(No Model.) 4 Sheets—Sheet 1.

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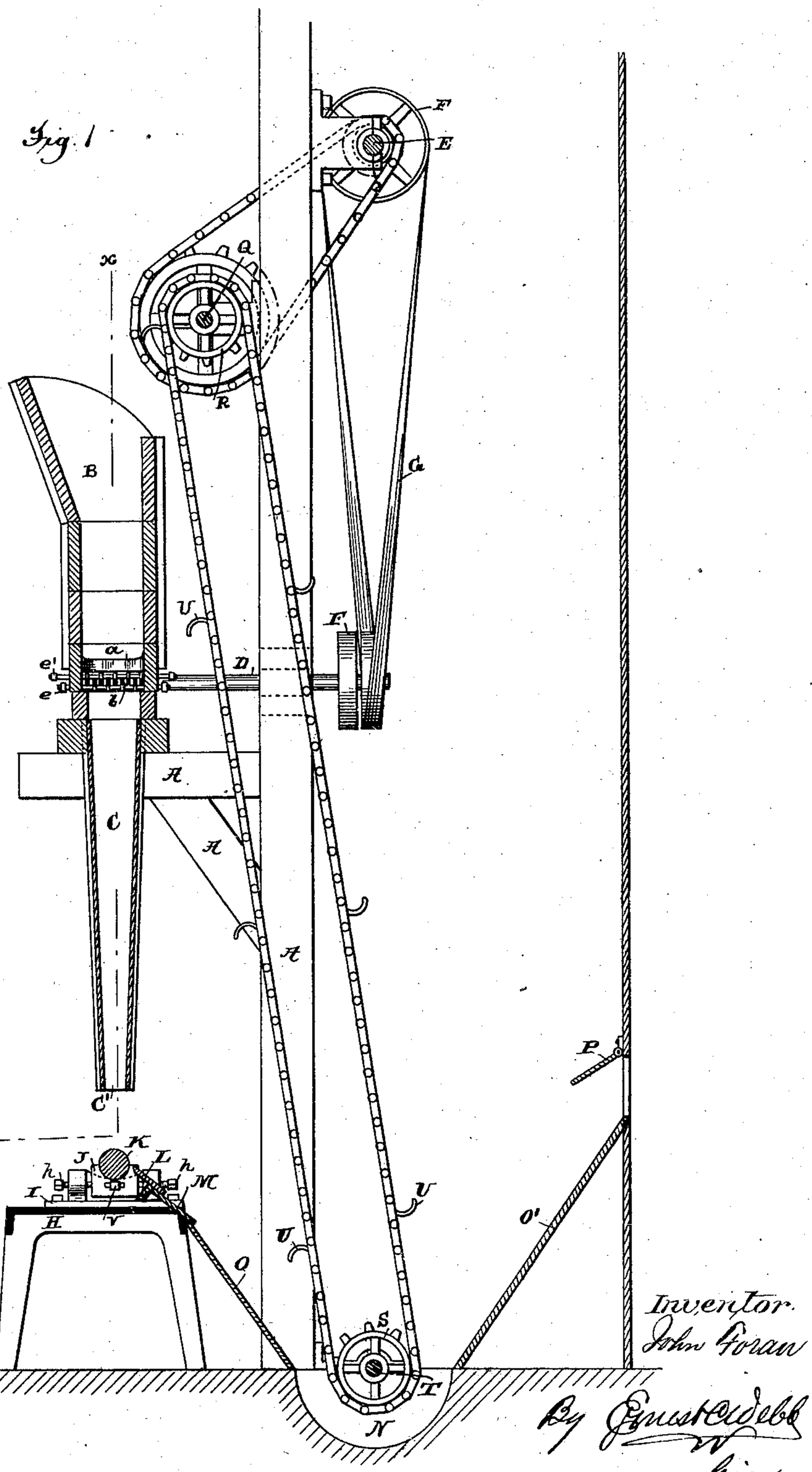
APPARATUS FOR MAKING SAND CORES.

