No. 725,312. PATENTED APR. 14, 1903.

A. L. & O. ANDERSON.

CRANE.

APPLICATION FILED MAY 17, 1902.

NO MODEL. 4 SHEETS—SHEET 1.

Fig 1

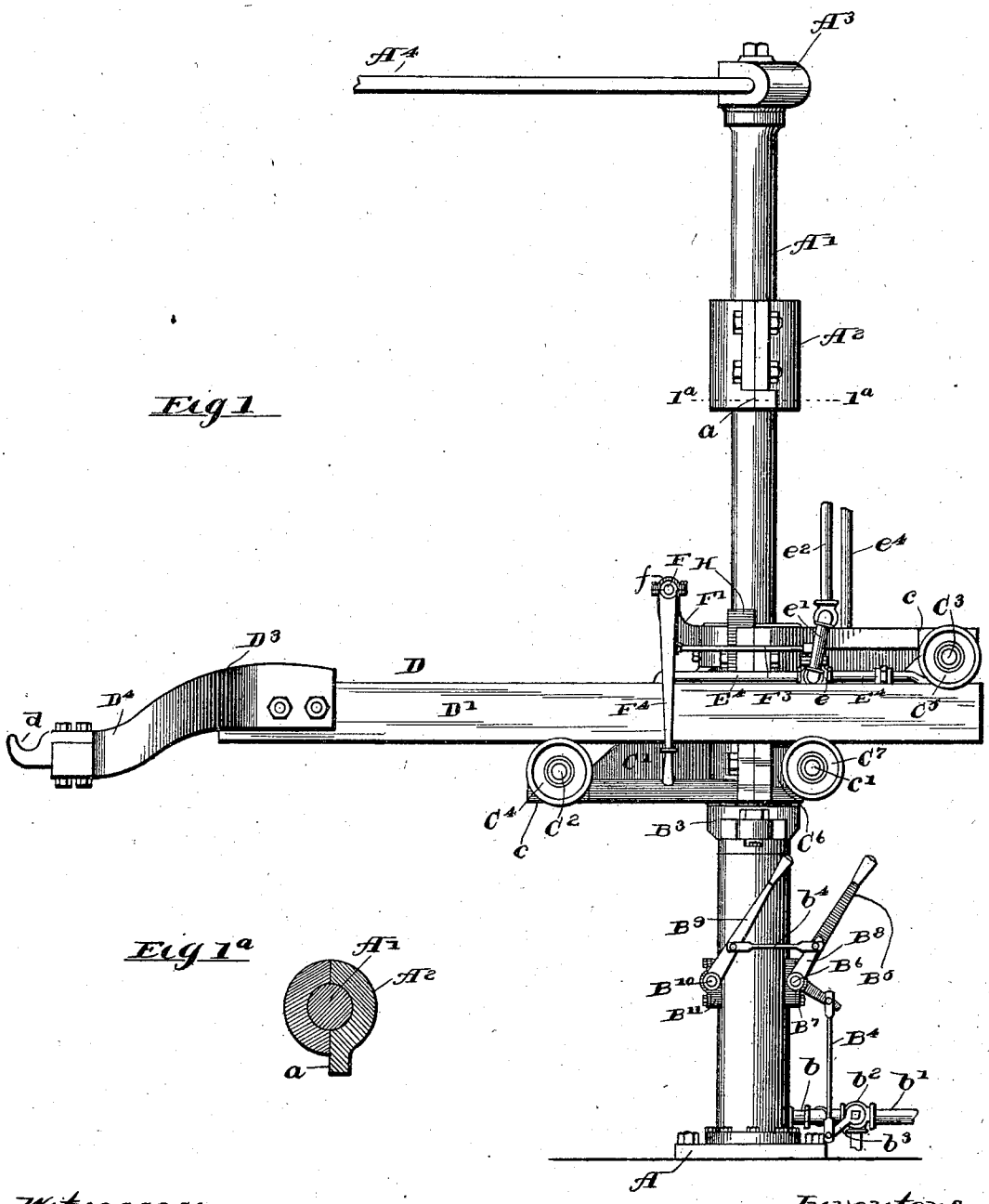


Fig 1a

Witnesses:-
Carl S. Crawford
William H. Hall

Inventors
Andrew L. Anderson
Oscar Anderson
by Poole & Bruce their Attorneys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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NO MODEL. 4 SHEETS—SHEET 2.

