No. 854,932.

PATENTED MAY 28, 1907.

L. P. DAGES.

MOLD PREPARING MACHINE.

APPLICATION FILED NOV. 8, 1906.

5 SHEETS—SHEET 1.

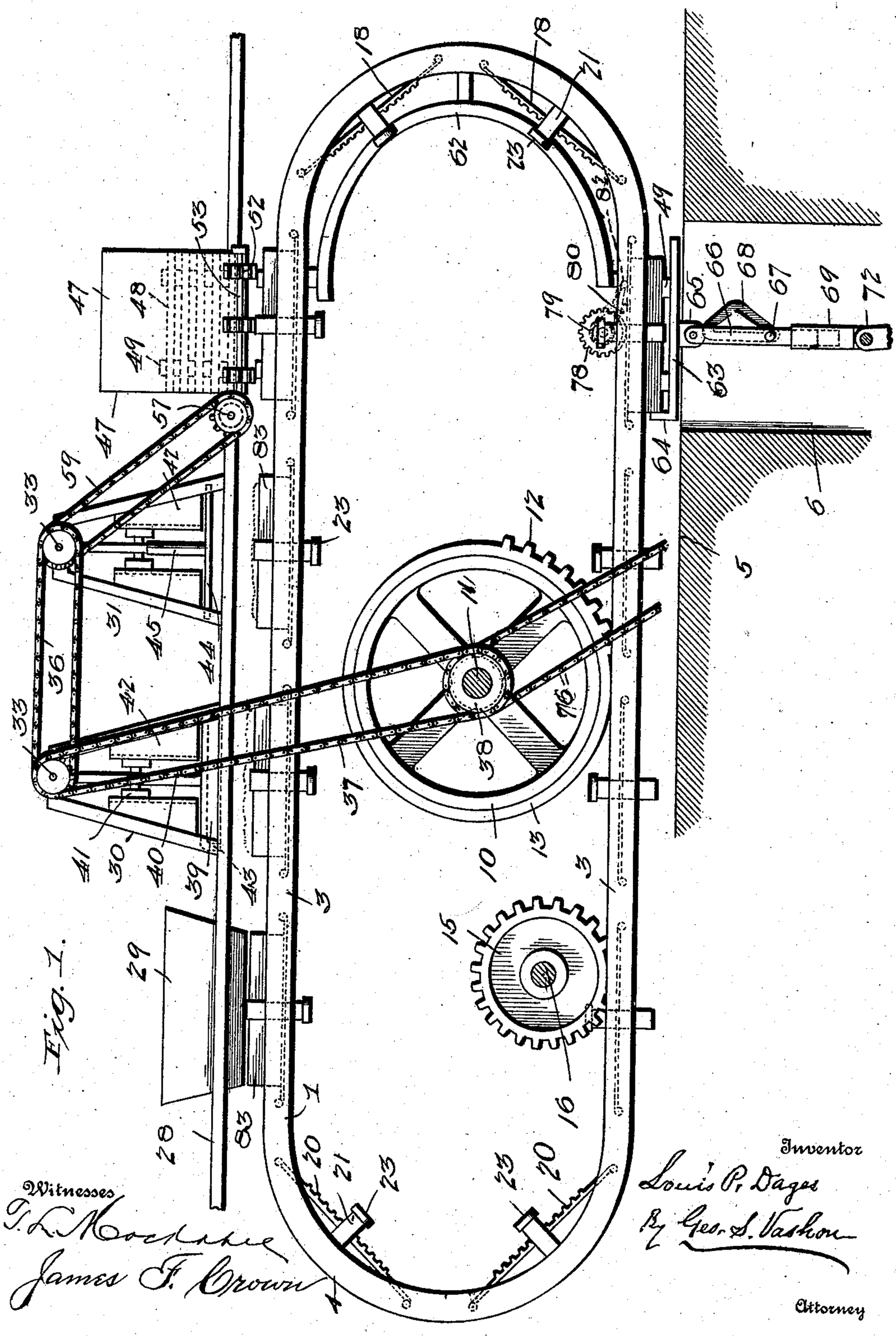

Fig. 1.

Witnesses

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5 SHEETS—SHEET 2.

Fig. 2.

