

(No Model.)

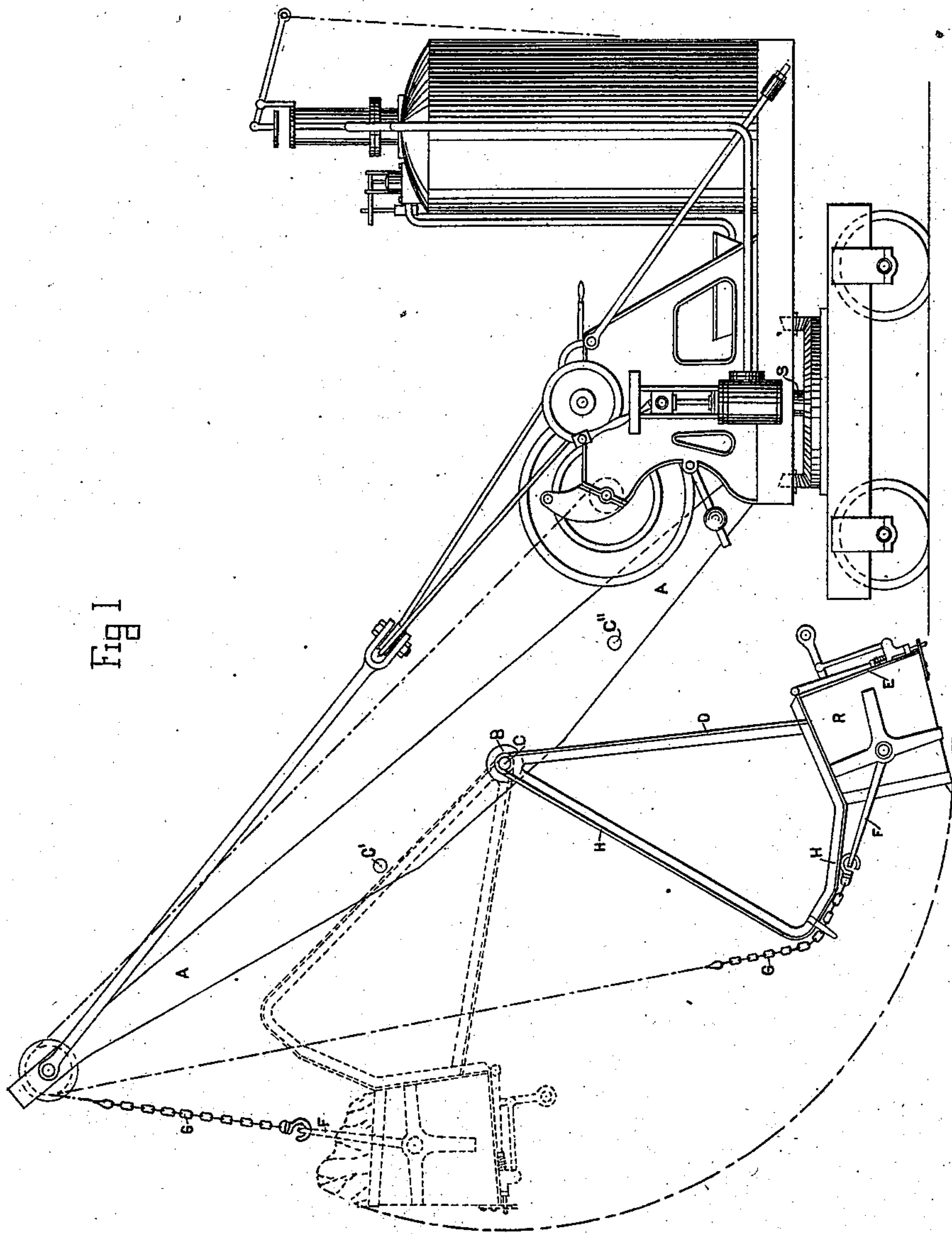
2 Sheets—Sheet 1.

T. WHITAKER.

EXCAVATING AND MACHINERY THEREFOR.

No. 376,793.

Patented Jan. 24, 1888.



Witnesses

James F. Outinell

Walter C. Dodge.

