E. C. COVERT.

MOLDING MACHINE.

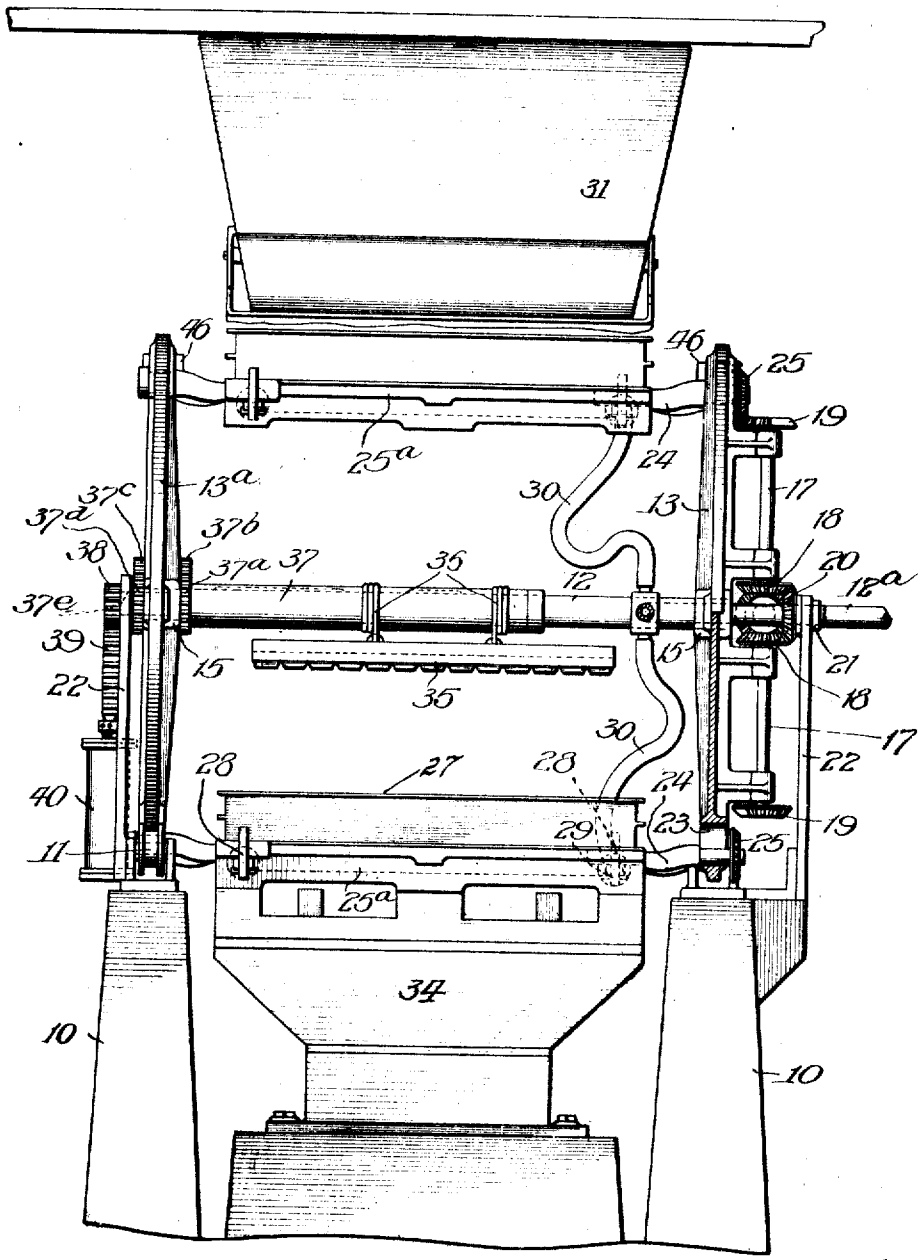
APPLICATION FILED AUG. 21, 1911.

1,010,023.

Patented Nov. 28, 1911.

2 SHEETS—SHEET 1.

Fig. 1



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2 SHEETS—SHEET 2.