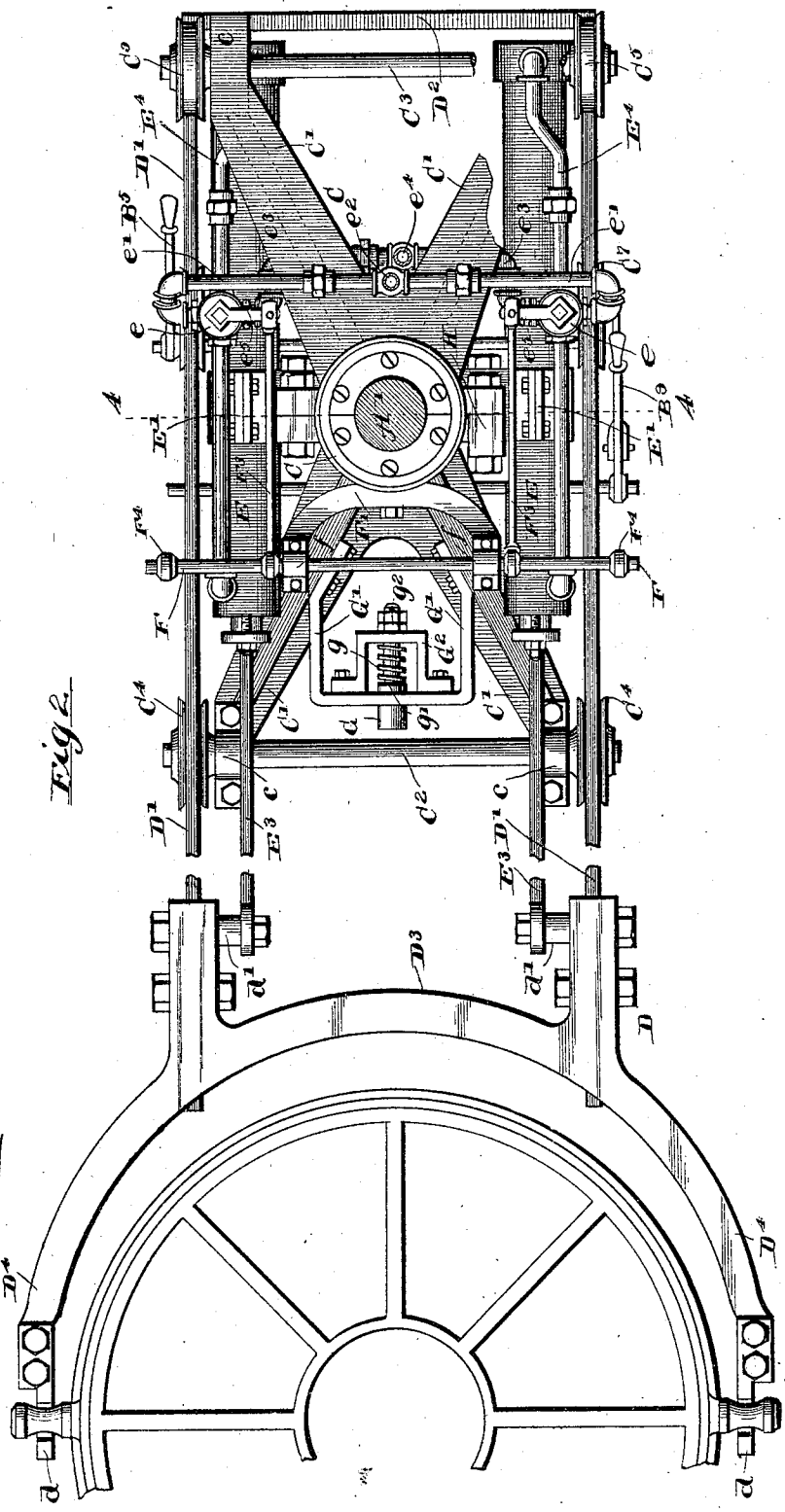


Fig 2

Witnesses:-
Carl F. Gunther
William R. Hall

Inventors:-
Andrew L. Anderson
Oscar Anderson
by Poole & Brown their Attorneys

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NO MODEL. 4 SHEETS—SHEET 3.

