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J. A. FIELD.

MOLDING MACHINE.

No. 481,017. Patented Aug. 16, 1892.

Fig. 1

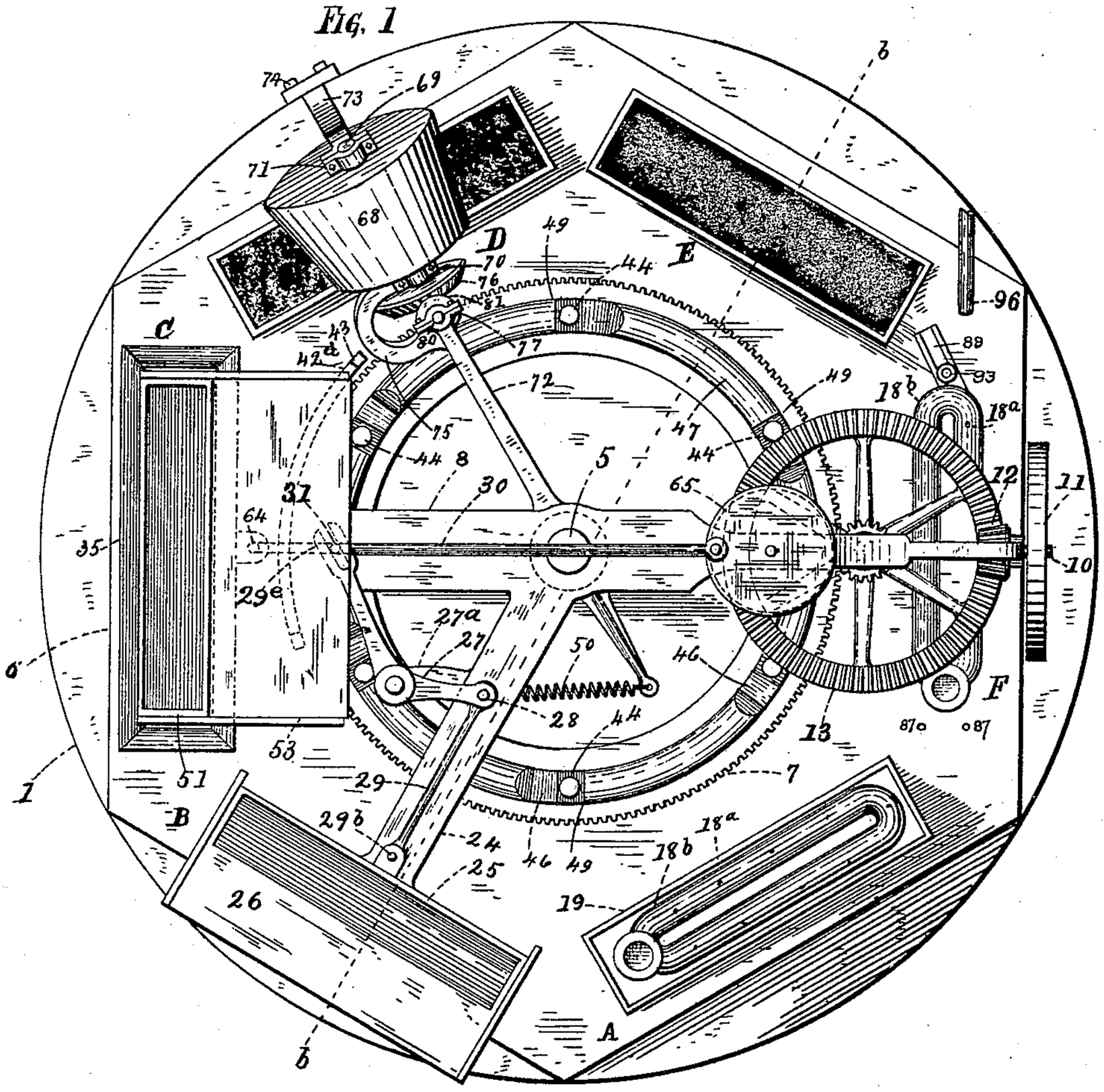

Fig 2

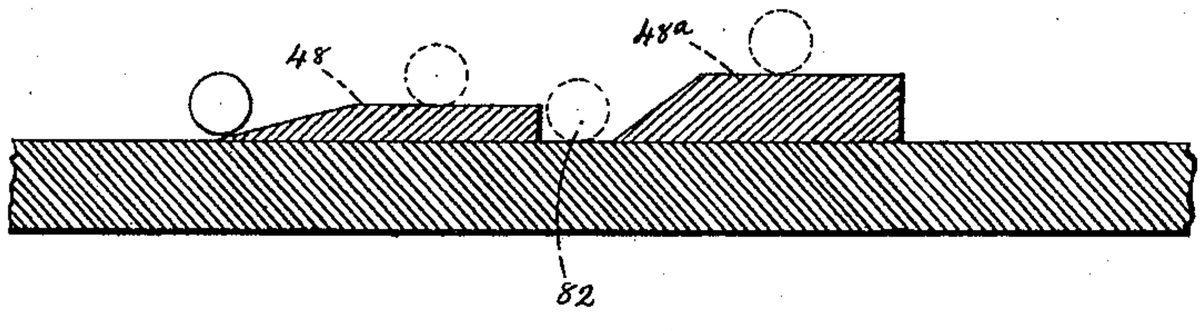