Fig 2

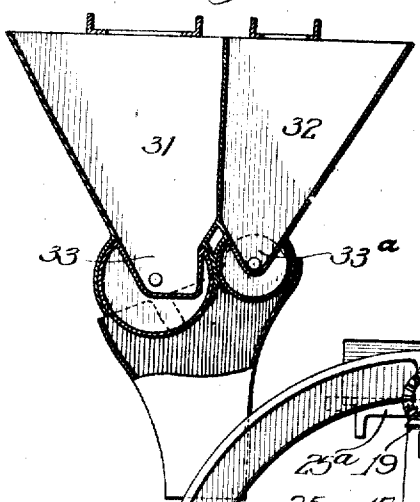
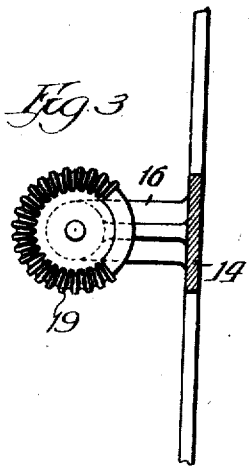
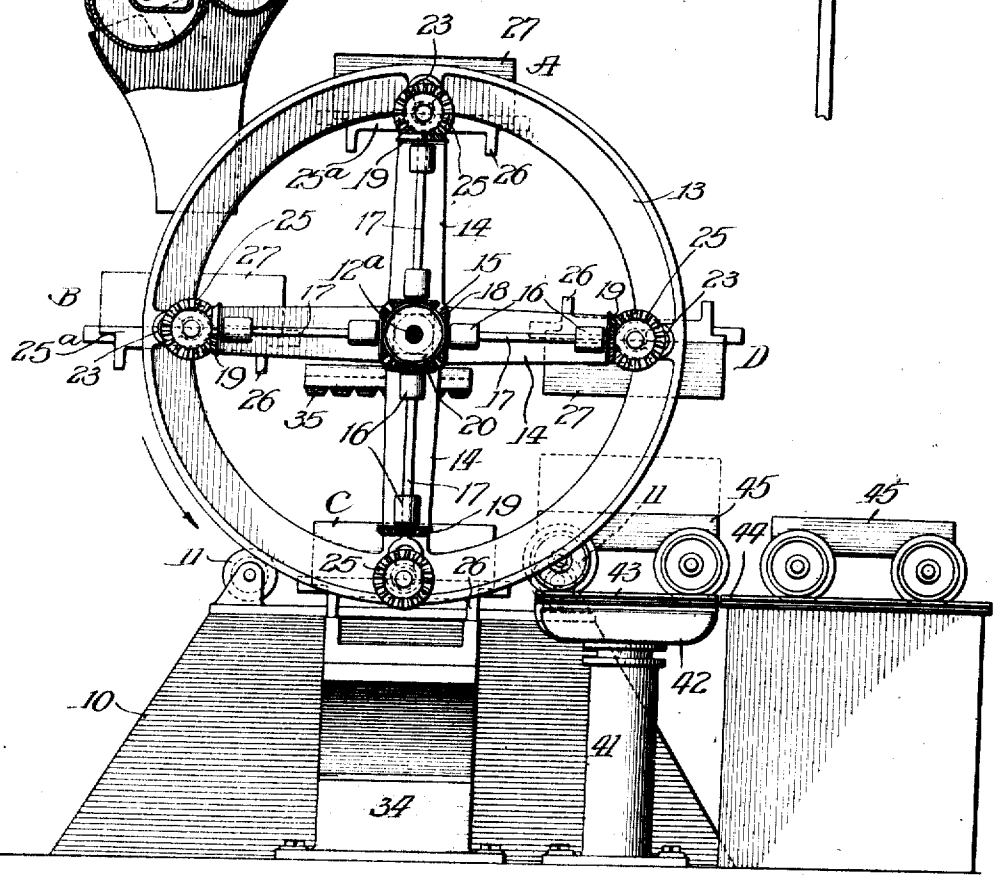


Fig 3





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MOLDING-MACHINE.

1,010,023. Specification of Letters Patent. Patented Nov. 28, 1911.

Application filed August 21, 1911. Serial No. 645,239.

To all whom it may concern:

Be it known that I, EDSON C. COVERT, of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Molding-Machines, of which the following is a specification.

My invention relates to the art of molding and has particularly reference to a machine adapted for use in the handling of flasks during the making of the molds.