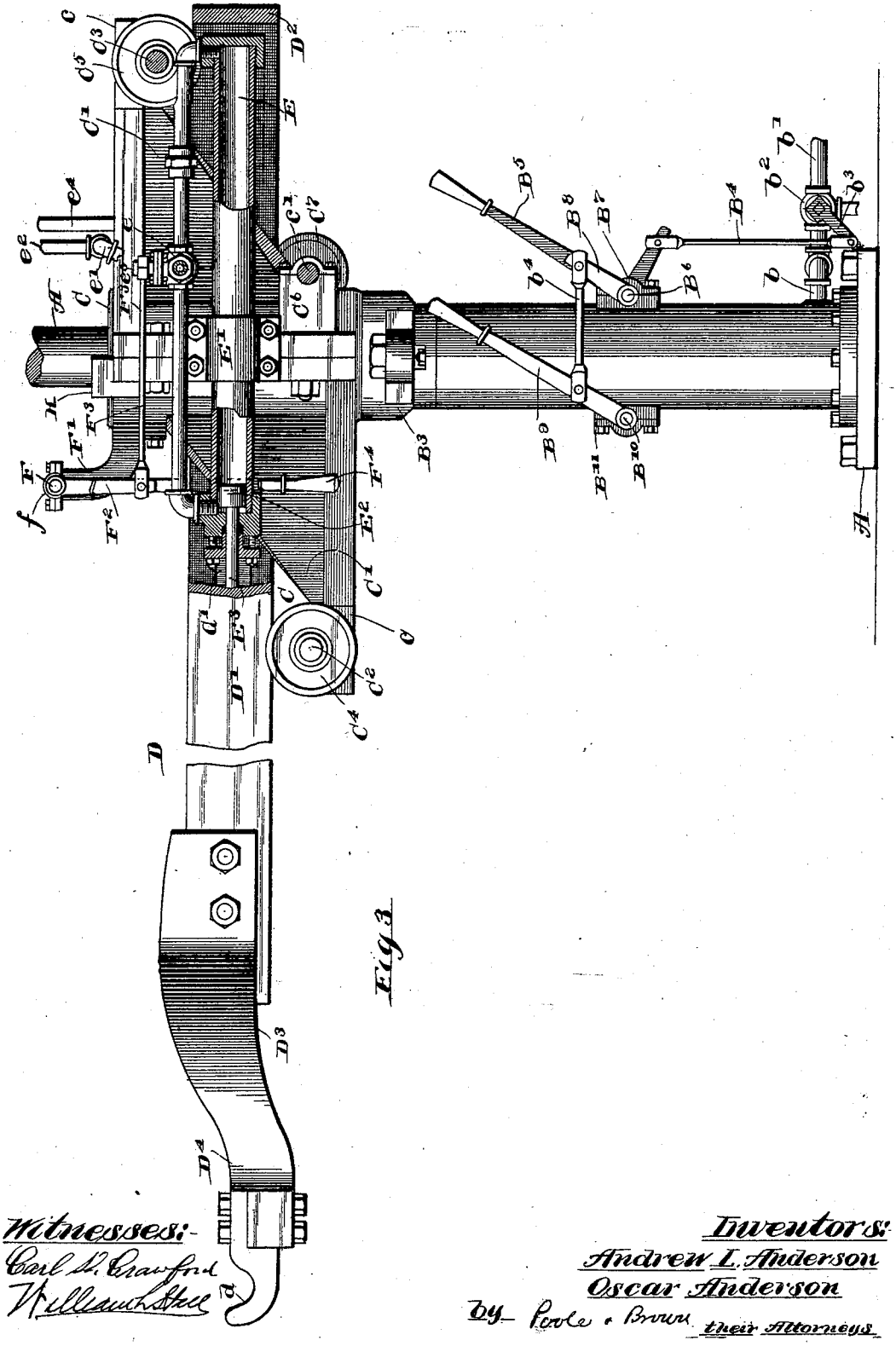


Fig 3

Witnesses:
Carl A. Crawford
William A. Steel

Inventors:
Andrew L. Anderson
Oscar Anderson
by Poole & Brown their Attorneys

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NO MODEL. 4 SHEETS—SHEET 4.