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FIG. 3

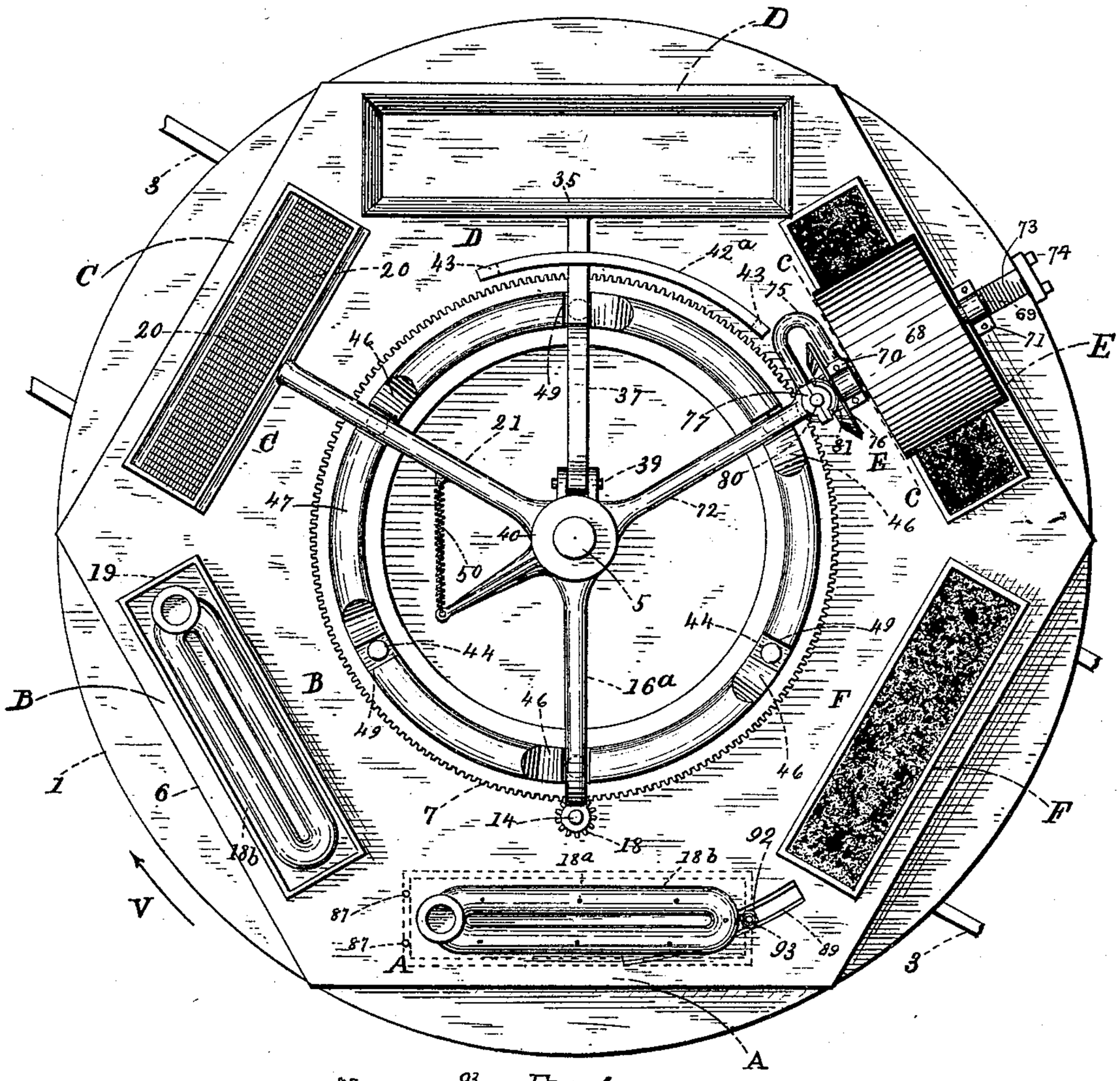

FIG. 4

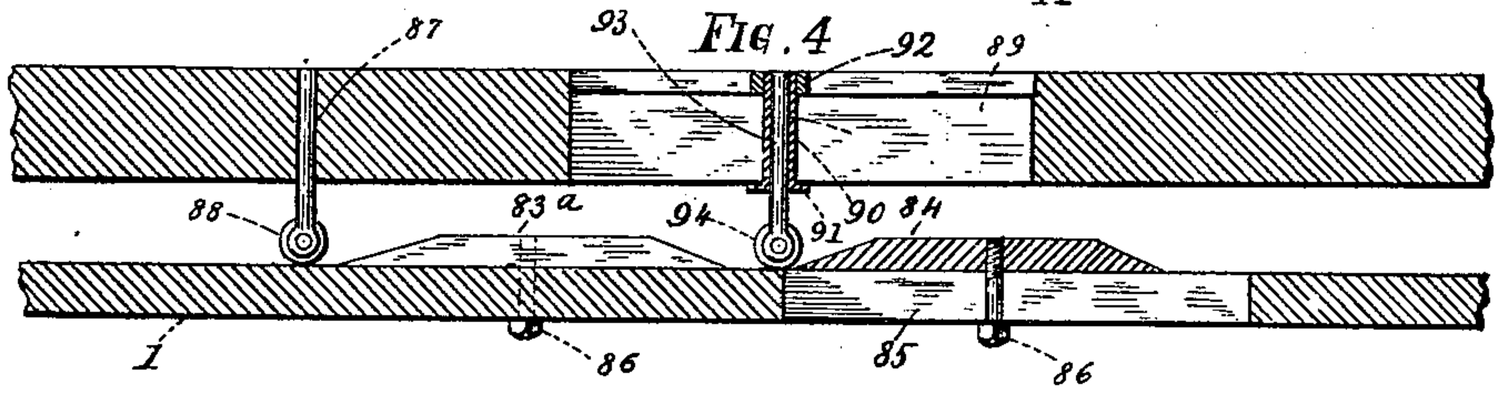

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FIG. 5.

