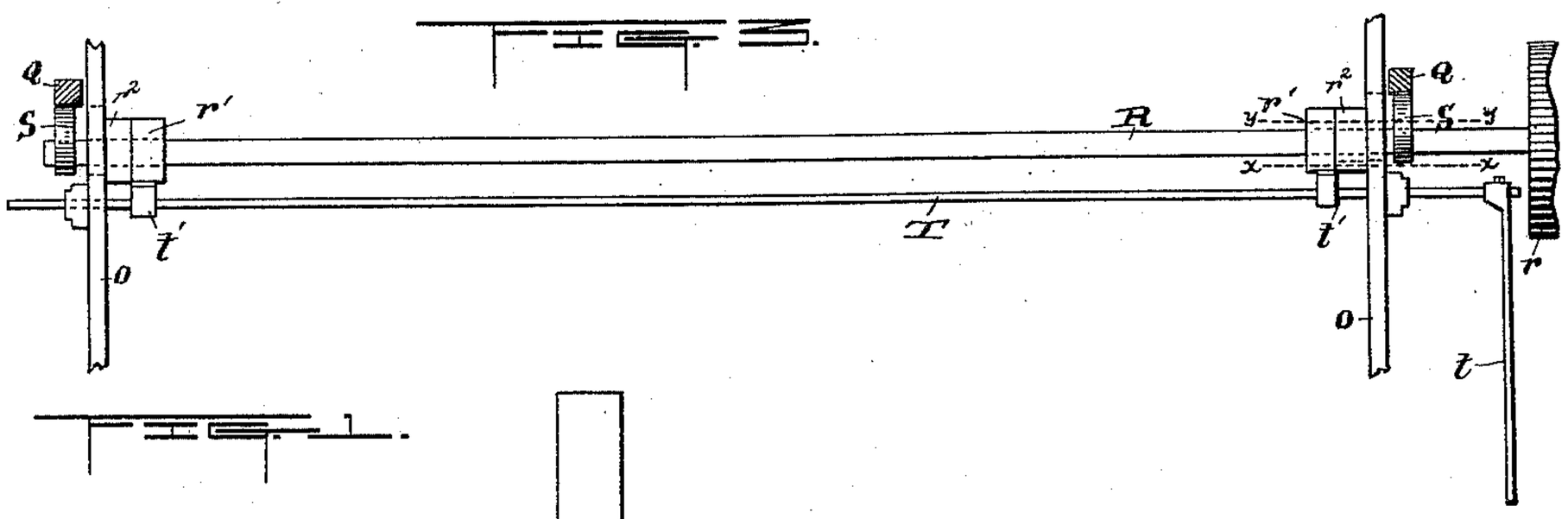
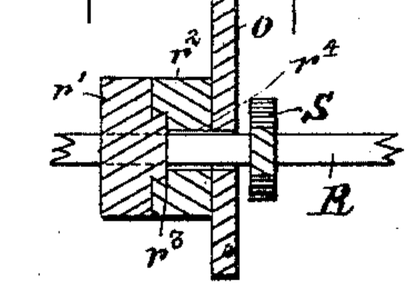
(No Model.) 2 Sheets—Sheet 1.

D. CARLIN.

SAND CORE MAKING MACHINE.

No. 432,790. Patented July 22, 1890.





WITNESSES

R. B. Seward.

Benj. E. Carroll

INVENTOR

David Carlin

By E. C. Seward

his Atty.

