

May 16, 1944.

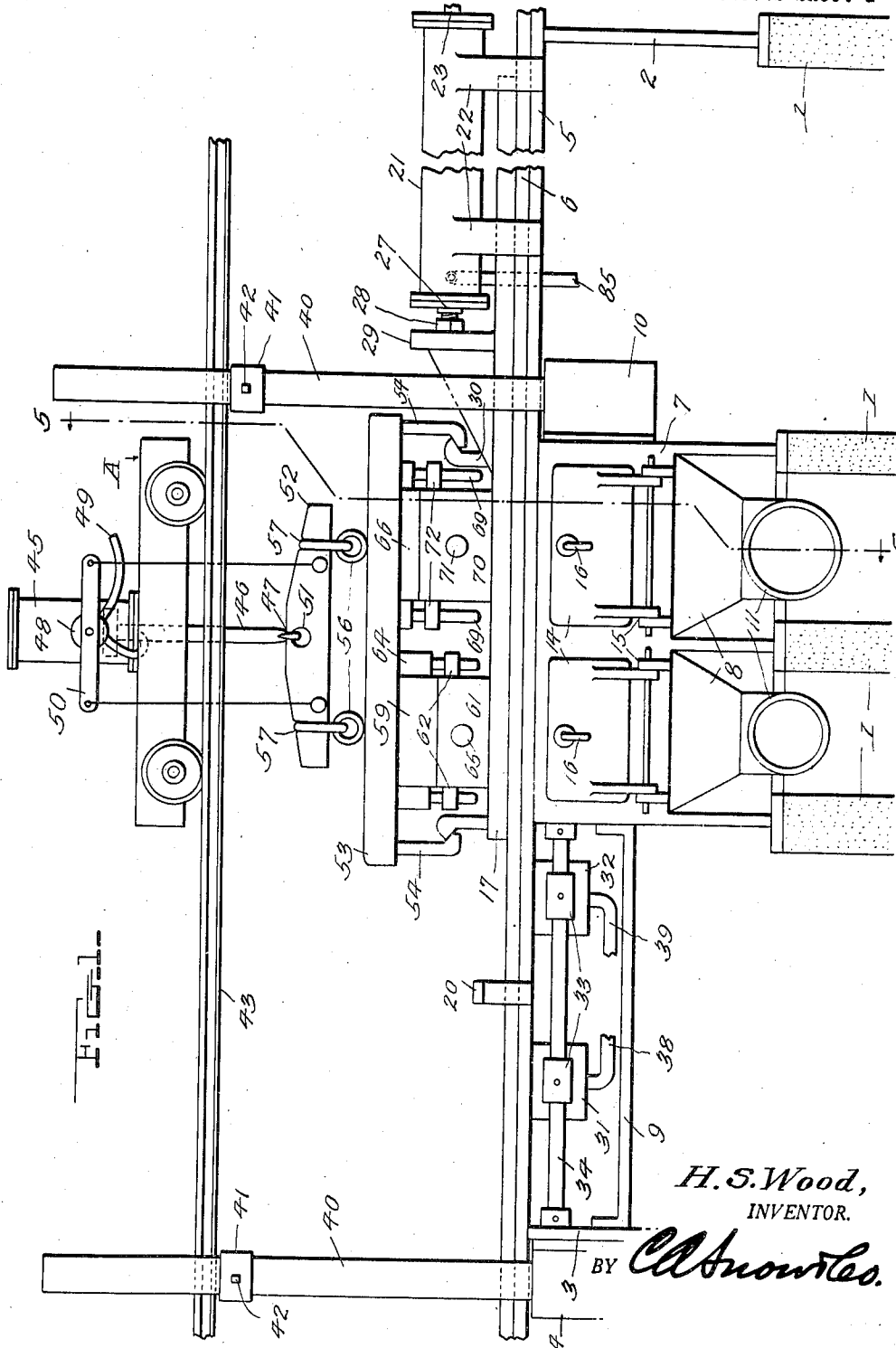
H. S. WOOD

2,349,219

MOLDING MACHINE

Filed May 21, 1942

5 Sheets-Sheet 1



May 16, 1944.