No. 368,915. Patented Aug. 23, 1887.

Fig. 1



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John Foran
By Edmund Webb
his Atty

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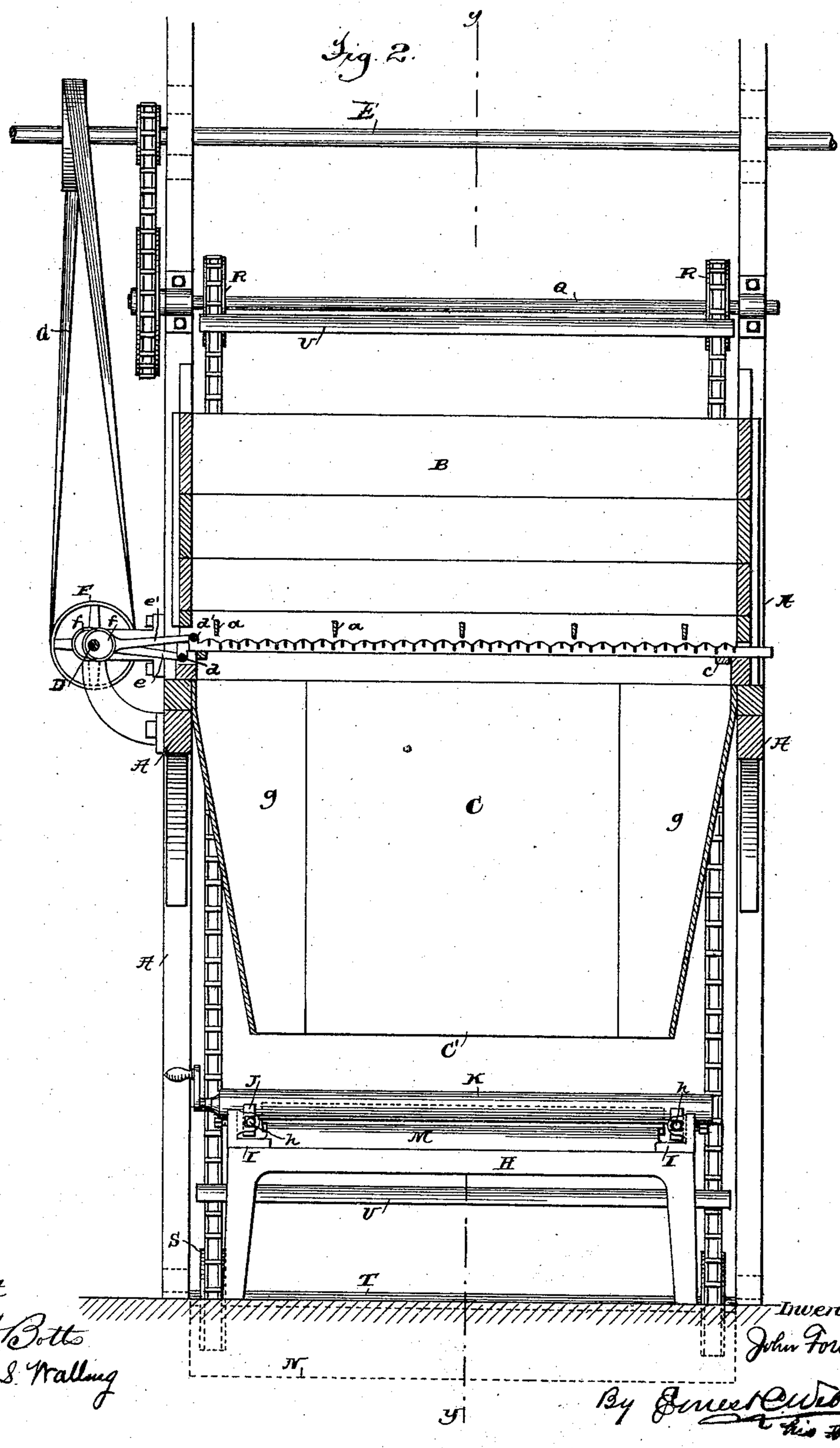
Fig. 2.