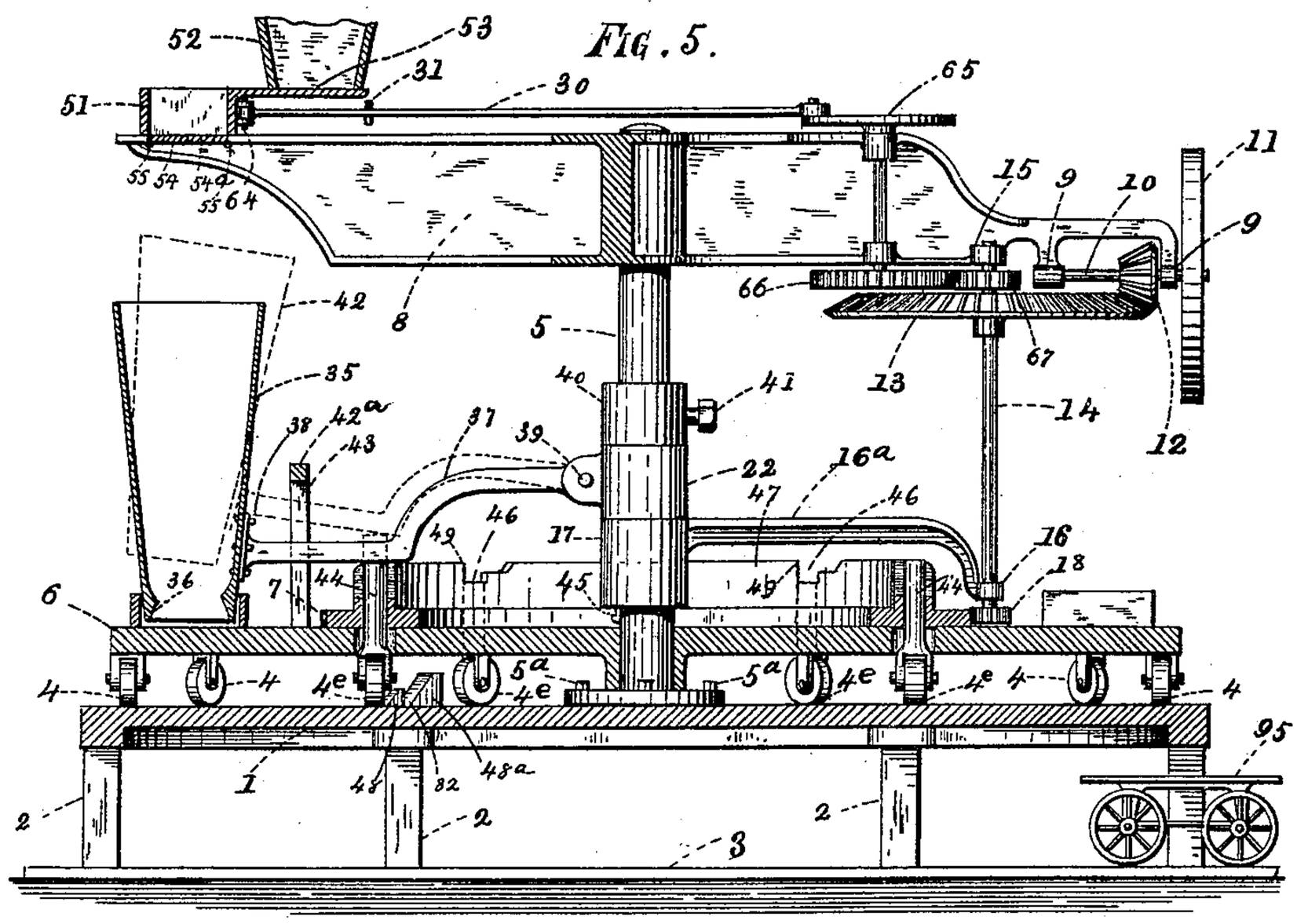

FIG. 6

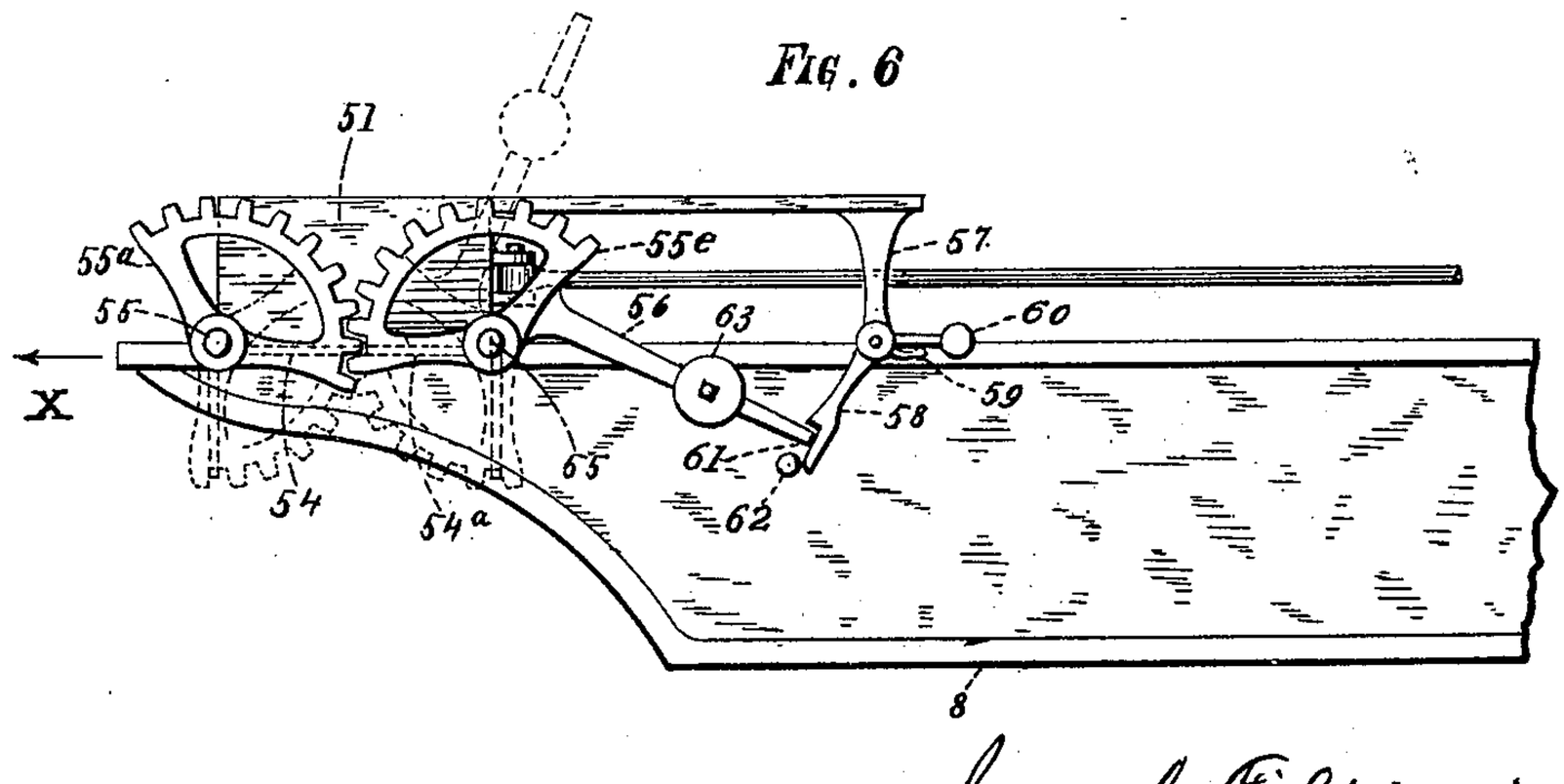

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FIG. 7

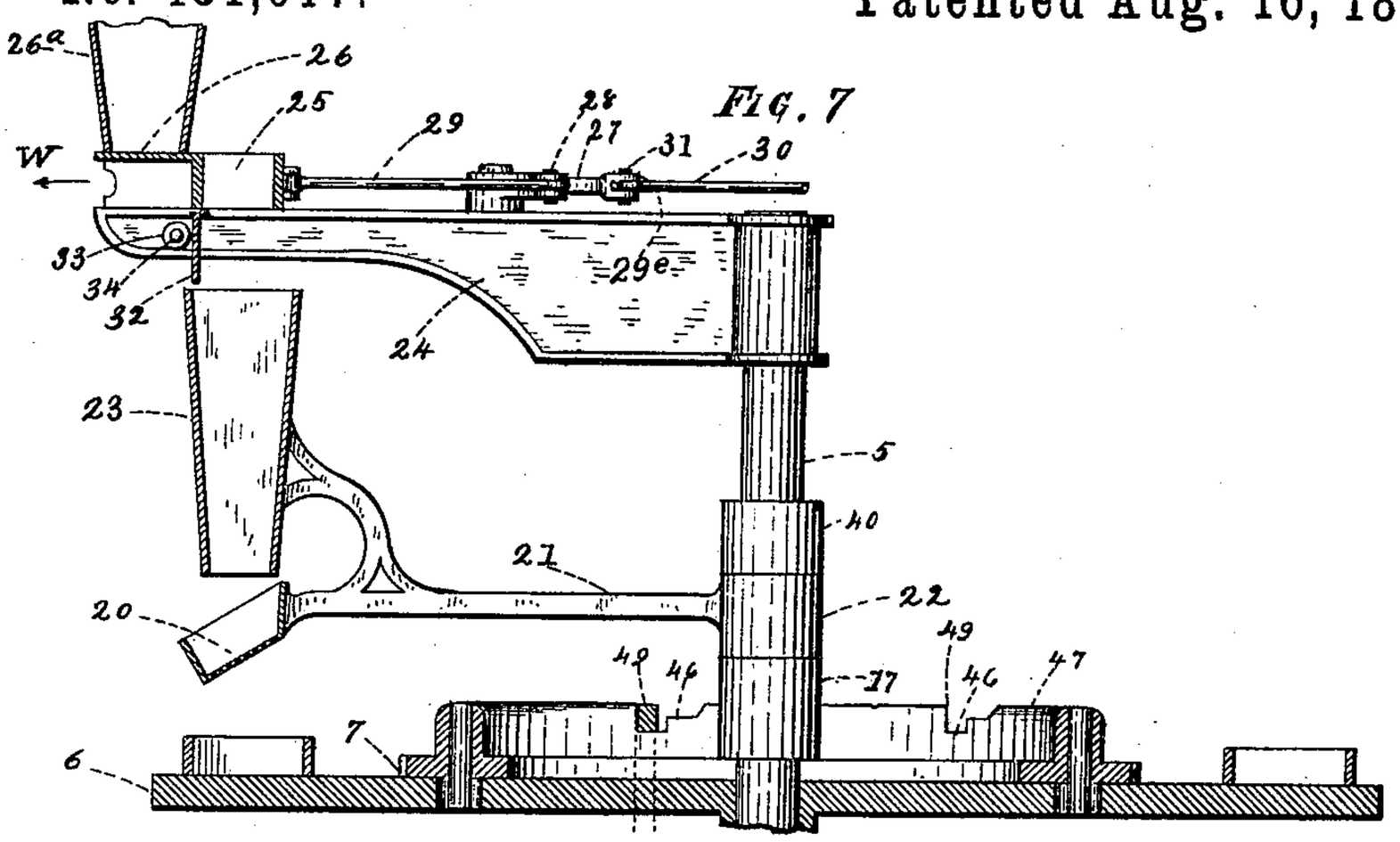

FIG. 8

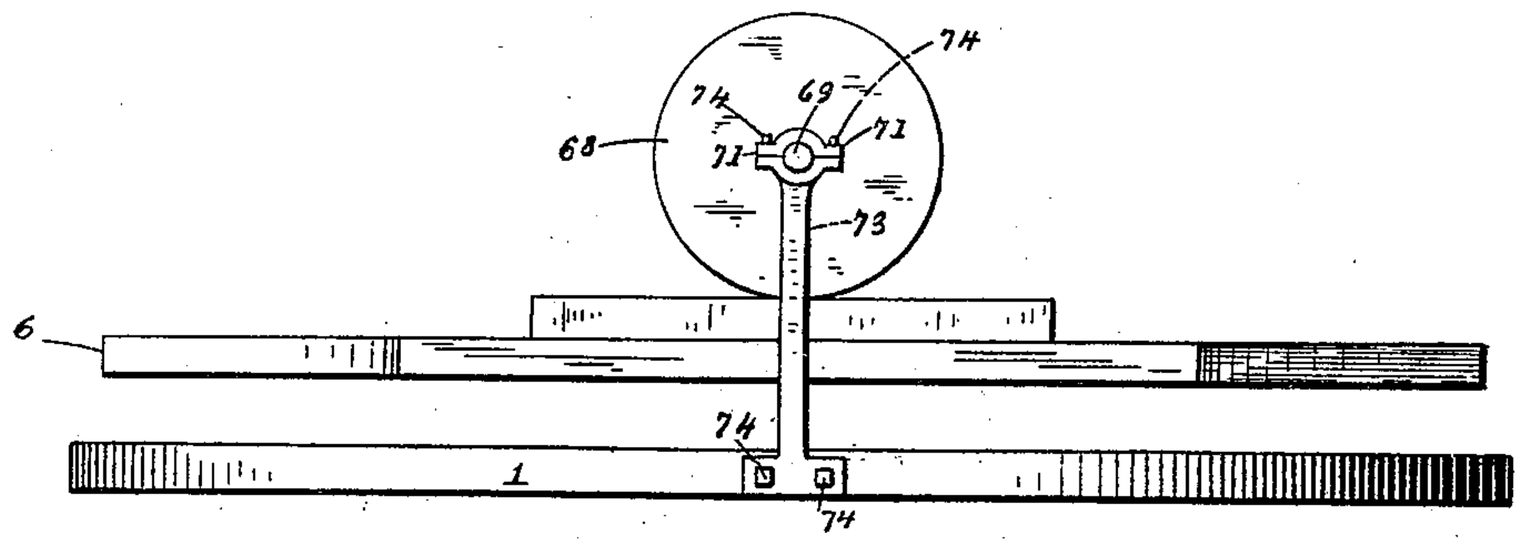

FIG. 9

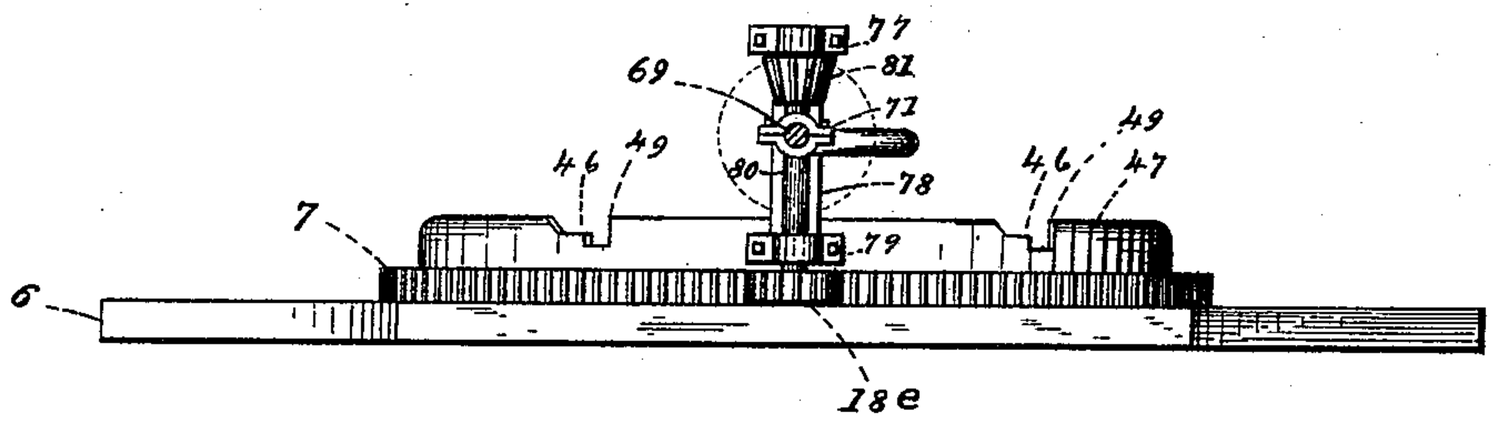

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FIG. 10

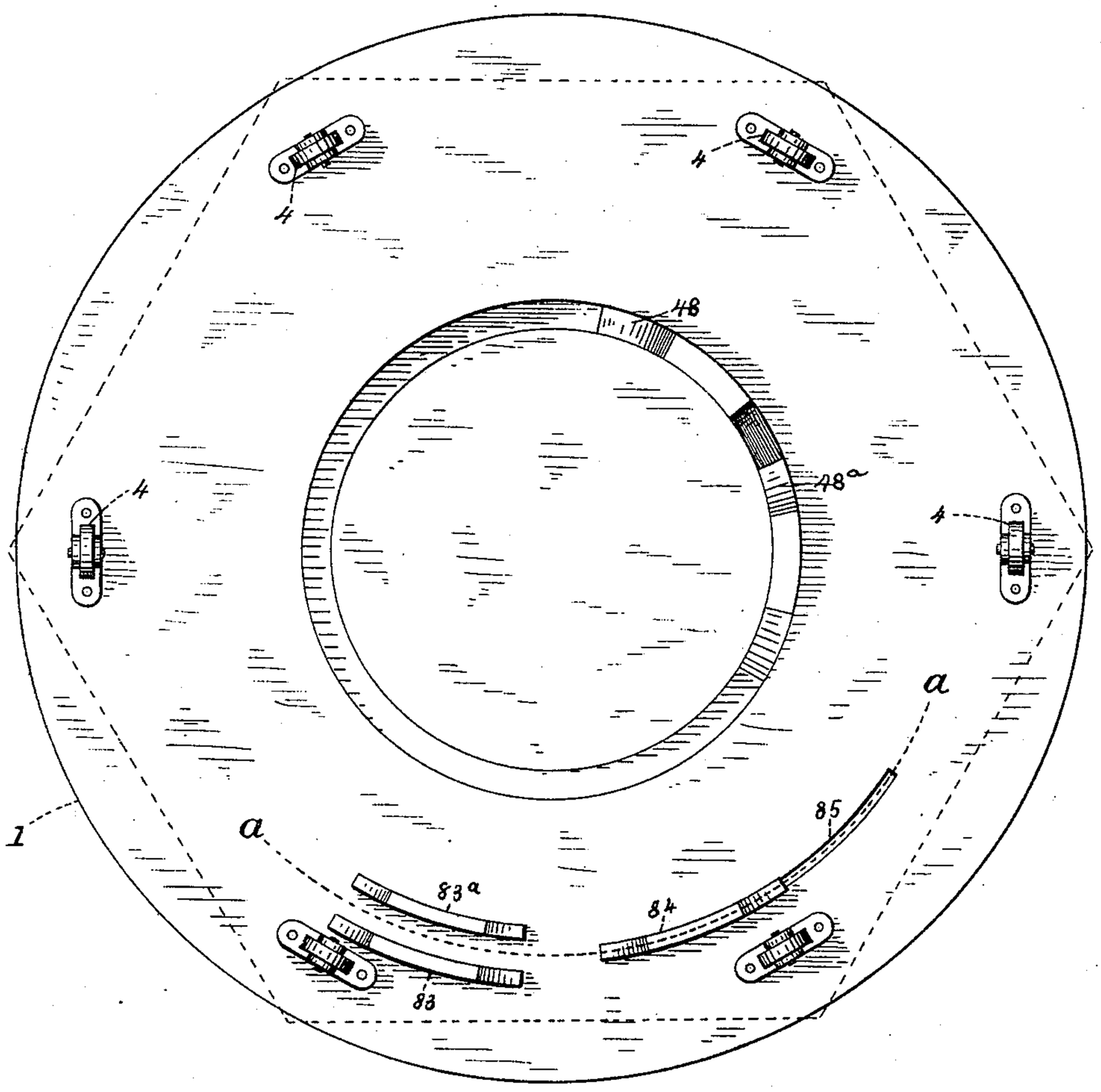


FIG. 11

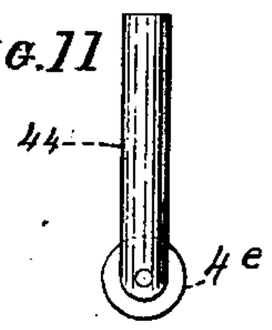
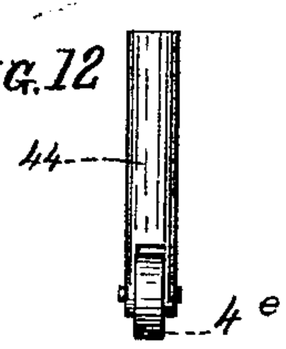


FIG. 12



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UNITED STATES PATENT OFFICE.

JESSE A. FIELD, OF BUFFALO, NEW YORK.

MOLDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 481,017, dated August 16, 1892.

Application filed January 9, 1892. Serial No. 417,456. (No model.)

To all whom it may concern:

Be it known that I, JESSE A. FIELD, a citizen of the United States, residing in Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Molding-Machines, of which the following is a specification.