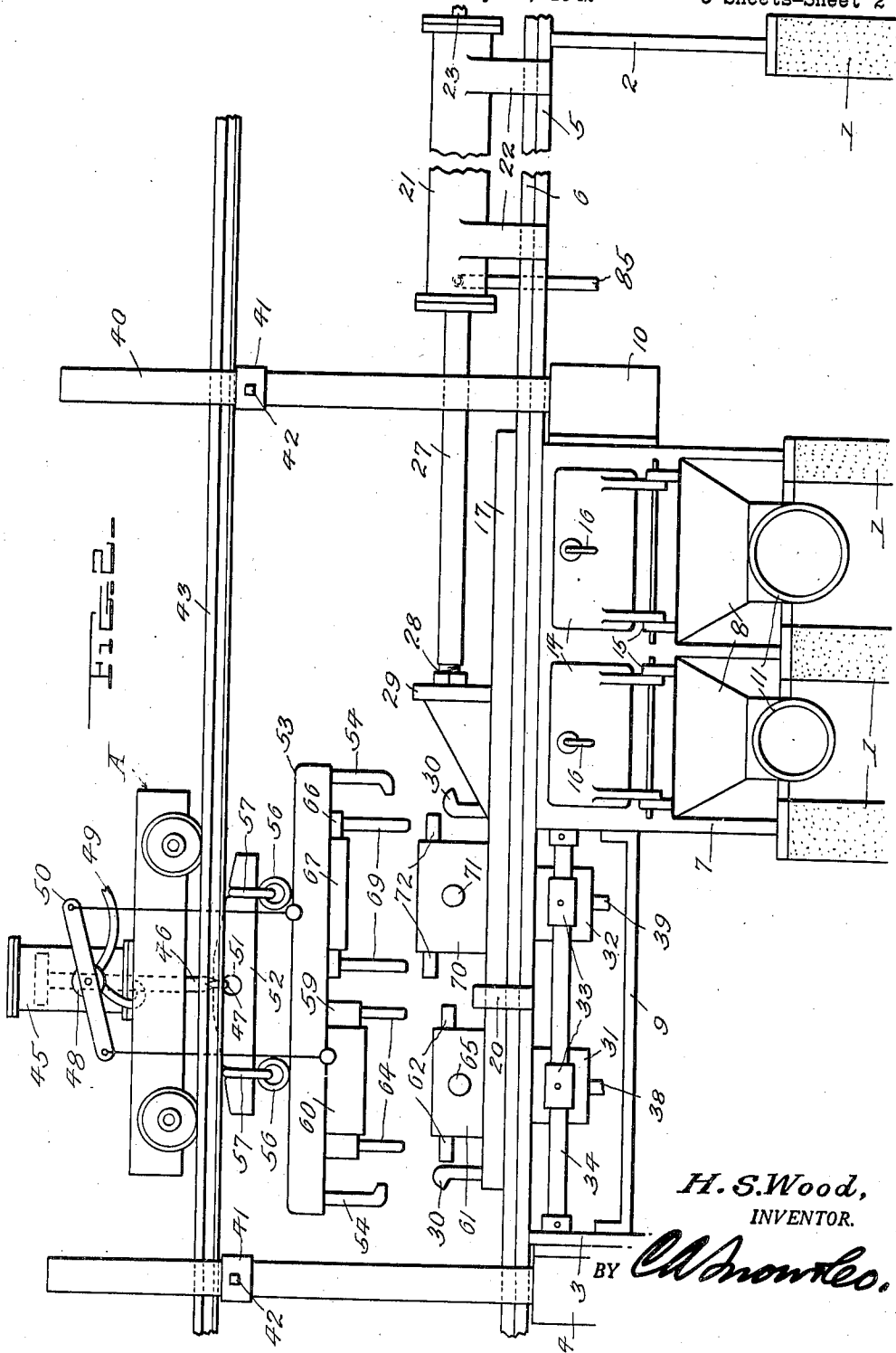
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MOLDING MACHINE