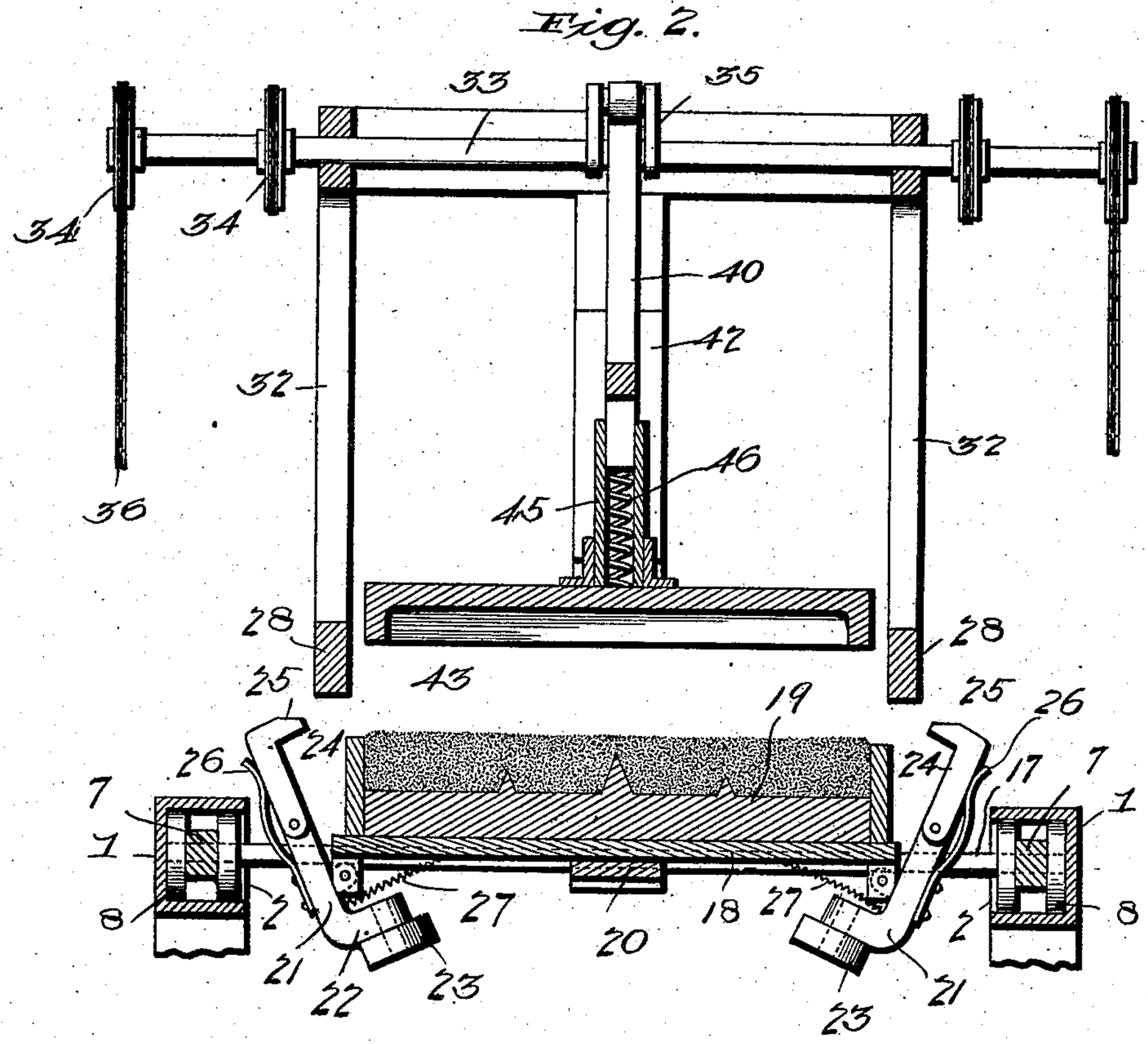
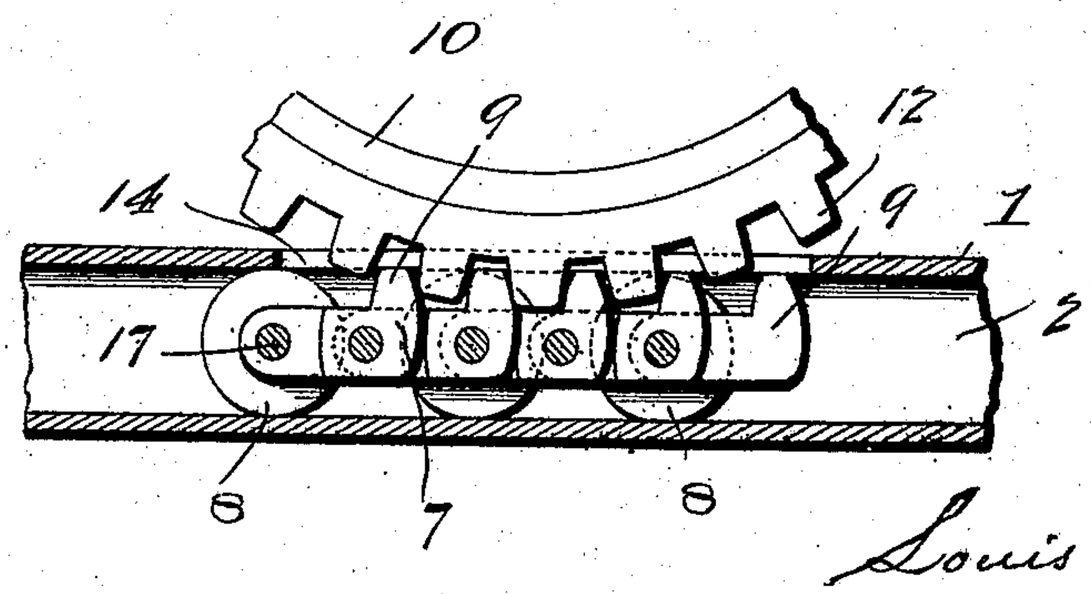


Fig. 3.



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5 SHEETS—SHEET 3.

Fig. 4.