My invention consists in certain improvements in molding-machines for making iron or other castings, and will be fully and clearly hereinafter described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a plan view of the machine complete. Fig. 2 is a detached vertical longitudinal section through the wedge-shaped inclines which operate the combined peening and feeding receptacle. Fig. 3 is a plan view of the mechanism below the sand-feeding mechanism and gearing for operating it. Fig. 4 is a section in or about line *a a*, Fig. 10, cutting through a portion of the rotating platform and its supporting bed or platform, showing the mechanism for raising the flask and mold up from the pattern. Fig. 5 is a side elevation, partly in section, showing a substantially central section through the rotating platform and through the sand-feeding hoppers and the combined peening and feeding receptacle, and showing, also, the gearing for operating the sand-feeding, for rotating the table, and other mechanism. Fig. 6 is an enlarged side elevation of a portion of the sand-feeding mechanism. Fig. 7 is a sectional elevation cutting through the rotating table in or about line *b b*, Fig. 1, cutting, also, through the facing-receptacles, riddle, and feeding boxes. Fig. 8 is a side elevation of the rotating table, showing an outside end view of the flask-covering roller and its end-supporting bearing. Fig. 9 is also a side elevation of the rotating table, showing a section through the roller-shaft in or about line *c c*, Fig. 3. Fig. 10 is a plan view of the lower stationary supporting-bed. Fig. 11 is a detached side elevation of one of the rollers and its shaft for lifting the sand feeding and peening mechanism. Fig. 12 is an edge elevation of the same.