Filed May 21, 1942

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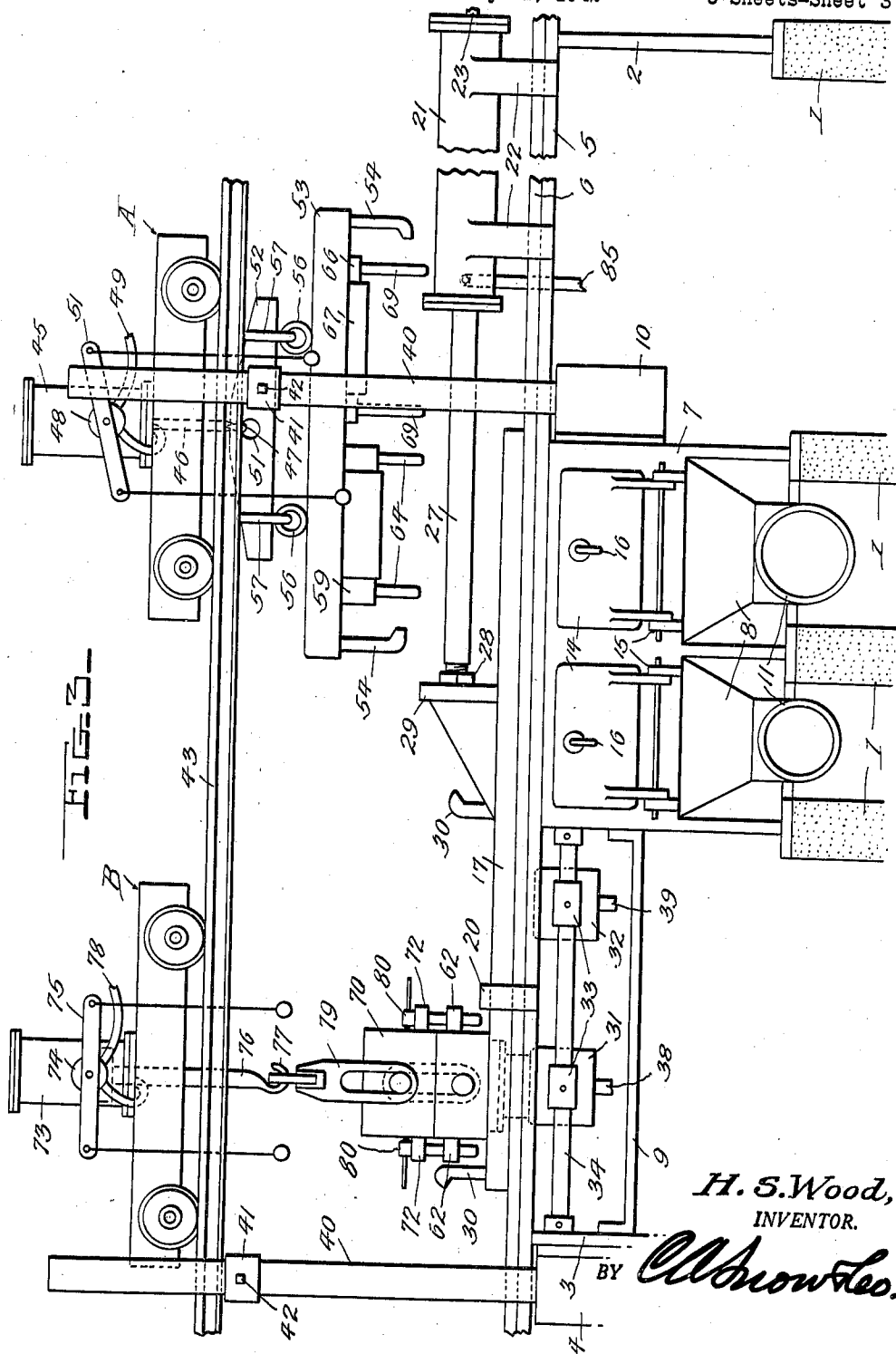
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MOLDING MACHINE