Inventor =

Thomas Whitaker,

by Dodge & Son,

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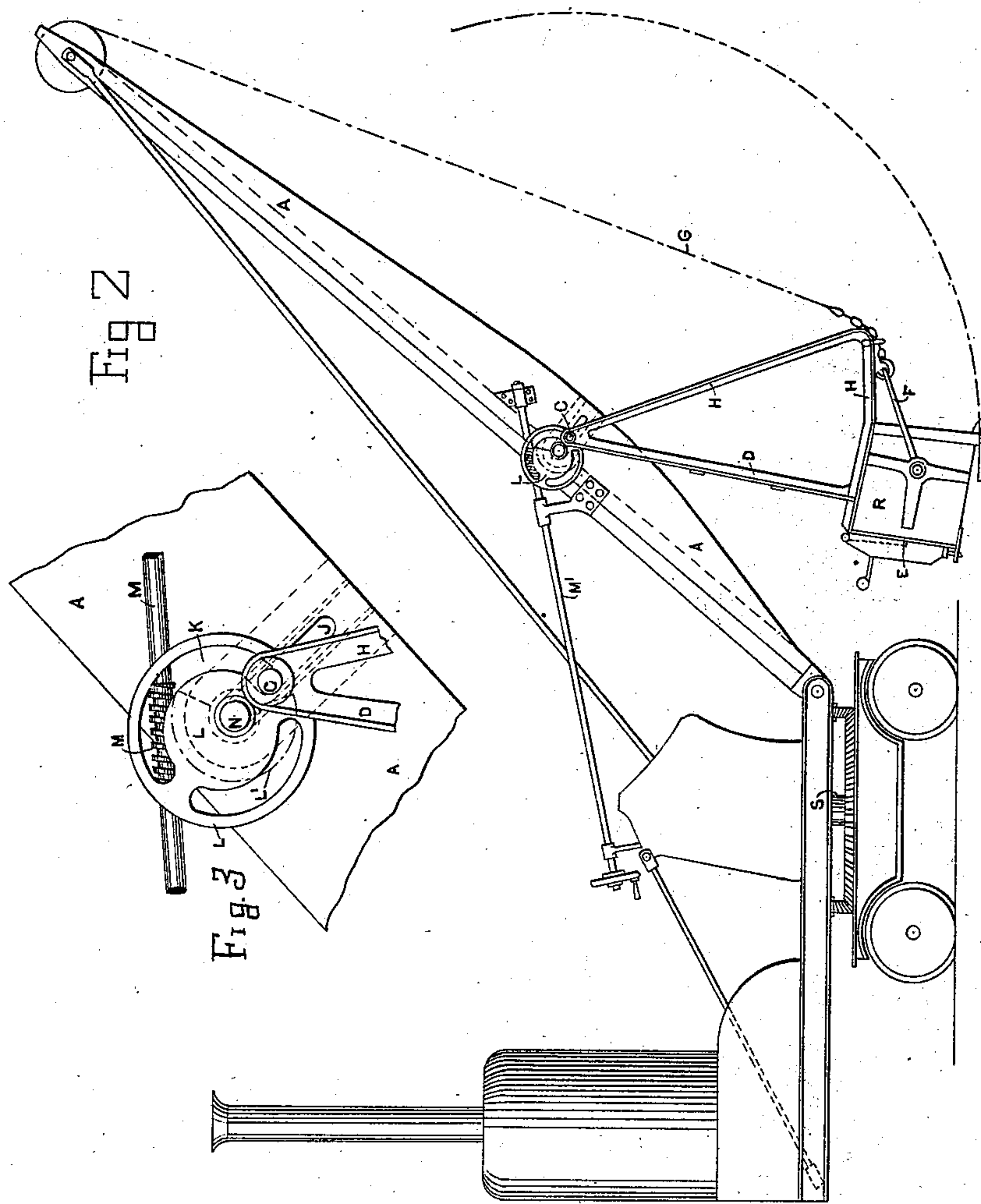
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UNITED STATES PATENT OFFICE.

THOMAS WHITAKER, OF HORSFORTH, NEAR LEEDS, COUNTY OF YORK,
ENGLAND.

EXCAVATING AND MACHINERY THEREFOR.

SPECIFICATION forming part of Letters Patent No. 376,793, dated January 24, 1888.

Application filed May 11, 1887. Serial No. 287,871. (No model.) Patented in England December 20, 1886, No. 16,701.

To all whom it may concern:

Be it known that I, THOMAS WHITAKER, a subject of the Queen of Great Britain, residing at Horsforth, near Leeds, in the county of York, in the Kingdom of England, have invented certain new and useful Improvements in or Relating to Excavating or to Machinery for Excavating, (for which I obtained provisional protection in England, dated December 20, 1886, No. 16,701,) of which the following is a specification.

This invention has for its objects the application of the ordinary steam-crane or machinery on the principle of the steam-crane to excavating, and a novel or improved method of excavating.

Referring to the drawings, Figure 1 shows a side elevation of my apparatus as applied to a crane with a jib having a derrick-motion; Fig. 2, a variation where the jib is rigid at one angle with the horizon; Fig. 3, a detail view of feeding device.

As applied to steam-crane I carry out my invention in the following manner: On the jib A of a portable, or even in some cases, floating, steam-crane, near the center of its height I place a bracket or brackets, B, and on these brackets, or a pin, C, in these brackets, I swivel an arm, D, carrying the excavating-bucket R, with a hinged or movable bottom, E, capable of opening and allowing the contents to escape when required, as shown in Fig. 1. The bucket is provided near the top with a stirrup or bow, F, by which it is suspended to the hauling-chain G of the crane. I arrange this chain with a radius arm or quadrant, H, so that in excavating the pull of the chain shall always be in a direction nearly parallel to the face of the cut and not direct to the jib-head.