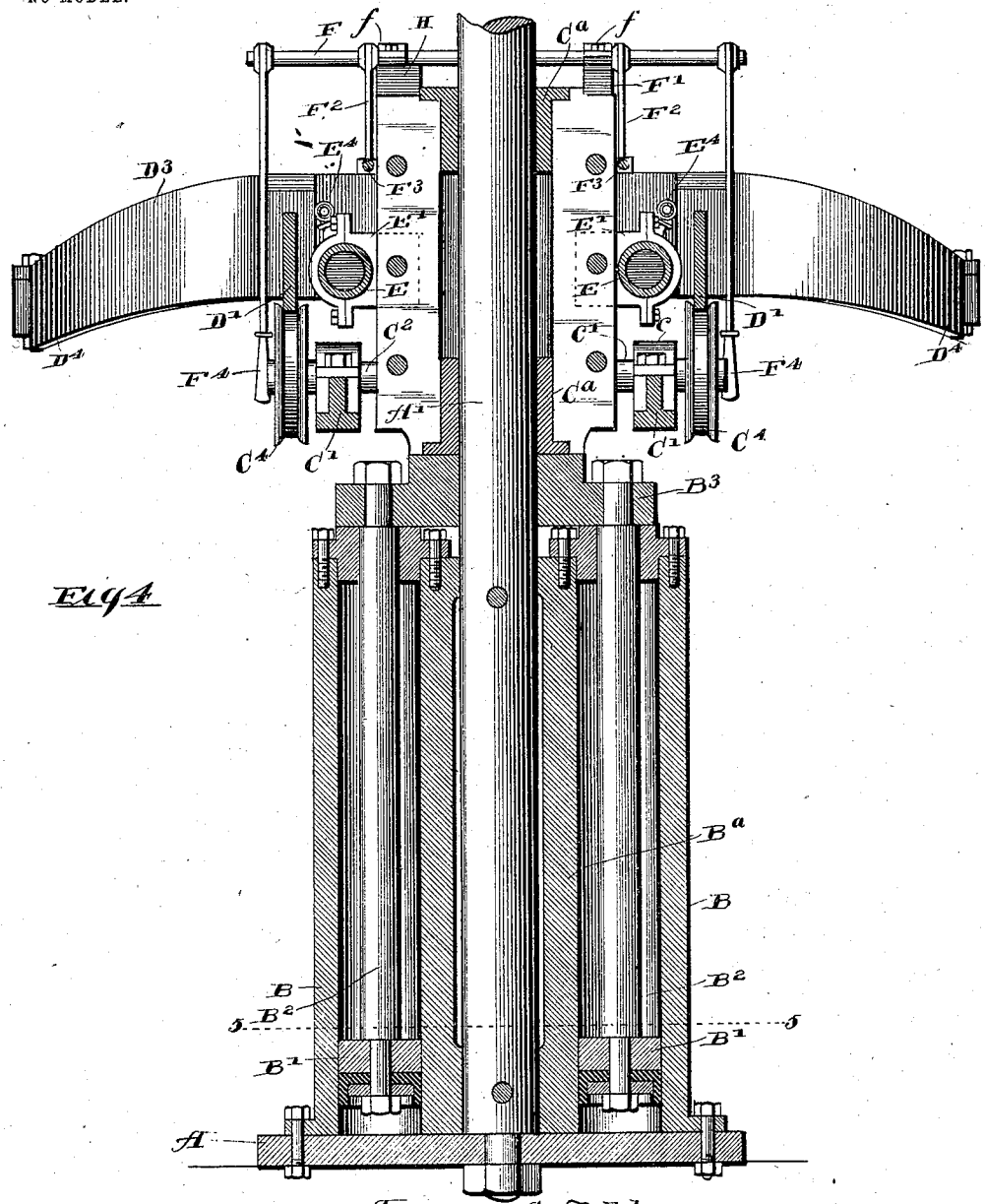


Fig 4

Fig 5

Witnesses:
Carl S. Crawford
William A. Stelz

Inventors
Andrew L. Anderson
Oscar Anderson
by Poole & Brown
their Attorneys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ANDREW L. ANDERSON AND OSCAR ANDERSON, OF CHICAGO, ILLINOIS.

CRANE.

SPECIFICATION forming part of Letters Patent No. 725,312, dated April 14, 1903.

Application filed May 17, 1902. Serial No. 107,738. (No model.)