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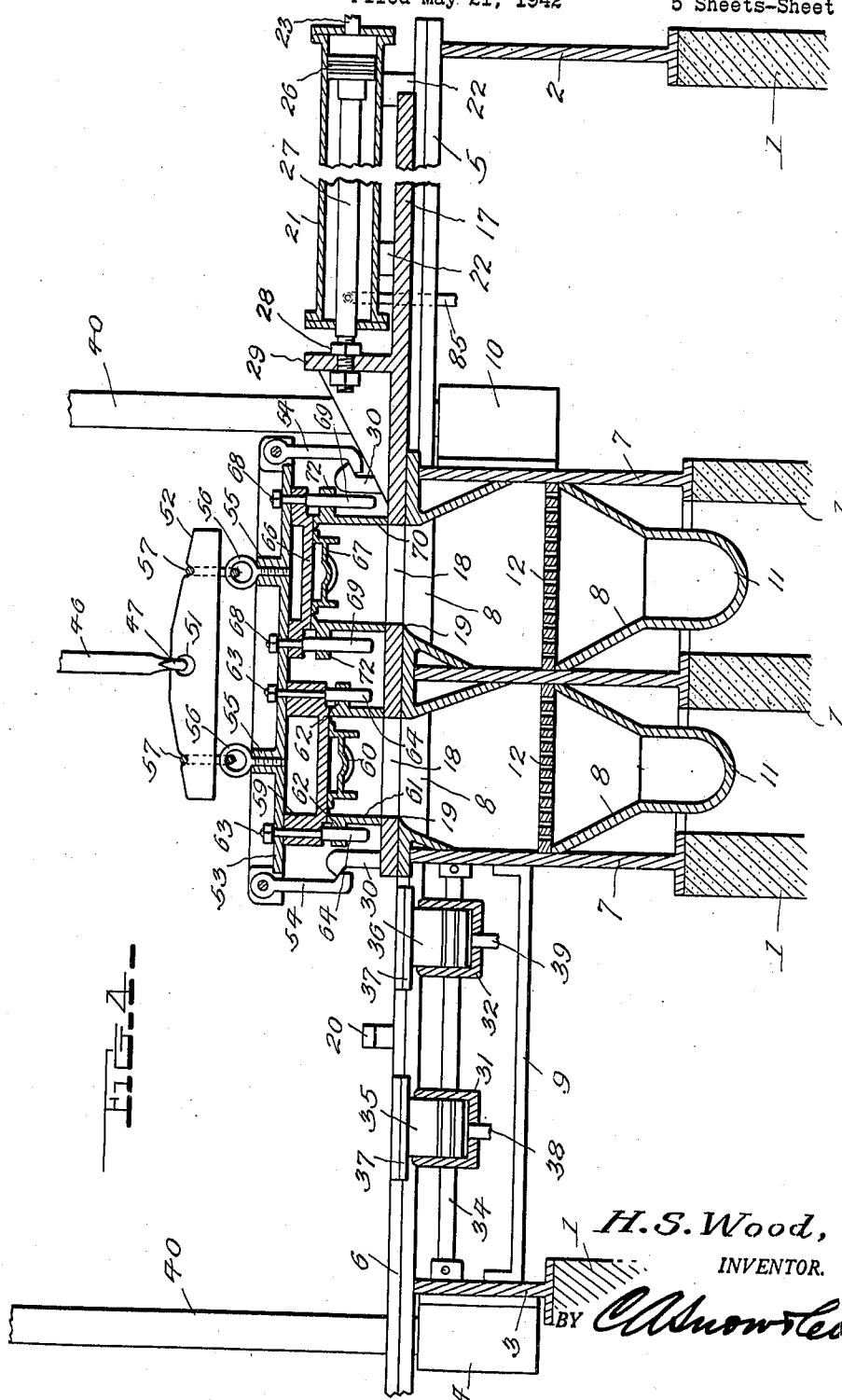
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MOLDING MACHINE