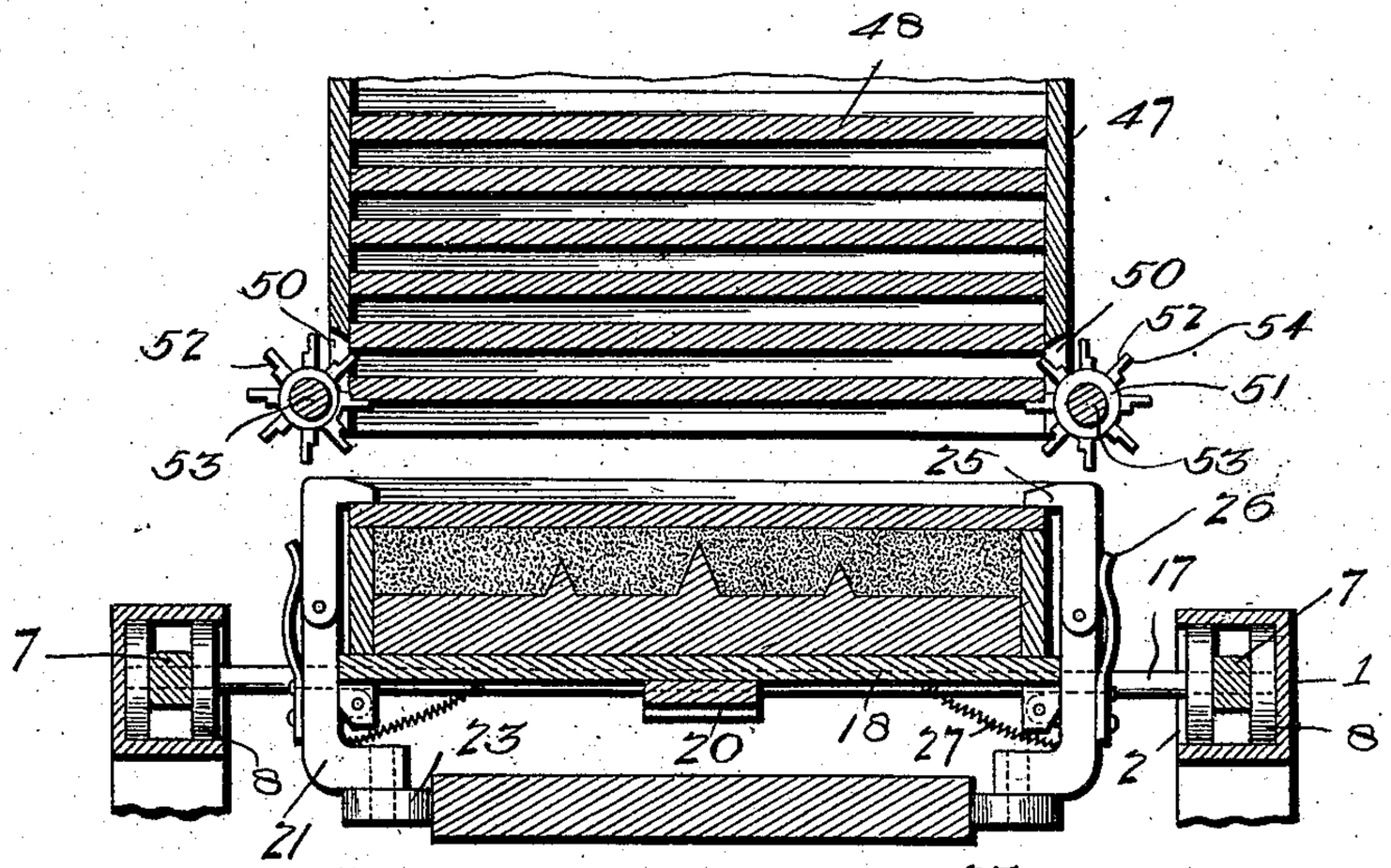
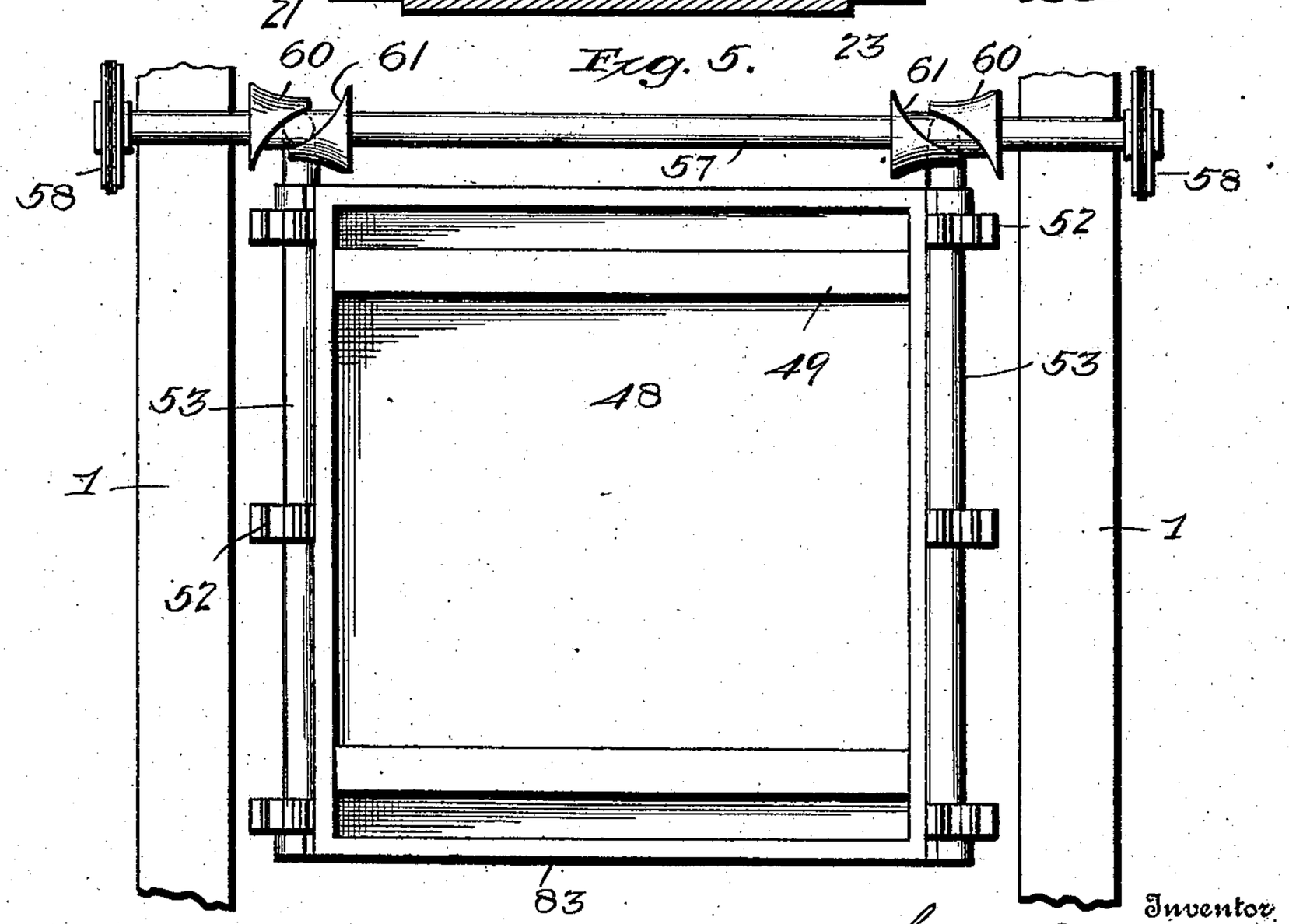


Fig. 5.