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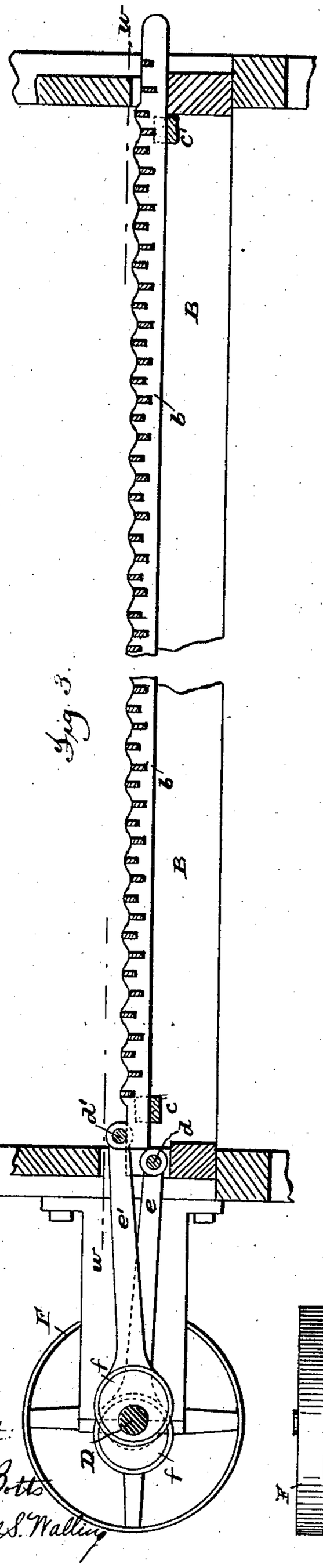

Fig. 3.

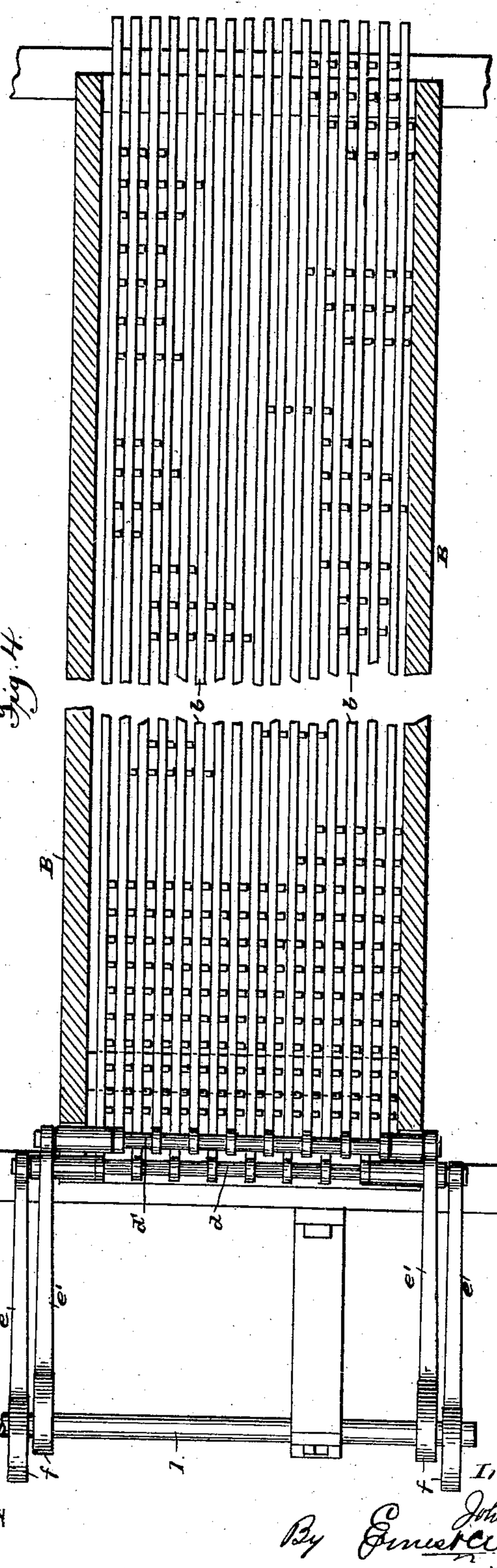

Fig. 4.