Filed May 21, 1942

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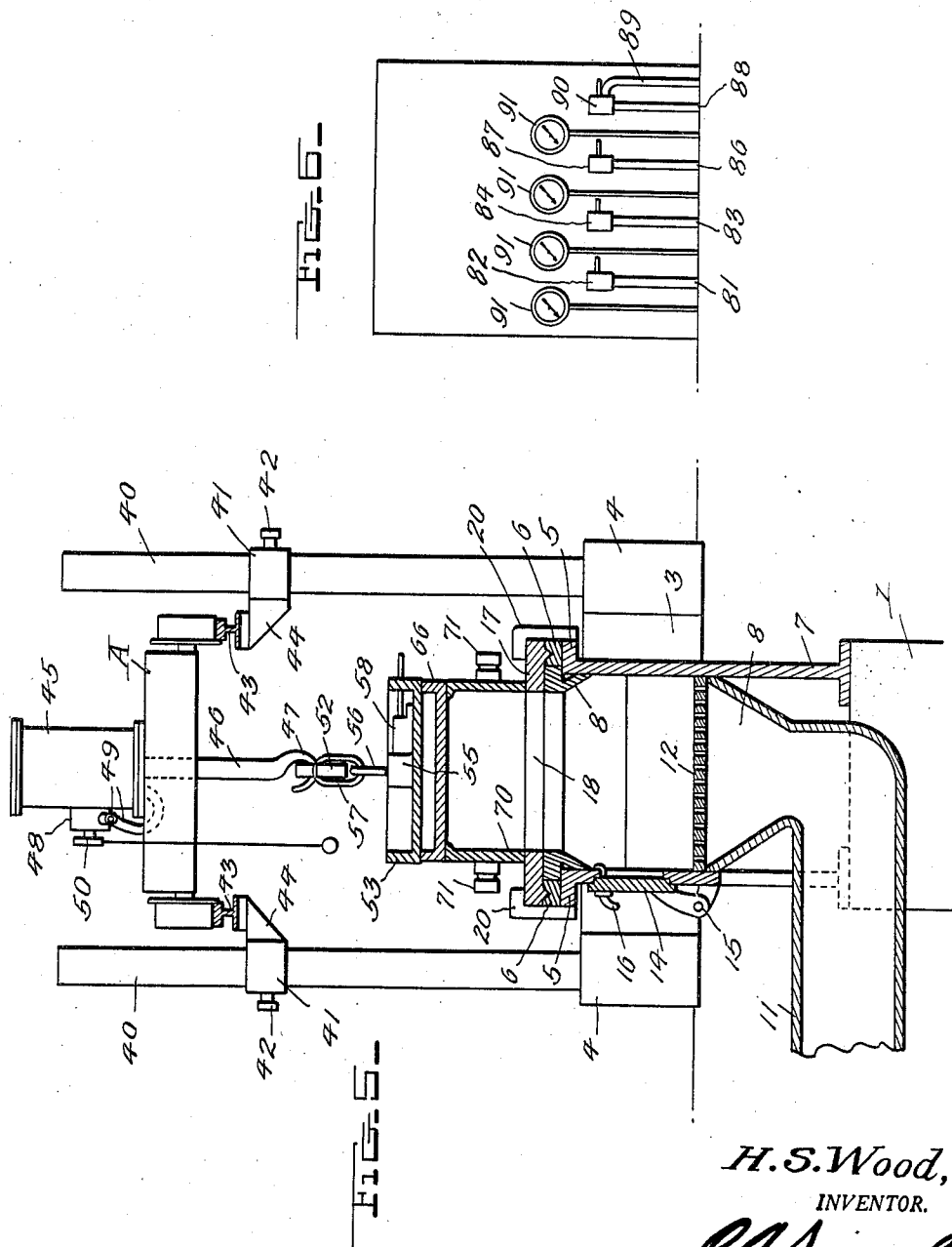
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MOLDING MACHINE

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UNITED STATES PATENT OFFICE

2,349,219

MOLDING MACHINE

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3 Claims. (Cl. 22-9)

This invention aims to provide novel means whereby a drag and a cope, closed at their upper ends by a pattern carrier, may be filled with molding sand, by air pressure from below.