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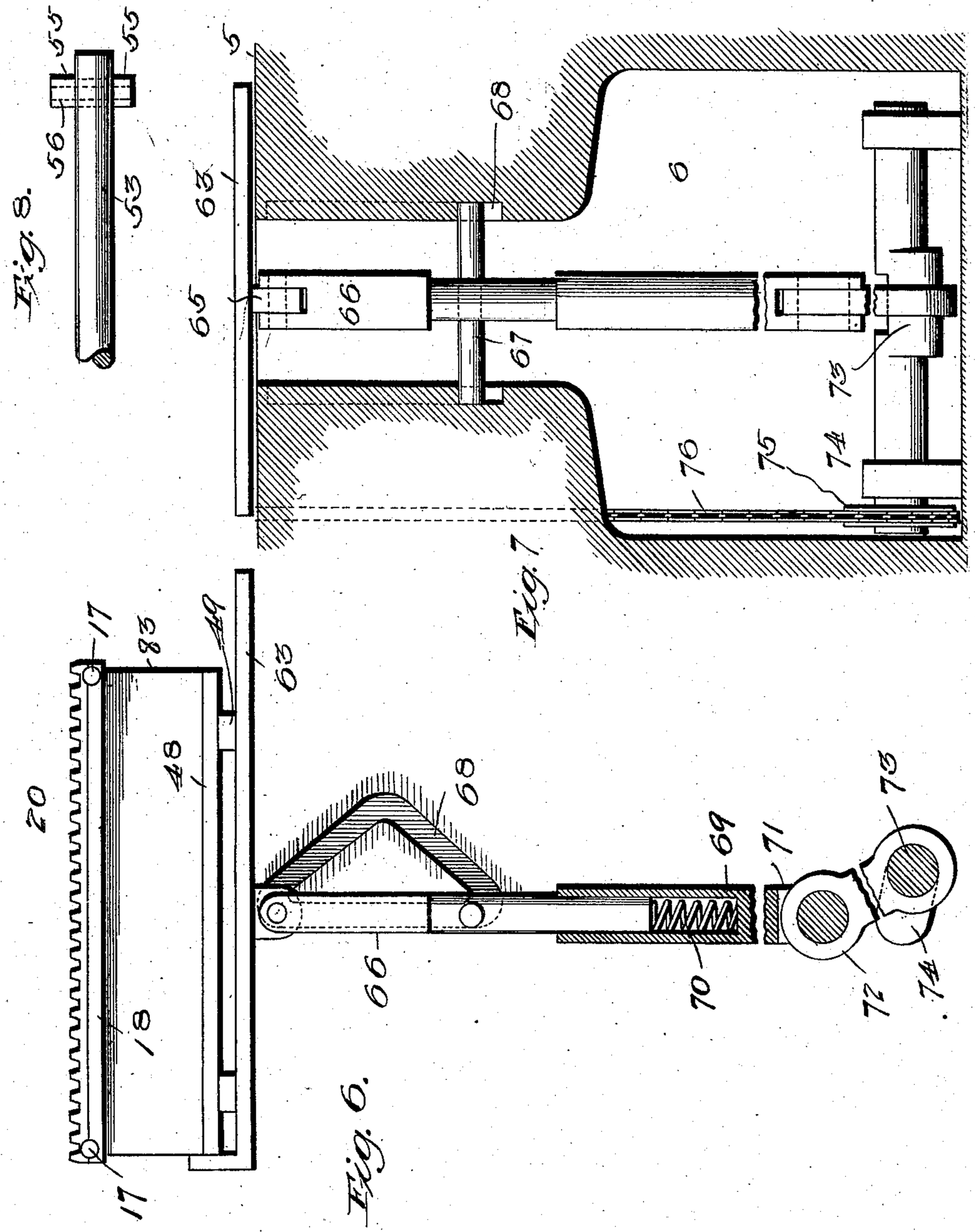
5 SHEETS—SHEET 4.



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5 SHEETS—SHEET 5.

Fig. 9.

