising a base having a sleeve projecting therefrom to engage the shipper-shaft, and two lateral arms having horizontal flanges on their upper sides to guide the parallel members of the dipper-handle.

6. In an excavator having a swinging boom, a saddle-block comprising a sleeve engaging the shipper-shaft, and lateral arms projecting therefrom and having flanges on their upper sides to engage and guide the dipper-handle.

7. In an excavator, the combination of a swinging boom, a dipper-handle formed of two parallel members straddling the boom, a shipper-shaft mounted on the boom, and pairs of connected thrusting-gears and thrusting-pinions loosely mounted upon the shipper-shaft, said pinions engaging the respective parallel members of the dipper-handle.

8. Thrusting-gearing for steam-shovels and the like, comprising a shipper-shaft, two thrusting-gears loosely mounted upon the respective ends of said shaft, and thrusting-pinions attached to said gears.

9. In an excavator, the combination of a swinging boom, a shipper-shaft extending through supports on said boom, thrusting-pinions on said shaft, a divided dipper-handle straddling the boom, and a saddle-block embracing said shipper-shaft between its supports and extending outside of and above the separate members of the dipper-handle to hold the racks upon the dipper-handle members in mesh with the thrusting-pinions.

10. In an excavator, the combination of a swinging boom, a shipper-shaft extending through supports mounted upon the boom,

thrusting-gears with thrusting-pinions rigidly attached thereto and mounted upon each end of the shipper-shaft, a divided dipper-handle straddling the boom, and a saddle-block embracing said shipper-shaft between its supports and extending outside of and above the separate members of the dipper-handle to hold the racks upon the dipper-handle members in mesh with the thrusting-pinions.

ions.

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

WILLIAM ELSTON MAGIE.

Witnesses:

RIDGELY FLETCHER,
HARRY B. HAYDEN.