Referring to the drawings, the supporting-bed 1 is preferably made round, substantially as shown; but it may be of any other suitable form. It is supported on a framework or posts 2, and below it is a railway-track 3, (shown in Figs. 3 and 5,) upon which is placed a small truck of sufficient size to receive the molds and carry them off. (See Fig. 5.) On the top of this table is secured in any well-known way a series of rollers 4, (see Fig. 10,) where these rollers are shown on the lower platform. If desired, these rollers may be secured to the under side of the rotating platform, substantially as shown in Fig. 5; but I do not think it would answer the purpose so well, as dirt and other obstructions are liable to be deposited on the lower platform, over which the rollers run, which could not happen on the under side of the rotating table or platform. To the lower supporting-platform is rigidly secured a vertical column 5 by means of a flanged base and bolts 5^a, (see Fig. 5,) the rotating table 6 being first put on, as shown in said Fig. 5. The rotating table 6 is adapted to rotate on the column 5 and is supported on the rollers 4, above mentioned. Horizontally on the rotating platform is rigidly secured a gear-wheel 7. (See Figs. 1, 3, 5, and 9, where this gear is shown.)

To the upper part of the column or shaft 5 is rigidly secured a supporting cross-head 8, having at its rear end two bearings 9, (shown in Fig. 5,) in which is mounted the driving-shaft 10, on the outer end of which is rigidly secured a driving-pulley 11. (Shown in Figs. 1 and 5.) To the shaft 10 is secured in any well-known way a bevel-pinion 12, which gears in with a horizontal bevel-wheel 13. This wheel 13 is mounted on a vertical shaft 14, which shaft is set in a bearing 15 at the top, and its lower end is supported in a bearing 16, which bearing is rigidly secured to the vertical shaft by means of the arm 16^a, the shaft 5 passing through its hub 17, and to which it is securely fastened in any well-known manner. At the foot of the vertical shaft 14 is a pinion 18, which gears in with the horizontal gear-wheel 7.

From the above construction it will be seen that by turning the driving-pulley 11 the motion will be communicated through the pinion 12 to the bevel gear-wheel 13, and from that through the pinion 18, and thereby give the rotating platform its required rotary movement. On this rotary table is secured a series of patterns, as seen in Figs. 1 and 3,

where I have shown a pattern of a radiator-section; but any other pattern would answer just as well, and I have in this instance shown this rotary table as provided with six sections A, B, C, D, E, and F, or places on which to secure a pattern; but any other number of such sections may be used, more or less, according to the size of the machine. These patterns are each secured in position on the table and are operated upon as they rotate as follows, reference being had to Figs. 1 and 3; At the point A the pattern 18^b is provided with a series of anchors 18^a or some device to support the core when put into the mold, which anchors are taken from the pattern and carried off by the mold when it is removed therefrom. This operation is performed at this point while the platform is rotating slowly in the direction of the arrow V in said Fig. 3. By the time the staples are put in place the pattern 18^b has reached the point B, and another pattern is in its place ready to receive staples. Here another attendant places over the pattern a flask 19. While this is being done the pattern reaches the point C and receives a coating of some suitable and well-known facing either by an attendant, whose duty is at this point for this purpose, or automatically, as will be hereinafter explained. By the time it has received its coating of facing it has reached the point D, where it receives a supply of sand, which is supplied through the peening and sand-feeding receptacle, as will be more clearly shown farther on. Just enough sand is dropped into the flask to fill it sufficiently to make a proper mold. Shortly after this flask has received its charge of sand at the point E it passes under the compressing-roller, when it is compressed around the pattern and smoothed off at the top; but just before receiving this compressing and smoothing it is peened around the edge by the sand-receptacle and peening device, as will be more clearly hereinafter shown. After passing the compressing-roller the mold is gated and then automatically lifted from the pattern at the point F, from which it is removed and placed upon the truck.

The means for automatically facing the pattern consists of a riddle 20. (See Figs. 3 and 7). It is secured on an incline, substantially as shown in Fig. 7, to an arm 21, (also shown in Fig. 7), and is rigidly fastened to the collar 22, which is adapted to turn back and forth on the vertical shaft or column 5, moving at the same time, or with the sand feeding and peening receptacle. This movement will be described when describing the action of the sand feeding and peening receptacle, as the same mechanism operates both. Above the riddle 20 is a feeding-funnel 23, (shown in Fig. 7,) made of light sheet iron or tin, through which the facing material is dropped onto the riddle. It is secured to the arm 21, and consequently partakes of the same lateral movement. Above the funnel 23 (see Fig. 7) is located the mechanism for feeding a limited quantity of the facing material, which consists of an overhanging arm 24, (shown in Fig. 7,) projecting out radially from the cross head or arm 8, of which it forms a part. On the top of the overhanging arm 24 is a sliding box 25. (See Figs. 1 and 7.) This box is provided with a projecting horizontal table 26, which is attached to or forms a part of the box 25 and moves with it back and forth. It receives its movements by means of an angular arm 27, which is pivoted to an arm 27^a, projecting from the overhanging arm 24. (See Fig. 1.) To one end of the arm 27 is pivoted by a pin 28 a connecting-rod 29, having its opposite end pivoted to the sliding box 25 by a pin 29^b. (Shown in Fig. 1.) The other end of the angular arm 27 is made in the form of a fork 29^c. (Shown in dotted lines in Fig. 1.) The connecting-rod 30, that moves the box for supplying sand to the sand receiving and peening receptacle, is provided with a holding or projecting pin 31, (see Figs. 1, 5, and 7,) which pin projects up between the fork 29^c, so that the reciprocating movement of the rod 30 (which will be fully described farther on) imparts a reciprocating movement to the arm 27, and consequently to the facing feed-box 25. Above the table 26 is a stationary hopper 26^a, (see Fig. 7,) containing the facing sand or other equivalent facing material. It is rigidly secured to some part of the building so as to be immovable, and thus allow the table 26 and the feed-box 25 to slide back and forth under it. At one side of the bottom of this box 25 is a hinged door 32, (see Fig. 7,) which hangs downward when open, and back of the door 32 is a friction-roller 33, secured to a stationary pin 34.