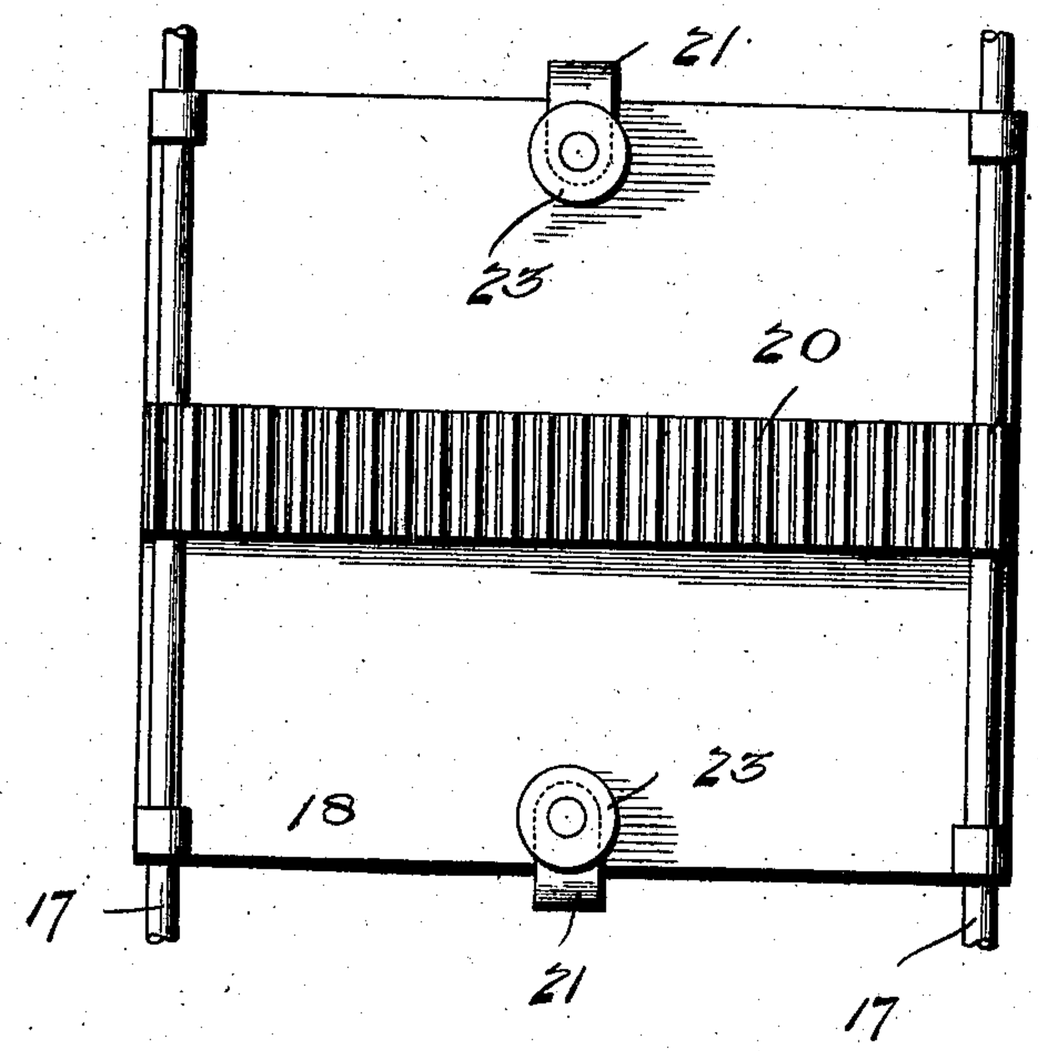
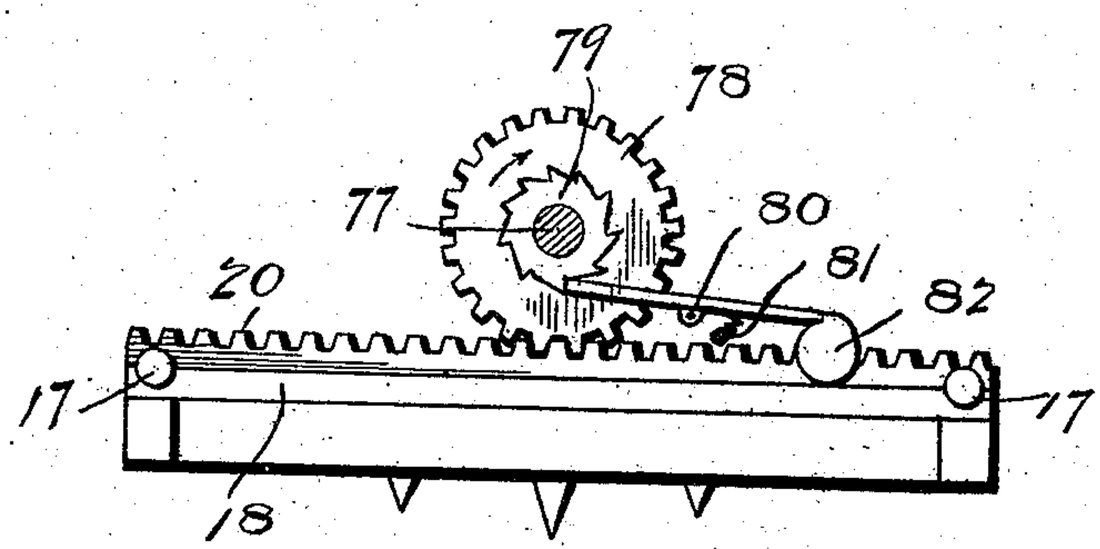


Fig. 10.



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UNITED STATES PATENT OFFICE.

LOUIS P. DAGES, OF BALTIMORE, MARYLAND, ASSIGNOR OF ONE-HALF TO GEORGE P. ZULAUF, OF BALTIMORE, MARYLAND.

MOLD-PREPARING MACHINE.

No. 854,932. Specification of Letters Patent. Patented May 28, 1907.

Application filed November 8, 1906. Serial No. 342,555.

To all whom it may concern:

Be it known that I, LOUIS P. DAGES, a citizen of the United States, residing at the city of Baltimore, in the State of Maryland, have invented new and useful Improvements in Mold-Preparing Machines, of which the following is a specification.

This invention relates to a mold preparing machine and particularly adapted for use for snap molding in malleable novelty and gray iron shops, and embodies essentially a plurality of plates having flasks thereon in which pattern plates are disposed, the plates being connected for step-by-step movement respectively under a sand supply hopper or feeding means, sand pressing devices, closure feeding means, or mechanism, and a flask receiver or platform. The plates are connected to endless cog-belts at opposite points which are driven in unison and include devices for engagement with coöperative elements at intervals, and on these plates pattern or match plates or devices are disposed and when the plates connected to the cog belts arrive at a certain point or prior to their disposition under the sand supply hopper or feeding means, the flasks are applied thereto and held in positive position thereon. The sand pressing devices operate to practically pack the sand over the pattern or match plates with the same effect in view as in the manual preparation of molds.

The object of the invention is to provide an organization of mechanical elements which will practically operate to prepare a sand mold or flask for casting purposes and dispense with the manual or hand work usually required for this purpose.

The accompanying drawings disclose the preferred embodiment of the machine, though variations in the details, dimensions, proportions and time of movement of the several parts may be resorted to without departing from the spirit of the invention, and in the drawings, Figure 1 is a side elevation of a machine embodying the features of the invention, showing a portion of the shafts in section and also illustrating a receiving pit in section. Fig. 2 is a transverse vertical section through a part of the machine. Fig. 3 is a longitudinal vertical section of a portion of the endless track and cog-belt, the driving element of the cog-belt being shown in part in elevation. Fig. 4 is a transverse vertical section through another portion of the machine. Fig. 5 is a top plan view of a part of the machine showing the closure feeding stack and the operation mechanism therefor. Fig. 6 is a sectional elevation showing the flask receiving platform, mechanism for operating the same, and a flask thereon in side elevation. Fig. 7 illustrates a sectional elevation of a pit showing the receiving platform for the flask and operating mechanism in end elevation and partially broken through. Fig. 8 is a detail view of a portion of the mechanism. Fig. 9 is a detail plan view of one of the match plate carriers. Fig. 10 is a side elevation of one of the match plate carriers showing the match plate thereon and the mechanism coöperating therewith or with the flask receiving platform to loosen the sand and liberate the latter from the said match plate.