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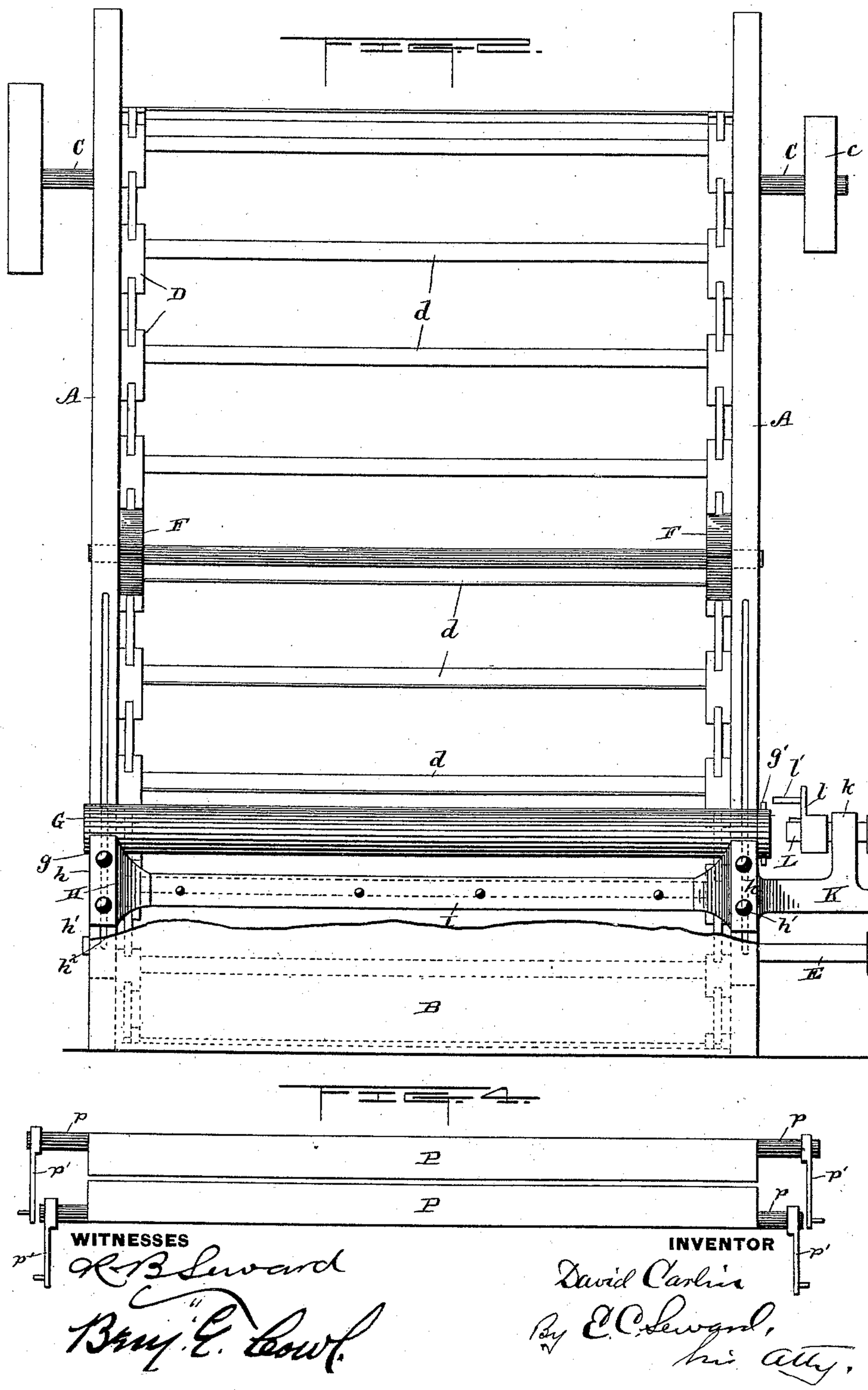

WITNESSES

R. B. Leward

Benj. E. Lowe.

INVENTOR

David Carlin

By E. C. Lewgard,

his Atty.

UNITED STATES PATENT OFFICE.

DAVID CARLIN, OF PITTSBURG, PENNSYLVANIA.

SAND-CORE-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 432,790, dated July 22, 1890.

Application filed February 6, 1890. Serial No. 339,379. (No model.)

To all whom it may concern:

Be it known that I, DAVID CARLIN, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Sand-Core-Making Machines; 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.

My invention relates to an improvement in sand-core-making machines.

The object is to provide a machine which can be operated by unskilled labor to produce cores of high excellence, a machine which shall be simple and occupy very little ground area, and which shall do its work rapidly.

With these ends in view my invention consists in certain features of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view of the machine in side or end elevation. Fig. 2 is a front view in elevation with sand-feeding and core-arbor-wetting devices removed. Fig. 3 is a view in detail of the shaft and shifting-rod for operating the feed. Fig. 4 is a view in detail of the feed-plates, and Fig. 5 is a horizontal cross-section on line $x\ x$, Fig. 3; and Fig. 6 is a similar section on line $y\ y$, same figure.

A represents a supporting-frame, at the base of which a sand-receiving box B is located.

At a suitable distance above the box B an elevator-supporting and driving shaft C is journaled in suitable bearings secured to the frame A, and having fixed thereon a driving-pulley c and wheels c', about which the elevator-chains D pass. The opposite end of the elevator is held near the bottom of the sand-box B by a shaft E, provided with wheels e, about which the elevator-chains D pass, and as the elevator extends upwardly from its lower end it is directed back from a vertical line by means of a pair of guide-pulleys F, mounted on arms of the frame A, in sliding bearings f, engaged by adjusting-screws f'. The object of so slanting the elevator is to carry it back out of the way of the core-arbor, so that the waste sand may fall freely from the arbor into the core-box in position to be picked up by the buckets d of the elevator. In fact, the bottoms of the descending buckets d as they approach the bottom of the sand-receiving box B tend to direct the falling sand to a point at the bottom of the box B, where the buckets first begin to scoop up their load. The core-arbor G may thus be located in or over the upper portion of the sand-receiving box B directly over the lower portion of the elevator, and is conveniently supported in suitable bearings g, secured to the cross-head H.