The mode of action is as follows: The bucket being lowered to the bottom of the face of excavation, the crane is slightly fed forward, the hauling operation is begun, and pulling almost or quite in the direction of the cut cuts a thin layer off all the way to the top of the excavation, filling the bucket. The bucket is then drawn back a little to clear the face of the excavation by means of the derrick-motion jib, or by the worm-wheel and eccentrics, where the crane is used as a fixed jib, the crane swung

round till the bucket is over the wagon, when its contents are discharged and the bucket is swung back. The bucket is again lowered and fed forward by lowering the jib, or by using the eccentrics, and the operation repeated. If a boulder too big to be dislodged at a single scrape be found, I scrape beneath it and above it and at the sides of it, using the derrick-motion, or the eccentrics hereinafter described, to draw the bucket backward or forward past the boulder till the boulder is sufficiently undermined to be extricated.

When, as in Fig. 2, a derrick-motion is not attached to the crane, I make the bracket carrying the pin upon which the arm swings adjustable in any convenient manner, so as, by means of hand-wheel gear, to vary the feed of the bucket. As shown in Fig. 3, the stud or pin C slides in a slot, J, in the jib, and also in a circular slot, K, in the eccentric bracket L. At the back of eccentric bracket L and fixed immovably to it is a worm-wheel, L', concentric with the axis N, worked by a worm, M, on hand-wheel shaft M'. By turning the handle, and thus the worm-wheel, the eccentric is turned angularly, and thus the slot K, eccentric with the axis N, in passing pin C forces it up or down slot J. A simple screw and hand wheel parallel with slot J could be used to regulate the position of C, but would not be so convenient; or other well-known mechanical equivalents—such as a slotted bell-crank lever—can be adopted. As the pressure of the cutting would be apt to strain the jib unless special precautions were used, I place a strut and tie-rods at the back of the jib, or otherwise truss it or form it in girder-fashion, so as to stand the pressure and make it specially unyielding at the center bracket.

In some cases it is desirable to excavate considerably below the line on which the crane or excavator runs, or, in rare cases, above the said line. To allow for such cases I arrange parts C, D, &c., so that they can be taken off and placed lower down or higher up the jib at special points—such as *c' c''* in Fig. 1. The crane swiveling on its axis S, the excavator can take an entire semicircle of cuts before being fed forward.

It will be noticed that the outer face of the quadrant H is curved slightly, practically con-

centric with pivot C, so that when the hoisting-chain is drawn up taut it will lie against the curved outer face of the quadrant. This construction is preferable to the rigid guides for the bucket now in common use, as it is much lighter and cheaper and does not interfere in the slightest with the lateral travel of the crane in dumping or discharging the load.

The most important feature in connection with the use of the quadrant is that the direction of the pull or power applied to the bucket is first forward and then upward—in other words, practically parallel with the face of the cut—an arrangement which is obviously preferable to a straight upward pull upon the bucket.

I claim as my invention—

1. In an excavator, the combination, with a crane, of an excavating device, R, arm D, and quadrant H, whereby a nearly vertical pull is converted into a pull almost parallel with the circular face of the cut.

2. In a portable excavator, the combination, with a crane, of a jib, A, capable of rotating about its vertical axis, a quadrant, H, pivotally secured to the jib, a bucket, a chain secured to the bucket and passing over the outer face of the quadrant, and means, substantially such as shown, for raising and lowering the quadrant and the bucket.

3. In an excavating apparatus, the combination, with a portable crane, of a jib, A, mounted thereon, a radius-bar, D, and a quadrant, H, swinging upon a common center, a hoisting-chain, and a bucket, all combined and arranged to operate substantially in the manner shown.

4. In an excavator, the combination, with a portable crane having a jib, A, of a radius-bar, D, and quadrant H, and a bucket fixed relatively to the bar D, substantially as shown.

5. In an excavator, the combination, with the jib A, of a radius-bar, D, pivoted thereto, a hoisting-chain and bucket, and a device, substantially such as shown, varying or changing the position of the pivot of the radius-bar, whereby the throw of the latter may be varied.

6. In an excavator, the combination of the jib A, pin C, and slot J with a hand-regulating device, whereby the position of the pin C in slot J, and consequently its distance from the face of the work, can at any time be adjusted.

7. In an excavating apparatus, the combination, with a portable crane, of a jib having a series of centers, C C' C'', and a quadrant, H, adapted to be applied to any one of said centers at will.

8. In an excavator, the combination, with a jib, A, provided with a slot, J, of a slotted eccentric journaled upon the jib, a pin or stud passing freely through the slots in the eccentric and jib, a radius-bar, D, mounted upon the pin or stud, and means for rotating or turning the eccentric.

9. In an excavator, the combination, with a jib, A, provided with a slot, J, of a slotted eccentric, L, provided with a worm-wheel and mounted upon the jib, a pin, as C, engaging the slots in the eccentric and jib, a shaft, M', and a worm, M, secured to the shaft and meshing with the worm-wheel.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

THOMAS WHITAKER.

Witnesses:

HENRY S. LENTY,

SAML. HEMINGWAY,

Clerks to T. & H. Greenwood Teale, Solicitors and Notaries Public, Leeds, England.