From the above construction it will be seen that as the sliding box 25 is pushed outward in the direction of the arrow W, Fig. 7, the door will be closed by the roller as it passes over it, and that when the box 25 has passed outward to the limit of its movement the horizontal table 26 will have passed away from under the mouth of the stationary hopper 26^a, and thereby allow the facing material to flow out and fill the sliding box 25, and that a reverse or return movement will cause the sliding box to move into the position shown in Fig. 7 and permit the door 32 to open and drop the facing material into the funnel 23, through which it falls into the inclined riddle, and is thus distributed over the pattern.

The sand feeding and peening receptacle receives its movement as follows, reference being had to Figs. 3 and 5: The receptacle for receiving and allowing it to drop into the flask and cover the pattern consists of an open flaring receptacle 35. At the bottom it is made sufficiently thick and of the required form, substantially as shown at 36 in Fig. 5, to peen or press the sand and condense it sufficiently around the edges of the pattern within the flask. This sand-receptacle is made of some light material—wood or sheet-iron, for

instance—and is secured to an arm 37 by bolts 38. (Shown in Fig. 5.) This arm 37 is pivoted by a pin 39 to the collar 22, which collar is adapted to turn sidewise back and forth around the vertical shaft 5, and is kept in its place between the two stationary collars 17 and 40, which are rigidly secured to the shaft 5 in any well-known way, either by a set-screw 41 or by a key 45. (Shown in Fig. 5.) The pivot 39 allows also a vertical swinging movement to be given to the sand-receptacle 35, so that it may be lifted up into the position shown by the dotted lines 42. (See Fig. 5.) The side movement of the arm 37 is limited by a frame 42^a, (shown in Figs. 1, 3, and 5,) the posts 43 of which are shown in the section in Fig. 5, the top of both being shown by dotted lines in Figs. 1 and 3, so that the arm 37, and consequently the sand-receptacle, can only move laterally the distance between the two posts 43. The sand-receptacle 35 receives its up-and-down swinging movement by means of the vertical bolts 44. (Shown in Figs. 1, 3, 5, 11, and 12.) On the rotating table, as shown, there are six places on which patterns are secured. Consequently there are six depressions 46 in the upwardly-projecting rim 47. (Shown in Figs. 1, 3, 5, 7, and 9.) In each of these depressions 46 is a bolt 44, which projects vertically down through the rim 47 and rotating table 6, and are each provided with a forked portion, between which is pivoted a roller or wheel 4^e. In the track of the rollers 4^e are two upwardly-projecting inclined portions 48 and 48^a, the second one being higher than the first. (See Figs. 2 and 5.) These inclines are located so that as each roller 4^e passes over them the peening and sand receptacle will be raised and dropped at the exact time a flask is in the proper position to receive the molding-sand and the peening action.

It will be noticed that one of the inclines 48 and 48^a is higher than the other (the incline 48^a) and that an opening 82 is left between them. (See Fig. 2.) The object of this construction is to cause the combined sand receptacle and peening device to first raise up to allow the mold and flask to pass under it and then drop suddenly down to give the peening action and then raise up high enough to release the arm 37, so that the rim 47 can pass under said arm and also to allow the flask when filled above the top to pass under the peening device, which operation is successively repeated as the table 6 rotates. While the peening and sand receptacle 35 is being thus dropped into the flask to press the sand down the motion of the rotating platform is continuous. Therefore the receptacle 35 must turn with it while the rollers 4^e are passing up over the inclines 48 and 48^a. This is done as often as the arm 37 drops down into one of the depressions, and as the vertical side 49 comes against the arm 37 it is carried with the rotating table until the bolt 44, which is immediately under it, lifts it up above the side 49, when a spring 50 (shown in Figs. 1 and 3) immediately draws it back to its normal position. This operation is performed as often as a flask passes under the peening and sand-receiving receptacle.

On the upper part of the stationary vertical shaft or column 5 on the top of the cross-head 8 is a sliding box 51 for receiving the molding-sand from the hopper 52. (See Fig. 5.) It is also provided with a horizontal table 53, which shuts off the lower end of the hopper 52 when the box 51 passes from under it. As this box 51, filled with sand, passes over the receptacle 35 it drops it into it. This is done by means of two doors 54 54^a, which are hinged on pivots 55, (see Fig. 6,) the doors 54 and 54^a being shown therein by dotted lines. The pivots 55 are geared together by toothed gears 55^a and 55^e, so that both move at once and are held in position when closed by means of a weighted arm 56, secured rigidly to the gear 55^e.

Pivoted to an arm 57, projecting down from the sliding-box platform or table 53, is a small weighted arm 58. A small stop 59, projecting from the arm 57, prevents the weighted portion 60 from moving down too far. At the lower end of the arm 58 is a notch 61, into which the end of the weighted arm catches and holds the doors 54 and 54^a closed, as shown in said Fig. 6. Now it will be seen that if the box 51 when it is thus closed and loaded with sand is being pushed forward near the limit of its movement, the end at 61 of the arm 58 will come against a stationary pin 62 and be thus moved off from the end of the arm 56 and allow the heavy sand to open the doors 54 and 54^a, so that it drops into the receptacle 35. The moment the doors 54 and 54^a are released of their weight of sand the weight 63 will again close them and bring all the parts into the position shown in Fig. 6. The box 51 receives its proper reciprocating motions by means of a connecting-rod 30, which is pivoted to said box by a pin 64. (See Figs. 1 and 5.) The opposite end of this connecting-rod 30 (see Figs. 1 and 5) is pivoted to a disk 65. This disk receives a rotary movement by means of a gear-wheel 66, which gears in with a pinion 67 at the upper part of the vertical shaft 14, as shown in said Fig. 5. The sand after being thus peened around the edges of the pattern, as above described, then passes under the compressing and smoothing roller 68, (shown in Figs. 1, 3, and 8,) when the top of the mold is leveled off smooth and compressed. The compressing and smoothing roller 68 may be either of a conical shape, as shown in Fig. 1, or with parallel sides, as shown in Fig. 3. It is mounted on a shaft 69, set in horizontal bearings 70 and 71. (See Figs. 1, 3, 8, and 9.) The bearing 70 is secured to a stationary arm 72, which is rigidly fastened to or forms a part of the fixed collar 17. The bearing 71 for the outer end of the shaft 69 is secured to a vertical arm 73 by bolts 74. (See Fig. 8.) There is a U-shaped bend 75