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Fig. 5.

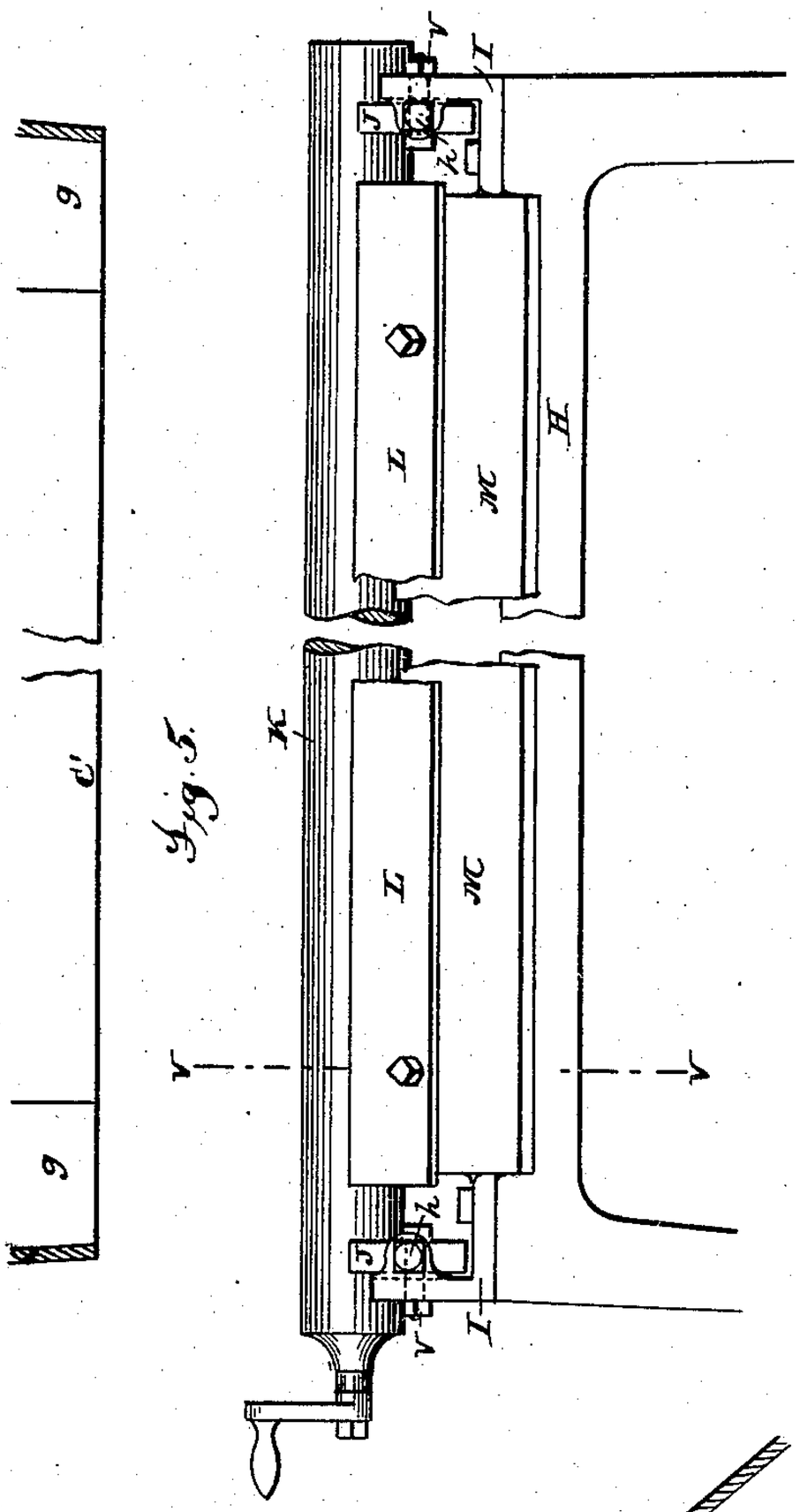


Fig. 7.