A further object of the invention is to employ novel means whereby, after the drag and cope have been filled, they may be transferred, without changing their relative positions, a squeezing instrumentality, the drag and cope patterns being lifted from the drag and from the cope, the cope being inverted on the drag.

It is within the province of the disclosure to improve generally and to enhance the utility of devices of that type to which the present invention appertains.

With the above and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed, may be made within the scope of what is claimed, without departing from the spirit of the invention.

In the accompanying drawings:

Fig. 1 shows in side elevation, a device constructed in accordance with the invention, one truck being omitted, and the parts being in the positions which they occupy whilst sand is being introduced into the drag and the cope;

Fig. 2 is a side elevation, one truck being omitted, the parts being in the positions which they will assume after the drag and the cope have been advanced over the squeeze or lifting means, and after the parts that carry the cope pattern and the drag pattern have been lifted free from the drag and the cope;

Fig. 3 is a side elevation showing a device constructed in accordance with the invention, the parts being in positions that they will assume after the cope has been inverted on the drag, and after the truck that carries the drag and cope patterns has been retracted;

Fig. 4 is a longitudinal section, wherein parts appear in elevation, the drag and cope patterns and associated parts being in position on the upper ends of the hoppers;

Fig. 5 is a transverse section taken through one of the hoppers and associated parts, portions of the machine being in elevation;

Fig. 6 is a diagrammatic elevation of the remote controls.

In carrying out the invention, there is provided a foundation 1 of any desired sort, the foundation carrying, at one end of the machine, a cross

beam 2, and at the opposite end of the machine a cross beam 3 (Fig. 3), the cross beam 3 supporting sockets 4.

Elongated base members 5 are supported on the cross beams 3 and 2 and carry lower track rails 6 (Figs. 5 and 3). A casing 7 is provided, and may be connected at its upper end to the base members 5, as shown in Fig. 5. The casing 7 embodies a pair of hoppers 8, which taper toward their upper ends and toward their lower ends. The hoppers 8 are disposed close together, one behind the other, lengthwise of the machine. A brace 9 extends from one portion of the casing 7 to the cross beam 3. The opposite portion of the casing 7 carries sockets 10, corresponding in function to the sockets 4, and to be referred to hereinafter. Each hopper 8 is provided intermediate its ends with a transverse, foraminous grid 12. Molding sand may be placed in the hoppers 8, above the grids 12 when doors 14 are opened, the doors being hinged at 15 to the casing 7, and being held closed by latches 16.

An elongated carriage 17 is mounted for reciprocation on the lower track rails 6 and has openings 18 (Fig. 4) registering with the open upper ends of the hoppers 8. It may be here noted that, as shown in Fig. 4, one of the hoppers 8 is supplied at its upper end with a sand shear 19, which is V-shaped in vertical section. Referring to Fig. 2, when the carriage 17 is advanced to a predetermined position, it moves under the overhanging parts of the hold-downs 20, as shown in Fig. 5.

A means is provided for imparting reciprocation to the carriage 17, and that means may be of any desired sort. For example, a fluid pressure cylinder 21 may be attached by brackets 22 to the base structure 5. A fluid pressure pipe 23 is secured to one end of the cylinder 21, and a fluid pressure pipe 25 communicates with the cylinder adjacent to the opposite end thereof. A piston 26 is mounted for reciprocation in the cylinder 21 and is carried by a rod 27, secured adjustably, as at 28, to an anchor 29 on the carriage 17. As shown in Fig. 1, the carriage 17 is supplied with keepers 30, the openings 18 in the carriage being disposed (Fig. 4) between the keepers.