back of the horizontal bearing 70 on the arm 72, within which is rigidly secured to the shaft 69 a bevel-wheel 76. (Shown in Figs. 1 and 3.) Back of the wheel 76 is a vertical bearing 77 on the arm 72, and projecting down from the arm 72 is an arm 78. (Shown in Fig. 9.) To this arm 78 is another vertical bearing 79, and in the bearings 77 and 79 is mounted a vertical shaft 80, having at its upper end a bevel-pinion 81, which gears in with the bevel-wheel 76, and at the lower end of the shaft 80 is rigidly secured a pinion 18^e, (see Fig. 9,) which gears in with the large horizontal gear-wheel 7 and from which it receives its rotary motion and is transmitted through the bevel-pinion 81 and bevel-wheel 76 to the compressing-roller, thereby giving it its proper rotary motion as the flask and sand pass under it. As soon as the mold and flask passes under the compression-roller it is raised up from off the pattern, which is secured to the table 6 by means of the inclined portions 83, 83^a, and 84. (See Figs. 4 and 10.) The projecting inclined portions 83 and 83^a are arranged upon the stationary bed 1 side by side and securely fastened in position with sufficient space between them to allow the roller that passes up and over the incline 84 to pass between them, (see Fig. 10,) where a plan view of these inclined projecting pieces is shown. The projecting portion 84 is made adjustable longitudinally (see Figs. 4 and 10) by means of a slot 85, which passes through the bed 1, and a screw-bolt 86, by which it is tightened at any point to which it may be adjusted. The object of this adjustment is to provide for flasks of different sizes.

On each of the six divisions A, B, C, D, E, and F of the rotating table are two holes, in each of which is fitted loosely a pin 87, having a small roller 88, adapted to roll up and over the inclines 83 83^a. Beyond pairs of pins 87 is a slot 89 through each portion A, B, C, D, E, and F of the rotating table. In this slot 89 is passed a sleeve 90, (see Fig. 4,) having a flange 91 at the bottom, and at the top is a screw portion and a nut 92 by which the sleeve is adjusted to any point in the slot and secured. By this means an adjustment may be made to correspond with the adjustment of the incline below it. In this sleeve is passed (so as to fit loosely) a pin 93, having pivoted at its lower end a roller 94. The inclines or projections 83, 83^a, and 84 are located on the stationary bed at the point F, so that every time a flask reaches that point the mold is lifted up off from and above the pattern and supported there by the pins 87 and 93 for a moment until removed and placed on the truck 95.

In Fig. 3 I have shown a flask in dotted lines and the tops of the pins 87 and 93, showing substantially their position and about where they touch the under side of the flask when they rise to lift up the mold.

If desired, the mechanism for feeding and peening the sand may be dispensed with, as all that could be performed by hand by an operator stationed at that part of the machine. The machine would operate nearly as well, but could not work so quickly. The facing material can also be put on by hand by an operator stationed at the proper point for doing it, in which case the mechanism above described for that purpose could be dispensed with and in some cases it would be.

On that part of the table where the pattern is ready to receive the anchors I use an air-blast to clean the pattern, (see Fig. 1,) where I have shown a spout 96, which may receive a pressure of air from any well-known air-forcing apparatus—an ordinary centrifugal blower, for instance.

It will be noticed from the above description and drawings that the movable table while the machine is in operation has a continuously-rotating movement without any intermissions. This construction saves a large portion of the time required in the operation of the machine, as an intermittingly-moving machine should not move faster during its movements than I continuously move the table on my machine. Consequently the intermissions represent so much loss of time, which the above-described construction saves. A continuously-rotating movement is therefore an important advantage which does not exist in a molding-machine having an intermittingly-rotating table.

I claim as my invention—

1. In a molding-machine, the combination, with a stationary supporting-table provided with a vertical central shaft, of a movable table carrying the patterns mounted thereon and resting on friction-rollers, so as to turn easily on the stationary table, a combined sand receptacle and peening device for guiding the sand into the flask and peening it around the inner edges of the flask near the pattern as the rotating table brings it in the proper position, mechanism, substantially as above described, for giving it its peening movement, and a means consisting of a roller under which the flask passes for compressing the sand in the flask after the peening device has done its work, substantially as described.

2. In a molding-machine, the combination, with a stationary table provided with a series of supporting-rollers, of a rotating table mounted on said rollers, a series of patterns secured to said rotating table at a substantially equal distance apart, a vertical shaft rigidly secured to the stationary table and around which the movable table rotates, a combined sand and peening device, mechanism, substantially as above described, for giving it its intermittent swinging and up-and-down movements for peening the sand around the edge of the pattern, a roller for smoothing down the sand after it has been fed into the mold, pins passing down through the rotating table and provided with rollers at their lower ends, inclined upward projections located on the stationary table over which said rollers pass and lift the

mold and flask up from the pattern, and mechanism, substantially as above described, for giving the moving table its required rotating movements, as herein set forth.

3. In a molding-machine, the combination of a stationary table provided with wheels, upon which is mounted a movable table, a vertical shaft rigidly secured to the stationary table, so as to pass up through the center of the rotating table, a riddle secured to an arm attached to a collar on the stationary shaft at an incline to receive the facing material and sift it on the pattern when it comes around to that point, a combined sand receiving and peening device, mechanism, substantially as hereinbefore set forth, for giving the required peening movements, a smoothing-roller and gearing operated by a horizontal gear on the rotating table for giving it its proper rotating movements as the molds pass under it, a means consisting of pins passing through the rotating table and having friction-rollers at their lower ends adapted to roll up the inclines on the projections on the lower table for lifting the mold from the pattern, and gearing, substantially as described, for giving the movable table its rotating movements.

4. In a molding-machine, a stationary supporting-table provided with rollers 4 and stationary inclined projections 83 83^a, in combination with an adjustable inclined projecting portion 84, and a continuously-rotating table mounted on a central pivotal shaft so as to rest on the stationary-table rollers and provided with pins mounted in vertical bearings in said movable table, having friction-rollers at their lower ends, so as to be moved easily by the inclined projecting portions, and a means, substantially as above described, for giving the rotating platform a continuously-rotating movement, whereby the flask or mold may be lifted up from the pattern during the continuous rotation of the table, substantially as described.

5. In a molding-machine, the combination, with a stationary supporting-table provided with a series of rollers and a vertical central shaft, of a movable table mounted thereon, a combined sand receptacle and peening device secured to an arm 37, pivoted to a collar adapted to be moved laterally one way on the stationary vertical shaft, a spring for bringing it back to its normal position, an upwardly-projecting rim on the rotating table, provided with a series of depressions, each having a vertical pin fitted loosely therein and provided with a friction-roller at the bottom, and inclined projections on the lower stationary table for lifting said pins as they successively pass over them, whereby the peening device is lifted and dropped every time a flask comes below it, substantially as described.

6. In a molding-machine, the combination, with the sliding box for feeding sand, of two doors 54 54^a, pivoted at the bottom and geared so that both move together, a weighted arm projecting out from the gear 55^e, a weighted holding and releasing arm pivoted to an arm connected with the sliding box, and a stationary pin 62 for releasing the arm and pivoted doors, for the purposes described.

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