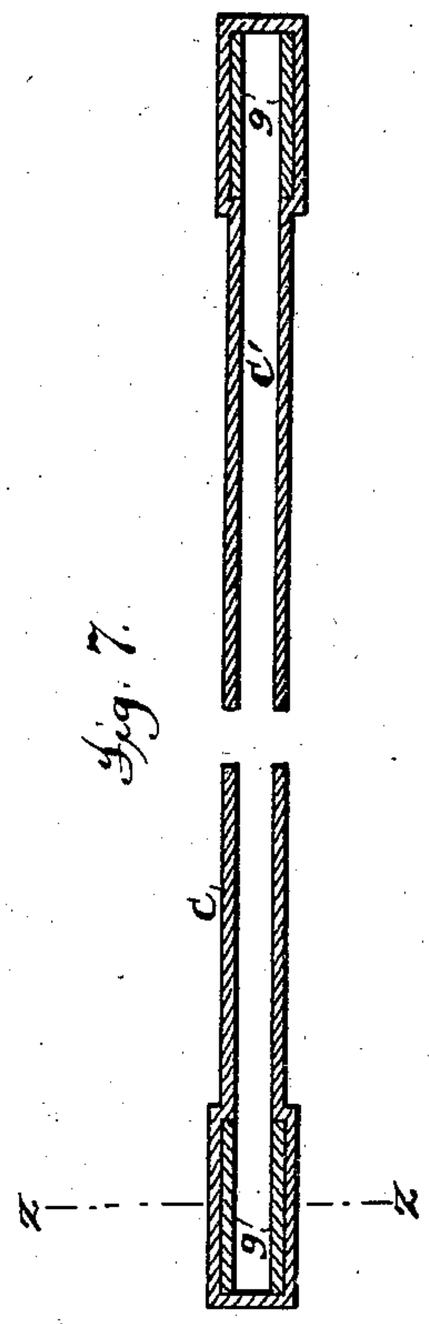


Fig. 6.

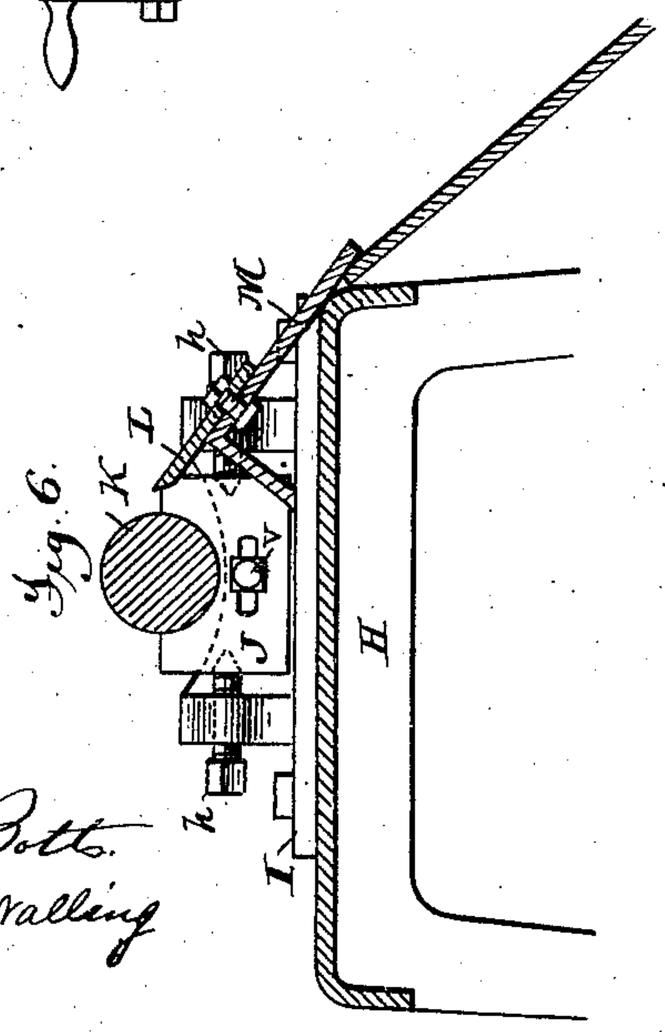
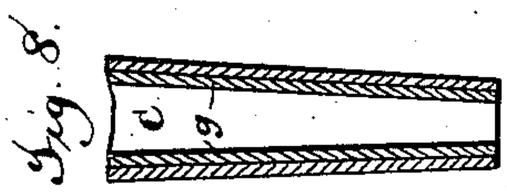