Squeeze and lifting cylinders 31 and 32 are provided, and are spaced apart, longitudinally of the machine. As shown in Fig. 2, the cylinders 31 and 32 have lateral offsets 33, receiving a supporting rod 34, having its ends connected, respectively, to the cross beam 3 and to the casing 7. A piston 35 is slidably mounted

in the cylinder 31. A piston 36 is slidably mounted in the cylinder 32, the pistons having enlarged heads 37, the heads being so spaced apart, longitudinally of the machine, and being of such diameters, that they can enter the openings 18 of the carriage 17, under conditions to be pointed out hereinafter. Pressure is supplied to the cylinder 31 through a pipe 38, and to the cylinder 32 through a pipe 39.

Standards 40 are mounted at their lower ends in the sockets 4 and 10, collars 41 being mounted on the standards for vertical adjustment, the collars being held in adjusted positions by means of set screws 42. The collars 41 at the respective sides of the machine, have offsets 44 (Fig. 5), supporting upper track rails 43. Referring to Fig. 3, a truck designated as a whole by the letter A, and a truck designated as a whole by the letter B are wheel-mounted to move along the track rails 43.

A fluid pressure cylinder 45 is mounted vertically on the truck A. A piston (shown in dotted line in Fig. 1) is mounted to reciprocate in the cylinder 45, the rod 46 of the piston being supplied at its lower end with a hook 47. A valve 48 is carried by the cylinder 45, and is interposed in a fluid pressure pipe 49 communicating with the cylinder below the piston therein. The valve has an operator's control, of any desired sort, marked by the numeral 50. The hook 47 of the piston rod 46 is engaged in a hole 51, formed in a beam 52, midway between the ends thereof.

The numeral 53 marks a carrier, disposed below the beam 52 and provided with pivotally mounted latches 54 adapted to cooperate with the keepers 30 on the carriage 17, to hold down the carrier 53. The parts 30 and 54 may be replaced by any other suitable mechanism adapted for the end in view. The carrier 53 (Fig. 4) has upstanding lugs 55, carrying eyes 56, and shackles 57, carried by the eyes, are detachably mounted on the beam 52. Referring to Fig. 5, a vibrator 58 of any standard and approved construction cooperates with one of the lugs 55 or with some other part of the carrier 53.

Referring to Fig. 4, the numeral 59 marks a drag pattern holder, carrying on its lower surface a drag pattern 60. The drag pattern holder 59 rests on a drag 61, supported on the carriage 17, about the appropriate opening 18 therein. The drag 61 has outstanding ears 62. The drag pattern holder 59 is connected to the carrier 53 by bolts 63, elongated and enlarged to form pins 64 received in openings formed in the ears 62 of the drag. The drag 61 is supplied with oppositely disposed trunnions 65.

As to the cope and associated parts, the description may be reduced to a mere catalogue, in view of what has been stated hereinbefore respecting the drag. The drawings (Figs. 4 and 1) show a cope pattern holder 66, a cope pattern 67, connecting bolts 68, pins 69, a cope 70, and trunnions 71 on the cope, the ears being shown at 72.

As to the truck B, it may be reduced to a catalogue of parts since, in most respects, it is like truck A. The truck B carries a cylinder 73, a valve 74, means 75 for operating the valve manually, a piston actuated rod 76, and a hook 77 at the lower end of the piston rod, the valve 74 being interposed in a fluid pressure pipe 78, corresponding to the fluid pressure pipe 49.

In practical operation, the parts are set up as shown in Figs. 1 and 4. There is molding

sand in the hoppers 8 above the grids 12. Air proceeding through the blast pipes 11 drives the sand up into the drag 61 and into the cope 70, lodging the sand about the patterns 60 and 67, it being understood that, if desired, the drag and the cope may be ventilated in any suitable way, to let out the air. The piston rod 27 advances the carriage 17, and the car A moves forward on the track 43, until the drag 61 of Fig. 2 is immediately over the left hand piston head 37 of Fig. 4, the cope 70 being directly over the right hand piston head 37. It is during the advancement of the carrier 17 that the sand shear 19 of Fig. 4 smoothes off the bottom of the sand in the drag 61, in the cope 70, and in the openings 18 of the carrier 17. The pistons 35 and 36 are operated to compact the material in the cope 70 and in the drag 61, it being understood that during this operation, the cope, the drag and the carrier 53 are in the condition shown in Fig. 1, with respect to each other.