To all whom it may concern:

Be it known that we, ANDREW L. ANDERSON and OSCAR ANDERSON, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Cranes; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in cranes and is herein shown as more specifically adapted for depositing the flask on a sand-molding machine and removing the finished mold therefrom.

The invention consists in the matters hereinafter set forth, and more particularly pointed in the appended claims.

In the drawings, Figure 1 is a side elevation of a crane embodying the improvements constituting our invention. Fig. 1^a is a transverse section taken on line 1^a 1^a of Fig. 1. Fig. 2 is a top plan view of the crane with parts broken away and parts shown in section. Fig. 3 is a side elevation, partially in section, of the lower part of the crane. Fig. 4 is a vertical section taken on line 4 4 of Fig. 2. Fig. 5 is a transverse section taken on line 5 5 of Fig. 4.

As shown in the drawings, A designates the base-plate of the crane, adapted to be bolted to a suitable foundation, and A′ a vertical standard rising from said base-plate. Bolted to said base-plate are twin vertical cylinders B B, provided with pistons B′ B′, the piston-rods B^2 of which are joined at their upper ends by a cross-head B^3, which is provided with a central opening through which the standard A′ extends, said cross-head sliding vertically on said standard. The connecting-web B^a between said cylinders is provided with an elongated passage through which the standard A′ extends. Clamped on the standard A′ is an adjustable two-part collar A^2, (shown in Fig. 1 and provided with a stop-surface *a*,) and said collar is adapted to form a vertical and horizontal stop, as will hereinafter more fully appear. At the upper end of said standard and affixed thereto is a head-block A^3, with which is connected a brace A^4, by which the standard is adapted to be supported from an adjacent molding-machine or like apparatus in connection with which the crane is employed.

The cylinders B are provided with supply and exhaust pipes *b*, as most clearly shown in Fig. 5, which communicate with a common pipe *b′*, and said pipe *b′* is provided with a three-way valve b^2. The operating-arm b^3 of said valve is connected by means of a link B^4 with a short rigid arm of a lever B^5, which lever is attached to a rock-shaft B^6, which has bearing in a lug or projection B^7 on the cylinders. Attached to said rock-shaft B^6 is a short arm B^8, which is attached by means of a link b^4 to a companion lever B^9, located on the side of the cylinders remote from the lever B^5 and attached to a rock-shaft B^{10}, which has bearing in a lug or projection B^{11} on the cylinders.

Supported on the cross-head B^3, with the standard A′ as a central bearing, is a revolving crane-head C, consisting of a central hub or body provided with radial arms or brackets C′, as shown most clearly in Fig. 2. Said arms are provided at their ends with bearings *c*, in which are mounted transverse rotative shafts C^2 C^3. Said shafts are provided at their ends with grooved wheels or pulleys C^4 C^5, respectively. The crane-head C is made of two like parts provided at their margins with overlapping flanges, which are secured together by means of bolts, as shown in Figs. 2 and 4, and is provided at the upper and lower ends thereof with interior cylindric sleeves C^a, with which the shaft A′ has bearing.

C^6 designates bearing-brackets which are attached to the flanges of the head C at the opposite sides of said head, and in said brackets is supported a transverse shaft *c′*, on which are rotatively mounted grooved pulleys C^7, the axes of which are located in the horizontal plane of the axes of the pulleys C^4.

D designates a generally rectangular carriage or traveling frame having side members D′ D′, a transverse end member D^2, and a curved front member D^3, having forwardly-directed crane-arms D^4, which, as shown in Fig. 2, are provided at their outer ends with

hooks d, adapted to engage the trunnions of a flask or mold. The said frame travels on the lower grooved rollers C^4 C^7, the lower margins of the members D′ of said frame engaging said rollers, and the upper grooved rollers C^5 engage the upper margins of said side members to hold said traveling carriage horizontally balanced. The said crane-head and traveling frame are adapted to be raised and lowered by admitting an expansible motive fluid into the lower ends of the cylinders B through the pipes b, and the motive fluid is exhausted through said pipes to permit the crane-head and the stem A′ to be lowered. After so raising the crane-head and frame to bring the crane-arms D^4 to the proper height to engage the part to be lifted the traveling carriage and said crane-arms are advanced toward the part to be lifted and are also at the proper time retracted by means constructed as follows:

E E designate horizontal cylinders supported on the head C and located one on each side of the traveling carriage. As herein shown, the cylinders are supported on two-part sleeve-bearings E′ E′, which are attached to the flanged margins of one of the parts constituting the head C. Said cylinders are provided with pistons E^2, as shown in Fig. 3, which are provided with piston-rods E^3, which piston-rods are connected at their outer ends with lugs d' on the front curved members D^3 of the traveling frame. Said piston-rods extend through suitable gland-packings at the forward ends of the cylinders, as shown in Fig. 3.