Fig. 8.



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Inventor:
John Foran
By Ernest C. Webb
his Atty.

UNITED STATES PATENT OFFICE.

JOHN FORAN, OF PORT CHESTER, NEW YORK, ASSIGNOR TO THE ABEND-ROTH BROTHERS, OF SAME PLACE.

APPARATUS FOR MAKING SAND CORES.

SPECIFICATION forming part of Letters Patent No. 368,915, dated August 23, 1887.

Application filed January 6, 1887. Serial No. 223,543. (No model.)

To all whom it may concern:

Be it known that I, JOHN FORAN, a citizen of the United States, residing at Port Chester, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Apparatus for Making Sand Cores, of which the following is a full, clear, and exact description.

This invention relates to the production of sand cores for casting iron pipes, the object being to form such cores rapidly and cheaply, and at the same time enable the workman or operator to control and regulate the shape and dimensions of the core without difficulty.

It is well known to those skilled in this art that sand cores have been formed for many years by packing the moist or green sand upon the core-arbor by hand while the latter is revolved, or by dropping the sand through a sieve upon the core-arbor, the sieve being held at a sufficient height above the core-arbor to cause the sand to adhere and pack with sufficient firmness to form the sand core. It is also well known that when either of these methods was employed a cutting-knife was used to remove the surplus sand, and the diameter of the core was regulated by adjustment of the cutting-knife. This was usually accomplished by unscrewing the cutting-knife from its table or support, adjusting it so that its cutting-edge was the desired distance from the core-arbor, and then fastening the knife to its table or support. I have found by actual practice for several years that both these methods were objectionable for several reasons. In packing the sand by hand it is difficult to obtain uniform results, and, moreover, the operation is slow and expensive. In packing the sand by gravity, by causing it to drop through a sieve held or suspended above the core-arbor, good results cannot be obtained unless the delivery of sand through a sieve can be automatically regulated by the operator so as to increase or diminish the quantity, as may be desired. I have also found that it is difficult to accurately adjust the cutting-knife to the core-arbor, because of the liability of getting the knife out of line, and therefore bringing one portion nearer the core-arbor than the other. I seek, therefore, by this invention to overcome these objections and to provide means whereby the delivery of sand upon the core-arbor can be automatically regulated by the operator, the sand delivered directly upon the core-arbor in a finely-distributed stream, the distance between the core-arbor and the cutting-knife varied with precision, and the surplus sand removed by the cutting-knife caused to fall back into the sand-pit. I also provide means for contracting or expanding the end of the sand-chute, so that one or two hubs may be formed, as desired.

To this end my invention consists in the details of construction and arrangement, all as hereinafter more fully explained, and pointed out in the claims.