The piston rod 46 of the cylinder 45 raises the carrier 53 and parts associated with it to the position of Fig. 2. Then the car A is rolled back out of the way, to the right in Fig. 3.

The car B is moved into the position of Fig. 3, and links 79, carried by the hook 77, are engaged with the trunnions 71 of the cope 70, the cope then being in the position of Fig. 2, with respect to the drag 61. By the operation of the piston rod 76, the cope is raised, and is turned over, and lowered upon the drag 61, pins 80 (Fig. 3) being inserted through ears 72 and 62 of the cope and the drag respectively. The links 79 are cast off the trunnions 71 of the cope, and the connected cope and drag structure may be carried away to the molding room, elsewhere or pouring station.

There are five remote air controls which, respectively, govern the backward and forward movement of the piston 27 in the cylinder 21 (Fig. 2), the flow of pressure to the air blast conduits 11, and the individual operation of the squeeze pistons 35 and 36 of Fig. 4.

Referring to Fig. 6, a pipe 81 furnishes an air blast to the conduits 11 of Fig. 3, the pipe 81 having at its upper end, a valve 82, under the control of an operator. A pipe 83 communicates with the pipe of the squeeze cylinder 31, and is provided with its individual hand valve 84. A pipe 86 communicates with the pipe 39 of the squeeze cylinder 32, and has an individual hand valve 87. A pipe 88 communicates with the pipe 85 for the cylinder 27 of Fig. 2, and a pipe 89 communicates with the pipe 23 of that figure, a valve being common to the pipes 88 and 89, to secure to reciprocation of the piston 26 of Fig. 2. Gauges 91, having no patentable novelty, indicate the pressures in the several conduits.

The molding material preferably comprises silicon dioxide.

Having thus described the invention, what is claimed is:

1. In a molding machine, a support, squeeze mechanisms carried by the support and spaced apart longitudinally thereof, a carriage mounted for reciprocation on the support and having openings spaced apart as are the squeeze mechanisms, a drag and a cope on the carriage and communicating with the openings, respectively, a vertically movable frame constituting a closure for the upper ends of the cope and the drag, means for coupling the frame releasably to the carriage, patterns on the frame and individual to the cope and the drag, means for advancing the

carriage to bring the openings thereof into registration with the squeeze mechanisms, respectively, means for raising the frame to cause the patterns to clear the cope and the drag, respectively, and means for discharging molding material through the openings and into the cope and the drag, before the carriage is advanced.

2. In a molding machine, a support, squeeze mechanisms carried by the support, a carriage movable along the support, drag and cope parts mounted side by side on the carriage, a closure for the upper ends of the drag and cope parts, the closure having patterns individual to the drag and cope parts, means for discharging molding material into the lower ends of the drag and cope parts, means for advancing the carriage to bring the drag and cope parts into the field of operation of the squeeze mechanisms, an overhead track, a truck movable along the track, and lifting means on the truck and connected

to the closure, to free the patterns from the drag and cope parts after the squeeze mechanisms have operated with respect to the drag and cope parts.

3. In a molding machine, a support, a carriage movable along the support, drag and cope parts disposed side by side on the carriage, means for fitting the drag and cope parts for casting, squeeze mechanisms carried by the support, means for advancing the carriage, to bring the drag and cope parts into the field of operation of the squeeze mechanisms, an overhead track, a truck movable along the track, a raising and lowering mechanism carried by the truck, and means for pivotally connecting the raising and lowering mechanism with the cope, whereby the cope may be raised, inverted and lowered upon the drag, the truck being movable on the track to position the cope above the drag.

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