E^4 E^4 designate inlet and exhaust pipes, one associated with each cylinder, and each of said pipes is connected at its opposite ends with the opposite ends of its cylinder, as shown in Fig. 3. Said pipes E^4 are provided with four-way valves e, which are connected on one side with the opposite ends of supply-pipes e' e', which latter are joined to a common supply-pipe e^2. The valves are connected at their other sides with exhaust-pipes e^3 e^3, which communicate with a common exhaust-pipe e^4, as shown in Fig. 2. The four-way valves e control the admission and exhaust of a motive fluid, such as steam or compressed air, which is admitted and exhausted at either end of each cylinder by the following mechanism.

F designates a rock-shaft, which extends transversely across and above the main frame and is journaled between its ends in bearings f f on the outer ends of a bracket F′, attached to the head C, in the manner clearly shown in Fig. 2. Depending from said shaft F are two rock-arms F^2, which are connected at their lower ends through the medium of links F^3 with the arms e^5 of the valves e, as most clearly shown in Fig. 2, said links being loosely connected at their opposite ends with the arms F^2 and e^5. The shaft F is provided at each end, outside of the traveling carriage, with depending operating-levers F^4, whereby the valves may be opened and closed from either side of the crane.

The movement of the projecting arm D^4 of the carriage or traveling frame toward the head C is checked by a buffing device consisting of a plunger G, adapted for contact with the member D^3 of the carriage or movable frame D when said carriage is in its rearmost position. Said plunger is mounted in a frame G′, which is attached to the adjacent arms C′ of the head C, in the manner shown in Fig. 2, and the plunger is held in its forwardmost position by means of a spiral spring g, surrounding the reduced rear end of the same and interposed between a shoulder g' on the plunger and a bracket G^2, attached to the frame G′. The inner end of said plunger is screw-threaded, and one or more nuts g^2 are attached thereto, which constitute a shoulder to prevent the detachment of the plunger from the frame by the action of the spring g.

Projecting above the top of the revolving head C is a stop-block H, which is secured to said head by bolts, and said block is so arranged that when the head is raised and is revolved it strikes the stop-surface a on the stop-collar A^2, as shown in Figs. 1 and 1^a. This stop-collar is arranged to limit the upward and rotary movement of the crane-arms at any point desired. The lowering movement of the revolving head is regulated by the exhaust of the motive fluid from the cylinders B, controlled by the operating-levers B^5 B^9.

To obtain a flask preparatory to placing it on a molding-machine, the operator swings the crane-head on its axis in proper position to receive the flask and projects the crane carriage and arms by the admission of the motive fluid to the cylinders E until the hooks on the crane-arms are beneath the trunnions on the flask. By a movement of one of the operating-levers B^5 B^9 the pressure-fluid is admitted to the twin cylinders until the crane-arms lift the flask to the desired height, the upward movement of the parts being checked by the stop-collar A^2 on the standard. The carriage is then moved inwardly and swung on its axis to swing the flask toward the molding-machine or the like until it is stopped by engagement of the stops H and a. The carriage is then run forward and pressure in the cylinders B released and the flask lowered upon the part which supports it. Thereafter the crane-head is further lowered to release the hooks d from the flask, and the carriage is retracted and the crane-arms swung outwardly for another flask.

It is obvious that a crane embodying the general features of construction herein illustrated may be employed for other uses than in connection with sand-molding machines;

and it is furthermore obvious that many of the structural details may be widely varied without departing from the spirit of the invention. We do not, therefore, wish to be limited to the application of the crane herein shown nor to such structural details except as hereinafter made the subject of specific claims.

We claim as our invention—

1. A crane comprising a stationary standard, a movable head having vertically-sliding, rotative movement thereon, a horizontally-movable carriage on said head, provided with a projecting crane-arm, and means for imparting vertical movement to said head.