In the accompanying drawings, in the several figures of which like parts are designated by similar letters of reference, Figure 1 is a central vertical section of the apparatus I prefer to employ in carrying out my invention. Fig. 2 is a section on the line *x x*, Fig. 1. Fig. 3 is a detail of the distributing device. Fig. 4 is a section on the line *w w*, Fig. 3. Fig. 5 is a side view of the cutting-knife, core-arbor, and supports. Fig. 6 is a section on the line *v v*, Fig. 5. Fig. 7 is a cross-section of the chute. Fig. 8 is a section on the line *z z*, Fig. 7.

A A designate the frame-work of my apparatus, B the sand-receiver, and C the chute. The receiver B is preferably composed of wood, and is supported in any suitable manner above the chute. It is provided with a series of cross-bars, *a*, which serve to break the sand delivered into the receiver and prevent it from caking. Between the receiver and chute a distributing device is arranged, which consists of a series of rack-bars, *b*, loosely supported at each end, edgewise in a horizontal plane, in a bar-guide, *c c'*, which is bolted or otherwise suitably secured to the frame-work. The upper edges of these rack-bars are corrugated, and they are each provided with a series of teeth or lugs on one side, and when in position for use these teeth all project in one direction, so that the teeth of one bar project toward the plane face of the adjacent bar. These rack-bars are operated in what I term "alternate pairs," and to accomplish this I employ what I term "bar-holders," *d d'*, to

which the rack-bars are suitably connected in the following way, namely: The first rack-bar and every alternate rack-bar thereafter is connected to bar-holder *d*, and the second rack-bar and every alternate rack-bar thereafter is connected to bar-holder *d'*. These bar-holders are each independently connected by a pair of arms, *e e* and *e' e'*, to a pair of cams, *f f*, fixed upon a shaft, D, to which motion is transmitted from the main shaft E in any suitable manner—for instance, as by pulleys F F and endless belt G—and when motion is imparted to the shaft D the rack-bars are given an endwise movement in alternate pairs by means of the cams and the connections just described. In other words, the rack-bars connected to the bar-holder *d* are pushed away from the shaft D at the same time that the rack-bars connected to the bar-holder *d'* are drawn toward the shaft, and vice versa.

I have found in practice that it is advisable to increase the space between the teeth at the ends of the bars, so as to increase the quantity of sand delivered on the ends of the core-arbor, and thus make the core firmer on the prints or bearings than at any other point.

The sand-chute C, which, as stated, is suitably supported in the frame-work below and in line with the rack-bars, is preferably composed of wood with converging sides, so as to make a narrow delivery-opening, C', and at each end thereof I form adjustable slides *g g*, by means of which the delivery-opening can be decreased or increased in width for a distance corresponding with the length of the slides. Thus, when it is desired to form a sand core with one hub, the slide at one end of the chute will be removed, and when desired to form two hubs both slides will be removed.

H designates the table upon which is placed the frame I, supporting the bearings J for the core-arbor K and the knife L and knife-rest M. The bearings for the core-arbor are adjustably secured in the frame by means of set-screws *h h*, elongated slots, and set-screws *v*. The adjusting-screws *h h* extend through the flanges of the frame and bear one against each end of the bearings. The frame is held stationary on the table by its own weight and the weight of the core-arbor, or it may be bolted to the table, if desired. The cutting-knife is bolted to the knife-rest, and the latter may be suitably secured to the frame supporting the bearings for the core-arbor or to the table. When desired to increase or diminish the distance between the core-arbor and the cutting-knife, the bearings are moved away from or toward the cutting-knife by means of the set-screws *h h* within the limits of the play permitted by the elongated slot, and in this way a perfect adjustment is obtained.

N designates the sand-pit, which is semicircular in shape and provided with inclines O O', the incline O extending up to and under the lower edge of the knife-rest and the incline O' extending up to a door, P, through which the sand is introduced into the sand-pit. This door is usually placed in the rear wall of the room or inclosure in which the apparatus is set up.

Q designates the elevator-shaft, to which motion is transmitted from the main shaft by any suitable means. To each end of the shaft Q a pulley, R, is fixed, and these pulleys are connected by means of an endless chain or belt to pulleys S, fixed upon and free to turn with a dead-shaft, T, suitably supported in the sand-pit.