The cross-head H, carrying the stripping-knife I, is secured to the uprights of the frame A by means of bearings h, which have a sliding adjustment toward and away from the feed-hopper in order to adjust the core-arbor toward and away from the feed-hopper to allow the sand to fall a lesser or greater distance, according as the core is to be smaller or larger. One convenient means of obtaining the desired adjustment of the knife-carrying cross-head is to provide the bearings h with tongues or bolts h', adapted to slide in slots h^2 in the frame A, and provide nuts or other well-known devices for locking the bearings in adjustment. A support K is provided at one end of the cross-head H either integral with the cross-head or fixed thereto, the said support being provided with bearings k for the reception of a core-arbor-driving spindle L, journaled therein and adapted to be adjusted together with the cross-head and support K toward and away from the hopper, remaining at all times in alignment with the axes of the cores. On the end of the spindle toward the core-arbor an arm l is provided, which has a sliding movement in the direction of the length of the spindle to engage the end of the core-arbor for the purpose of rotating it. It is found convenient to provide the arm l with a pin l', adapted to engage a pin or lug g' on the core-arbor. The spindle is also provided with a fixed and an idle pulley M M′, which correspond with pulleys m m' on the lower elevator-shaft E, through which motion is imparted to the spindle by a suitable belt m^2.

A water-trough N is conveniently located in front of the box B near the core-arbor bearings, in which the water is kept constantly at such a level that the face only of the core-arbor may be wet before placing it in

position to form the core. To keep the water at the desired level, a drain-pipe N′ is provided, and has its inlet within the trough at a point to carry off the water when it reaches a certain height, thereby retaining the water in the trough at a certain level.

The front of the sand-receiving box B slants gradually toward the lower end of the elevator to direct the falling sand to the elevator-buckets, and the bottom of the said box slants upwardly, as shown at *b*, from a point below the rear lower end of the elevator to a revolving sand screen or riddle, through which the supply of sand is fed to the box and the size of the grains determined in order to secure a more uniform finish of the core. The sand-feeding hopper O is secured to the supporting-frame A above the position of the core-arbor and under the upper end of the elevator in position to receive the sand as the elevator-buckets empty themselves.

The continuous feeding of the sand to the core-arbor and the regulation of the amount of sand fed are features of the highest importance in forming a perfect core. More particularly is it desirable that the amount of sand fed should gradually diminish as the core approaches completion, and to this end, as well as to provide an uninterrupted flow of the sand free from lumps or cakes, the following mechanism is provided: The bottom of the hopper O immediately above the delivery-spout *o* is provided with a pair of feed-plates P, each secured to a rock-shaft *p*. The rock-shafts *p* are each provided with an operating-arm *p′*, and the free ends of the arms *p′* are connected by links p^2 with vibrating levers Q, located in the present instance at the top of the hopper and fulcrumed at their rear ends in suitable bearings *q*. A shaft R is journaled in bearings secured to the hopper or to a suitable support in position immediately below the front ends of the vibrating levers Q, and has fixed thereon a pulley *r*, driven from the elevator-shaft C. The bearings *r′*, in which the shaft R is journaled, have a sliding movement toward and away from the vibrating levers Q, and for this purpose they may have a dovetail connection with their support, or any other well-known and approved plan may be adopted. I have shown, however, a block r^2 rigidly secured to the side of the hopper. This block is provided with a dovetail groove r^3, which takes the dovetail projection of the sliding bearing. A vertical slot r^4 is also formed in this block and is also formed in the side of the hopper to allow of the vertical movement of the shaft R. Although I have shown this construction the same is immaterial, for I contemplate as coming within the scope of my invention any device or mechanism by means of which the shaft may be vertically adjusted. The shaft R is provided with triangular-shaped cams S, fixed thereon in position to engage the under faces of the free ends of the vibrating levers Q as the shaft revolves, and thereby, through the levers Q, links p^2, and arms *p′*, the feed-plates P are caused to oscillate, keeping the sand at the bottom of the hopper thoroughly agitated and opening their lips to allow the sand to escape. It follows, therefore, that the greater the elevation of the vibrating levers Q the greater will be the opening between the lips of the feed-plates and the more rapid the feed, and vice versa.