Like characters refer to like parts throughout the several views.

The numeral 1 designates endless tracks which are of box-like contour in cross section and have inner open sides 2. These tracks 1 are located at opposite sides of the machine and comprise upper and lower longitudinal straight members 3 and semi-circular end connecting members 4. The tracks 1 will be supported by any suitable means over a bed 5, which may be the ground support of a building, and having formed therein a pit 6 for a purpose which will be more fully hereinafter set forth. Within the tracks 1 are endless cog-belts 7, one in each, composed of a series of links arranged between pairs of wheels or rollers 8 having a close relation to preserve the endless cog-belts in such rigid condition that they may be effectively engaged by operating means therefor without lost motion. The wheels or rollers 8 are free, however, to have unimpeded movement around the end connecting members 4, owing to the links comprised in the construction of the belts. These links have teeth 9 projecting therefrom and freely movable within the tracks, or are of such length as to obviate frictional contact with the top and bottom portions of the tracks. The endless cog-belts are driven by partially toothed wheels 10 secured on a shaft 11 which is the driving shaft for the entire machine and extends between the upper and lower, longitudinally straight members 3 of the tracks. The driv-

ing wheels 10 have teeth 12 extending over the circumference thereof to such an extent as to give the devices which will be more fully hereinafter described a step-by-step movement in order to effectively carry on the several steps in preparing the mold or series of molds included in the organization of the machine. The wheel 10 at each side of the machine may be modified as to the extent of movement which it imparts to the remaining mechanism by varying the extent of the teeth 12, and this may be accomplished through the medium of removable and replacable rims 13 carrying the said teeth. Adjacent to the location of the wheels 10 the top portions of the tracks 1 are formed with slots 14 to expose the teeth 9 of the endless cog-belts to permit the latter to be engaged by the teeth 12, the slots 14 being long enough to allow the teeth 12 to clear themselves. The teeth 12 will be brought into engagement with the endless cog-belts once in every revolution of the wheels 10, the latter being so positioned on the shaft 11 that the opposite cog-belts will be simultaneously engaged and equally moved. After the teeth 12 have cleared the cog-belts, or during the time that the untoothed portions of the wheels are moving over the lower longitudinal straight members of the tracks, the cog-belts remain motionless. In advance of the driving wheels 10 guide pinions 15 are located and held on a shaft 16, the said guide pinions being in effect idlers which engage the cog belts and steady the movement of the latter.

Connected to opposite pairs of wheels or rollers 8 at regular intervals by means of cross rods 17 are carriers 18 in the form of plates having secured on one side thereof a match or pattern plate 19 and at the center of the opposite side of each plate is a longitudinal rack 20. At the center of the opposite sides of the carriers, arms 21 are intermediately fulcrumed and have lower inwardly projecting feet 22 to which horizontally disposed rollers 23 are secured. To the upper ends of the arms 21 catches 24 are movably attached and have inwardly projecting hooks 25 at their upper extremities, the said catches being normally held in longitudinal alinement with the arms 21 by flat springs 26 bearing against the outer edges thereof and secured to the similar edges of the arms 21 below. The arms 21 with the rollers 23 and catches 24 thereon are normally drawn inwardly at their lower extremities by springs 27, such normal inward positions of the arms throwing the upper extremities and the catches 24 outwardly, as clearly shown by Fig. 2. The arms 21 remain in the normal position illustrated by Fig. 2 until each carrier arrives at a point where a closure is applied to the flask as will be more fully set forth in the following description. The carriers 18 all move in unison and equally in view of the operating mechanism therefor hereinbefore explained and they are terminally spaced a sufficient distance to avoid any tendency to jamming or locking when traveling around the semi-circular end connecting members 4 of the tracks, the said carriers when passing over the connecting members 4, assuming angular positions to the latter, as shown by Fig. 1.

Above the tracks 1 is a suitable frame 28 which forms a supporting means for a sand feeding hopper or analogous device 29, an ordinary hopper being shown in the present instance in which sand may be deposited. It will be understood, however, that any sand feeding means may be located at this point. In advance of the hopper or sand feeding means 29, two auxiliary frames 30 and 31 project upwardly and consist essentially of end uprights 32 having crank shafts 33 mounted in their upper extremities. Each of the crank shafts 33 has a pair of spaced sprocket wheels 34 on its ends or extremities outside of the uprights 32, the cranks 35 of these shafts being located at the centers thereof. The inner sprockets of the shaft 33 mounted in the upper portion of the auxiliary frame 30 are connected by chain belts 36 with the outer sprockets on the shaft 33 in the upper portion of the frame 31, and the outer sprockets 34 of the crank shaft held by the frame 30 are connected by chain belts 37 with suitable sprockets 38 on the drive shaft 11. The frame 30 has a vertically moving sand pressing plunger 39 mounted therein and provided with a rod 40 connected with a cross head 41 movable in suitable guides 42 and also to the crank 35 of the shaft 33 above. This sand pressing plunger has a surrounding depending flange 43 and has also such outside dimensions as to readily move downwardly into the flask that may be moved thereunder. In the frame 31 is a flat tamping plunger 44 having a stem 45 rising therefrom and connected to a cross head and to the crank shaft above in all respects similar to the sand pressing plunger 39 just described. Both the plungers 39 and 44 have those portions of the rods or stems 40 and 45 directly connected thereto formed tubular to receive cushioning springs 46, one in each, and the remaining portions of the rods or stems above movably extend into said tubular portions, as illustrated by Fig. 2, to give the plungers a yielding pressure which will be obviously advantageous in properly disposing and packing the sand in the flasks.