2. A crane comprising a stationary standard, a head having vertically-sliding and rotative movement thereon, a horizontally-movable carriage supported on said head and provided with a projecting crane-arm, and means on said head for imparting horizontal movement to said carriage.

3. A crane comprising a stationary standard, a movable head having vertically-sliding and rotative movement thereon, a horizontally-movable carriage supported on said head and provided with a projecting crane-arm, means for imparting vertical movement to said head and means on said head for imparting horizontal movement to said carriage.

4. A crane comprising a stationary standard, a movable head which has vertically-sliding and rotative movement thereon, means for raising and lowering said head, a stop on the standard for limiting the upward movement of the head, a horizontally-movable carriage which is supported on said head and is provided with a projecting crane-arm, means for moving said carriage horizontally and a crane-arm extending outwardly from said carriage.

5. A crane comprising a standard, a head on said standard having vertical and rotative movement thereon, means for raising and lowering said head, a stop on said standard for limiting both the upward and rotary movement of said head, a carriage supported on said head and provided with an outwardly-extending crane-arm and means for imparting horizontal movement to said carriage.

6. A crane comprising a standard, two upright cylinders provided with inlet and exhaust passages, pistons in said cylinders, piston-rods connected with said pistons, a cross-head which is attached to the piston-rods and is adapted to slide vertically on said standard, a crane-head which has both vertically-sliding and rotative movement in said standard and which rests on said cross-head, and a horizontally-movable carriage mounted on said crane-head and provided with a crane-arm.

7. A crane comprising a standard, two upright cylinders, pistons in said cylinders, piston-rods connected with said pistons, a cross-head with which said piston-rods are connected, a vertically-movable crane-head surrounding the standard and supported on said cross-head, a horizontally-movable carriage provided with a crane-arm, and rollers supported on said crane-head upon which the carriage rests and rolls.

8. A crane comprising a stationary standard, a movable crane-head having vertically-sliding and rotative movement on said standard, a horizontally-movable carriage provided with a crane-arm and having two parallel horizontal members which extend at opposite sides of the standard, and upper and lower rollers supported on said crane-head and which engage the top and bottom surfaces of the carriage members.

9. A crane comprising a stationary standard, a movable crane-head, which has vertically-sliding and rotative movement on said standard, a horizontally-movable carriage provided with a crane-arm and with two horizontal members which extend at opposite sides of the standard, and upper and lower rollers supported on said crane-head above and below the carriage members and engaging upwardly and downwardly facing surfaces on said carriage members, said upper rollers being located at the side of the standard remote from the crane-arm.

10. A crane comprising a vertically-movable head, forwardly and rearwardly directed arms on said head, shafts carried by said arms, rollers on said shafts, a horizontally-movable carriage, a crane-arm extending outwardly from said carriage, said rollers bearing against upwardly-facing surfaces at one end of the carriage and downwardly-facing surfaces at the other end of the carriage, and other rollers mounted on said head and engaging downwardly-facing surfaces on said carriage.

11. A crane comprising a vertically-movable head, forwardly and rearwardly directed arms on said head, shafts carried by said arms, rollers on said shafts, a horizontally-movable carriage, a crane-arm extending outwardly from said carriage, said rollers bearing against upwardly-facing surfaces at one end of the carriage and downwardly-facing surfaces at the other end of the carriage, other rollers mounted on said head and engaging downwardly-facing surfaces on said carriage, and means on the head for imparting movement to the carriage.

12. A crane comprising a standard, a vertically-movable head thereon, a horizontally-movable carriage supported on said head through the medium of rollers which are supported on said head, a crane-arm extending outwardly from said carriage and a yielding stop on the crane-head for limiting the retractive movement of said carriage.

13. A crane comprising a standard, a vertically-movable crane-head consisting of a central hub and radial arms, rollers mounted

on the arms of the head, a horizontally-movable carriage engaging and supported on said rollers, a crane-arm on said carriage, means for raising and lowering the head and means for moving said carriage horizontally on said rollers.

In testimony that we claim the foregoing as our invention we affix our signatures, in presence of two witnesses, this 13th day of May, A. D. 1902.

ANDREW L. ANDERSON.
OSCAR ANDERSON.

Witnesses:
TAYLOR E. BROWN,
GERTRUDE BRYCE.