For the purpose of moving the shaft R, and hence the cams S toward and away from the levers Q, a shifting-rod T, provided with an operating-lever *t*, is provided and has fixed thereon short arms or lugs *t′*, which are constructed to engage the sliding bearings *r′* as the rod is rocked by the attendant operating the lever *t*.

The operation of the parts having been specifically indicated in connection with their description the operation of the whole may be briefly stated. The core-arbor, having been placed in its bearings in the water-trough and its surface wet, is placed in its bearings in the machine to receive the sand. The elevator being in motion, and hence the arbor-driving spindle, the arm on the spindle is slid into engagement with the arbor and the sand allowed to fall upon the revolving arbor from the hopper. As the core reaches completion, the operator by means of the lever *t* diminishes the flow of sand and stops it as the core is completed. The sand which does not adhere to the core and that which is severed therefrom by the knife falls directly to the bottom of the box, and together with the sand from the riddle affords a constant supply to the elevator to be carried to the hopper. A deep pit in the sand-receiver is not required. There is no tendency of the sand to bank around a guide leading from the core-arbor to the sand-box, and the feed being under perfect control the cores may be completed with great facility and perfectness.

It is evident that slight changes might be resorted to in the form and arrangement of the several parts described without departing from the spirit and scope of my invention. Hence I do not wish to limit myself strictly to the construction herein set forth; but,

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In combination, a sand-receiving receptacle, a sand-feeding hopper, core-arbor bearings located beneath the feeding-hopper and over the sand-receiving receptacle, and an elevator extending from beneath the core-arbor bearings upwardly and rearwardly and thence upwardly and forwardly to a point over the feed-hopper, and adjustable guide-pulleys located intermediate the ends of the elevator for directing and regulating the tension of the elevator, substantially as set forth.

2. The combination, with the core-arbor and its bearings, of a cross-head carrying a knife and having an adjustment toward and away from the feed-hopper, a rotary spindle,

a spindle-support constructed to move with the cross-head, and means for coupling the spindle to the core-arbor, substantially as set forth.

3. The combination, with the core-arbor and its bearings and a cross-head having an adjustment toward and away from the feed-hopper, of a spindle-support fixed to move with the cross-head, a rotary spindle mounted in the support in alignment with the axis of the core-arbor, and a sliding arm on the rotary spindle for coupling the spindle to the core-arbor, substantially as set forth.

4. The combination, with the feed-hopper and a feed-plate pivotally secured to the bottom of the hopper in rocking adjustment to regulate the flow of sand through the bottom of said hopper, of an operating-arm secured to the plate, a rotatable cam, and a connection between the cam and the operating-arm, whereby the rotation of the cam causes the plate to rock or oscillate, substantially as set forth.

5. The combination, with the feed-hopper and the feed-plate pivotally secured to the bottom of the hopper in rocking adjustment to regulate the flow of sand through the bottom of said hopper, of operating-arms connected with the plates, a rotatable shaft carrying cams, levers in engagement with the cams, and connections between the levers and the operating-arms, whereby the rotation of the cams oscillates the plates, substantially as set forth.

6. The combination, with the feed-hopper and the rocking plates secured to the bottom of the hopper with their free edges toward each other, of operating-arms secured to the plates, rotatable cams mounted in movable bearings, levers engaged with the cams and connected with the operating-arms, and means for moving the cams toward and away from the levers, substantially as set forth.

7. The combination, with the feed-hopper and the rocking plates at the bottom of the hopper, of a rotary shaft carrying cams, sliding bearings in which the shaft is mounted, a shifting-rod having arms or lugs in engagement with the sliding bearings, levers in engagement with the cams, and connections between the levers and the rocking plates for regulating the feed, substantially as set forth.

8. The combination, with the sand-receiving box, the elevator extending from within the box, and the core-arbor bearings located over the box, of a water-trough supported conveniently near the core-arbor bearings and provided with a seat for the core-arbor, and means for keeping the water at a constant level to wet only the surface of the core-arbor, substantially as set forth.

9. The combination, with the sand-receiving box having an upwardly-inclined bottom and the elevator extending from within the box at the lower terminus of the incline, of a sand-riddle at the end of the box at the upper portion of the incline, and core-arbor bearings over the portion of the box at the lower terminus of the incline, whereby the elevator may be fed with the waste sand falling from the core and with the sand from the riddle, substantially as set forth.

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

DAVID CARLIN.

Witnesses:
J. CHAS. DICKEN,
W. C. DICKEN.