In advance of the tamping plunger 44 a flask closure feeding mechanism is located and consists of a chute 47 of such vertical extent as to give the same sufficient capacity to hold a number of closures at least corresponding to the number of carriers embodied in the machine. These closures, designated by the numeral 48, are each provided with a pair of supporting strips or battens 49 which act

as spacing devices to hold the closures uniformly separated within the chute 47. The bottom of the chute 47 is fully open as clearly shown by Fig. 4, and in the lower portions of the opposite sides thereof slots 50 are formed to receive feeders which consist of collars 51 having radial blades or arms 52 and secured on shafts 53. As shown by Fig. 4, a shaft 53 is located at each side of the chute and has thereon three feeders, the opposite feeders of each shaft being in alinement. To insure accurate engagement of the blades or arms 52 with the closures 48 they are each recessed at one side to form a seat 54, all of the feeders moving inwardly to bring the blades or arms under the closures in succession to prevent the delivery of more than one closure at a time. The shafts 53 will be intermittently operated and a delivery of one closure at a time will ensue and such delivery will only be effected when a flask is properly located under the chute. As shown in detail, particularly by Fig. 8, each shaft 53 has on one end a pair of rollers 55 horizontally disposed with relation to the shaft and freely rotatable on a pin 56 common to both and extending diametrically through the shaft. A transverse shaft 57 is mounted on the frame 28 between the chute 47 and the frame 31 having the tamping plunger 44 therein, said shaft 57 being located over the ends of the shafts 53 provided with the rollers 55. On the ends of the shaft 57 sprocket wheels 58 are secured and engaged by sprocket or chain belts 59 which also traverse the inner sprocket wheels 34 on the crank shaft 33 held in the upper extremity of the frame 31. On the shaft 57 directly over the rollers 55 of the shafts 53 cams 60 are located and have continuous spiral cam grooves 61 formed therein which are engaged by the said rollers 55 and through the medium of which motion is imparted to the shafts 53 from the shaft 57. Continual operative engagement is maintained between the shafts 53 and the cams 60 by the double rollers 55 in view of the fact that just as one roller of each shaft is clearing the cam groove 61 with which it engages, the other roller of the same shaft is entering the said cam groove, this operation being uniformly present in both shafts 53.

Secured within the curved end connecting member 4 adjacent to the location of the chute 47 is an arcuate flat rail 62 which operates as a closing means for the catches on the carriers, and has its upper end slightly in advance of the vertical center of the chute 47 and its lower end slightly in rear of the vertical center of a receiving platform which will be presently hereinafter referred to. The upper end of this arcuate rail 62 will be so shaped as to permit the rollers 23 to readily ride onto the opposite side edges thereof and thereby throw the arms 21 outwardly as illustrated by Fig. 4 to cause the catches 24 to be thrown inwardly over the closure 48 which has been delivered to a flask on the carrier. The upper hooked ends or extremities 25 of the catches 24 when thrown inwardly as shown by Fig. 4 by the rollers 23 engaging the opposite edges of the rail 62 will operate to properly place the closure 48 on the flask in the event that said closure may be placed slightly irregular when delivered from the chute 47, and furthermore the said catches will hold the closure firmly locked against the flask as long as the rollers 23 are in engagement with the opposite side edges of the rail 62.

The flasks with their closures are deposited over the pit 6 on receiving mechanism which comprises a tiltable platform 63 having a stop flange 64 projecting upwardly from the forward end thereof. This platform also has a rising and falling movement imparted thereto and is provided with a depending central boss or ear 65, see Figs. 6 and 7 to which the upper bifurcated end of a reciprocating member 66 is fulcrumed. At a suitable elevation this reciprocating member is provided with a cross rod 67 which projects outwardly therefrom equally in opposite directions and terminally engages triangular cam grooves 68 in the opposite side walls of the pit 6, the upper portion of the latter being contracted as shown by Fig. 7 to bring the side walls thereof closer to the reciprocating member and render the rod 67 effective in its operation with relation to said grooves. These triangular cam grooves are so disposed that their bases extend vertically and during part of the reciprocating movement of the member 66 the ends of the rod 67 move in the vertical portions of the cam grooves 68 or at such times when the platform 63 is held horizontally straight. The remaining portions of the cam grooves 68 control the tilting movement of the platform and this latter movement is effected to receive the flask a short time prior to the disengagement of the rollers 23 on the arms 21 from the lower end of the rail 62 to insure a disposition of the platform under each flask. As the flask rides over the platform, the latter is gradually brought to a horizontal position and when the flask is fully seated on the platform the reciprocating member 66 will be at its highest elevation and will remain in this maximum elevated position a short interval or during the time that the sand is being loosened from the carrier and the match plate or pattern by mechanism which will be presently referred to. The lower end of the reciprocating member 66 is movably fitted in the upper open end of a reciprocating socket member 69 having therein a cushion spring 70 to overcome any shocks or jars on the platform and to give the latter a yielding movement when receiving the flask and during the operation of the reciprocating member and socket. The reciprocating

socket 69 has a lower bifurcated extremity 71 in which one end of a link 72 is fulcrumed, the opposite extremity of the said link movably engaging a crank 73 of a crank shaft 74 having secured on one end a sprocket wheel 75 which is traversed by a chain belt 76 operated from the drive shaft 11. The interposition of the link 72 between the reciprocating socket member 69 and the crank shaft 74 controls the tilting operation of the platform 63 or throws the parts to which it is connected, namely, the socket 69 and member 66 in such position at regular intervals as to cause the terminals of the rod 67 to engage the angular portions of the cam grooves. 68.

Immediately above the platform 63 and at a suitable distance in advance of the lower end of the rail 62 a sand loosening mechanism is located and embodies a shaft 77 held in suitable bearings and carrying a pinion 78 which is adapted to mesh with the rack 20 of each carrier 18, said pinion rotating in the direction of the arrow indicated thereon in Figs. 1 and 10. Rotating with the pinion 78 on the shaft 77 are ratchet wheels 79 which are engaged by the ends of intermediately fulcrumed arms 80 which are normally held downwardly at their free ends by springs 81, the arms each having a striker or head 82 at its free end. The arms 80 are spaced a sufficient distance to cause the strikers or heads 82 to engage the carriers 18 at opposite sides of the racks 20 thereof, and as the flasks move under the sand loosening mechanism, the strikers vibrate with considerable rapidity on the carriers and release the sand from the latter as well as the match plates or patterns. When the carrier with its match plate or pattern is clear of the rail 62, which occurs when the rollers 23 become disengaged from the lower end of the rail 62, said arms immediately assume their normal positions as shown by Fig. 2 to release the closure 48, and the closure is then at the bottom of the flask with the battens 49 resting on the platform 63. The released carrier then passes on and continues to move in conjunction with the other carriers by step-by-step operation until it again arrives under the hopper or sand feeding means 29. After the platform 63 lowers with the prepared flask thereon, the said flask is removed and conveyed to any point where it is desired to be used for molding purposes.