U designates the elevator-buckets, which are of ordinary form and of a length equal to the distance between the chains or belts just described, but not quite so long as the sand-receiver B. These buckets are securely fastened to the endless chains or belts, and when the latter are in motion the buckets are filled with sand as they pass under the pulleys S, and the load is discharged in the receiver B when the buckets pass over the pulleys R.

It will be observed that when the apparatus is in operation the sand-receiver, distributing device, chute, and the core-arbor are all in line with each other, and when the sand is delivered into the receiver it passes down through the distributing device, thence through the chute, and is delivered in a fine stream and with considerable force upon the core-arbor, which is continuously revolved until the core is formed, and as fast as the cutting-knife removes the surplus sand the latter is thrown back into the sand-pit.

It is obvious that an apparatus of this construction can easily be controlled and regulated by the operator, and this is of great advantage in forming sand cores. It is also obvious that my invention is a great improvement over the older methods, hereinbefore referred to, because the sand is delivered and distributed automatically and with force enough to pack and adhere to the core-arbor and in the required quantity to insure uniform results. Moreover, skilled labor is not required to do the work, and I find in practice that the cost for labor has been very largely reduced by the use of my apparatus as compared with any of the aforesaid other methods of forming sand cores heretofore in use. It will also be observed that the apparatus is simple in construction, easily operated, and not likely to get out of order.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In an apparatus for forming sand cores, the core-arbor, supports therefor, a knife co-operating therewith, and a knife-rest inclined toward the sand-pit, combined with a distributer and chute, the said sand-pit, an elevator extending from the sand-pit upward into proximity to the distributer to discharge its load thereinto, and an incline extending from the knife-rest to the sand-pit for returning surplus sand from the core-arbor to the sand-pit, substantially as described.

2. In an apparatus for forming sand cores, the combination, with the receiver and chute,

of interposed anti-caking bars *a* and toothed bars *b*, and means for imparting an endwise movement to these toothed bars, substantially as described.

3. A distributing device comprising a series of toothed rack-bars loosely supported in guides at each end, and means for imparting an endwise movement to these rack-bars in alternate pairs, substantially as described.

4. A distributing device comprising a series of toothed rack-bars loosely supported in guides at each end, in combination with bar-holders *d d'*, arms *e e'*, and cams *f f*, fixed upon a shaft, D, whereby when motion is imparted to said shaft the rack-bars are moved horizontally, substantially as described.

5. The combination, with the receiver B, rack-bars *b*, and their connections, of the chute C, having converging sides, substantially as described.

6. The sand-chute C, having converging sides, as set forth, and provided with adjustable slides at each end of the discharge-opening, whereby said opening can be contracted or expanded, substantially as described, for the purpose specified.

7. The combination, with the frame I and core-arbor, of the bearings J, adjustably secured in the frame and adapted to be moved so as to increase or diminish the distance between the core-arbor and the cutting-knife, substantially as described, for the purpose set forth.

8. The combination, with the frame I, core-arbor K, and bearings J, of the set-screws *h h*, elongated slots and set-screws *v*, whereby the core-arbor can be adjusted with relation to the cutting-knife, substantially as described.

9. The combination, with the frame I, supporting the adjustable bearings J for the core-arbor K, of the cutting-knife L, substantially as described.

10. The combination, with the knife L and knife-rest M, of the sand-pit N, provided with the incline O, whereby the surplus sand removed by the cutting-knife is caused to fall back into the sand-pit, substantially as described.

11. In an apparatus for forming sand cores, the combination of the sand-pit N, having the incline O, elevator-buckets U, and hoisting mechanism, receiver B, distributing device, and chute C, with the core-arbor K, knife L, and knife-rest M, constructed and operated substantially as described, for the purposes set forth.

In testimony whereof I have hereunto set my hand this 5th day of January, A. D. 1887.

JOHN FORAN.

Witnesses:
J. W. DIEHL,
FREDK. CARRAGAN.