The flask consists of a rectangular frame, or a frame of any other shape, as indicated by the numeral 83, and is applied to the carrier over the match plate or pattern prior to the movement of the latter under the hopper or sand feeding means 29 and is held firmly in place around the said match plate or pattern. The operation of the mechanism is so timed that each flask and carrier will stop directly under the lower or outlet end of the hopper or sand feeding means 29 where it receives a charge of sand and then passes to the pressure plunger 39 which operates to squeeze or concentrate the sand within the flask. From the plunger 29 the flask containing the sand passes under the tamping plunger 44 which operates to positively pack the sand into the flask and the latter will then be in a condition to receive the closure therefor from the chute 47. After the sand is tamped or packed into the flask, the latter passes under the chute 47, receives one of the closures 48 which is locked by the catches 24 when the rail 62 is engaged by the rollers 23 on the arms 21. The flask thus completed as to its equipment is then delivered to the platform 63 as hereinbefore set forth, and from said platform it is removed at a proper time in condition to receive the molten metal. As clearly shown by Fig. 1 the preparation of the molds will be expeditiously carried on in view of the fact that after starting the mechanism for a certain length of time, a flask and carrier will be located under the hopper 29, each of the plungers 39 and 44, and the chute 47, and by this means a step or treatment with respect to each flask in position under the parts or devices just mentioned will be effected at a time when the cog belts engaging the carriers or operating the latter remain idle or inactive, or during the time the untoothed portions of the wheels 10 are moving over the lower members 3 of the tracks.

The machine hereinbefore set forth will materially reduce the cost of molding by dispensing with operatives or molders now commonly employed for carrying on the preparation of molds.

What I claim is:

1. In a machine of the class described, an endless track having an arcuate rail member, a plurality of carriers having automatically movable catch devices, flasks separately applied to the carriers, devices for supplying sand to and forcing it into the flasks, mechanism for delivering closures to the flasks in succession, said arcuate rail member being adapted to actuate the catch devices for bringing the same into operative position when contacting with said member, and means for operating the carriers to impart a step-by-step movement thereto.

2. In a machine of the class described, a track, a plurality of carriers having movable catch devices, flasks separately applied to the carriers, devices for supplying sand to and forcing it within the flasks, mechanism for delivering closures to the flasks in succession, means coöperative with the track for engagement with the movable catch devices for bringing the same into operative position when traversing said means, and means for imparting movement to the carriers.

3. In a machine of the class described, a track, a plurlity of carriers supported by said track and movable over the same, and hav-

ing movable catch devices, flasks separately mounted on the carriers, devices for supplying sand to and forcing it within the flasks, mechanism for delivering closures to the flasks in succession, a rail member situated beyond the mechanism for delivering closures to the flasks for engagement with the movable catch devices for actuating the latter to cause the same to lock the closures on the flasks, and means for receiving the flasks and molded sand therein.

4. In a machine of the class described, a track, a plurality of carriers having removable flasks supported by said track, means for imparting simultaneous step-by-step movement to the carriers, devices for supplying sand to and forcing it within the flasks, mechanism for delivering closures to the flasks, catch members associated with the carriers for locking the closures therein, and means coöperative with the track for actuating the catch members to lock the same for maintaining the closures in position in the flasks, and mechanism for automatically discharging the flasks from the carrier.

5. In a machine of the class described, an endless track, a plurality of flasks movable on said track, means for simultaneously actuating the carriers in a step-by-step movement, means for supplying sand to and forcing it within the flasks, mechanism for delivering closures to the flasks, catch members carried by the carriers, means associated with the track for actuating the catch members to lock the closures in position in the flasks, and automatically operative mechanism having a tilting platform for receiving the flasks after the same has been filled with material, and for discharging the same from the carriers.

6. In a machine of the class described, a track, a plurality of carriers movable on said track, flasks supported by said carriers, means for simultaneously moving the carriers by a step-by-step movement, mechanism for supplying sand to and forcing it within the flasks in succession, mechanism for delivering closures to the flasks in succession, catch members for the closures supported by the carriers, means coöperative with the track for actuating the catch members for locking the closures in position and for releasing the same, and a tilting platform for receiving the flasks when the latter are brought in position to be discharged from the carriers.

7. In a machine of the class described, an endless track, means having removable flasks connected to the track for simultaneous step-by-step movement, mechanism for supplying sand to and forcing it within the flasks, mechanism for delivering closures to the latter in succession and independently operating in conjunction with the several flasks, while each of the devices is operating with relation to an individual flask, catch members for locking and releasing the closures, means arranged in proximity to the track for actuating the catch members, and independent means for receiving the flasks when the latter have been filled with material.

8. In a machine of the class described, a plurality of flasks, carriers for supporting the flasks and movable in a step-by-step manner, a track for supporting the carriers, devices for supplying sand to and forcing it within the flasks, independent mechanism for delivering closures to the flasks, catch members for locking and releasing the closures, means in proximity to the track for actuating the catch members, mechanism operative upon the flasks for loosening the material contained therein, and means for receiving the flasks after having been filled with material.

9. In a machine of the class set forth, an endless track, a plurality of carriers movable upon said track and adapted to be actuated in a simultaneous step-by-step movement, flasks removably mounted on the carriers, devices for supplying sand to and forcing it within the flasks, independent mechanism for delivering closures to the latter, means carried by the carriers for locking and releasing the closures, means coöperative with the track for actuating the latter means, and tilting mechanism for receiving a flask from the carriers after said flask has been filled with sand.

In testimony whereof, I affix my signature in presence of two witnesses.

LOUIS P. DAGES.

Witnesses:
JAMES R. DUNN,
J. B. BOURNE.