My invention relates particularly to a machine adapted for handling large and heavy flasks wherein castings of many hundred pounds weight are formed. It is contemplated in the employment of a device as herein shown that a flask may be set, sand applied, properly rammed or jolted and the flask with contained mold removed, all in one cycle of operations.

One of the principal objects of the invention is to produce a machine of this character which shall be semi-automatic in action, which may utilize power in the place of hand labor and to so arrange the parts that whatever manual labor is required may be unskilled.

A further object of my invention is to provide such a construction that the principal portions of the machine will be balanced by the equal distribution of the weight of the pattern plates and flasks so that but little outside power will be required for the operation of the machine, while at the same time each pattern plate has an unequal distribution of its weight so that when free to rotate it is automatically brought to the desired positions.

My invention will be more readily understood by reference to the accompanying drawings, wherein,

Figure 1 is an end elevation partly in section, showing my improved molding machine; Fig. 2 is a front elevation also partly in section, showing the same machine, and Fig. 3 is an enlarged detail of the mutilated gear required for the operation of the device.

Referring more particularly to the drawings it will be seen that on the supports 10 I mount a plurality of supporting wheels or rollers 11, which carry the weight of the superposed machinery. A hollow shaft 12 has secured to each end thereof, large cast wheels 13 and 13^a, the rims of which bear upon the wheels or rollers 11, the wheels 11 being grooved therefor. The wheels 13 and 13^a are preferably rotated by hand although they may be driven by power suitably applied if desired. The large wheels 13 and 13^a are provided with radial spokes 14, terminating at their inner ends in a hub 15. The spokes of the wheel 13 carry bearings 16, within which are mounted shafts 17, having beveled pinions 18, 19 on their ends, the pinions 19, as shown in Fig. 3, being mutilated, or having a portion of the gear teeth removed, for a purpose later to be described.

It will be seen that there are in the present instance four shafts 17, four pinions 18 and four pinions 19. The pinions 18 all mesh with a beveled pinion 20, keyed to hollow shaft 12^a which projects into the end of hollow shaft 12, through support 22. This shaft 12^a and gear 20 remain stationary during the operation of the machine.

The wheels 13 and 13^a near their peripheries, are provided with elongated bearing slots 23. Mounted within the slotted openings 23 are shafts 24, each of which has a pinion 25 secured to one end thereof, said pinion adapted to mesh with a corresponding mutilated pinion 19. These shafts 24 carry metal pattern plates 25^a, the pattern plates having on their upper faces the design or shape of the casting to be produced. These pattern plates are provided with projections or lugs 26, so arranged that the pattern plate, when free of a superposed flask, will normally right itself, as shown in the positions A, B and C of Fig. 2. These lugs when the pattern plate is in position act merely as counterweights, although they provide legs when the plates are removed for any purpose.

It will be seen from the above description that the shafts 17 and connected gearing provide for parallel motion of the different pattern plates as the wheels 13 and 13^a rotate and that due to the mutilation of the gears 19, there will be a portion of the revolution of these wheels during which the gears 25 are not in mesh with the gears 19 so that the shaft 24, with its pattern plate, may rotate freely. A flask 27 is shown on each pattern plate, being secured thereto by the clamps 28. These clamps are actuated by means of fluid pressure cylinders 29, connected by an air hose 30, to the shaft 12, which is hollow and which is connected through shaft 12^a to a suitable source of

fluid pressure, not shown. This clamp is shown and described in detail in my copending application, Serial No. 648,789, filed Sept. 11, 1911, entitled "Clamps for flasks."

In order to provide sand to the flasks, I may use sand reservoirs as shown in Fig. 2. The hopper 31 ~~is adapted to furnish~~ backing sand and the hopper 32 facing sand. Measuring devices 33 33^a provide for the introduction of the proper amount of sand. A jolting device 34 is arranged directly beneath the center of the machine and is adapted to suitably jar or jolt the sand into contact with the pattern, thus making tamping unnecessary. This jolter may be of any well known form. In order that the top of the mold may be suitably packed as well as the bottom, I mount a grid 35 above the jolter by means of cables 36, these cables passing over a sleeve 37, which sleeve incloses shaft 12. On the end of sleeve 37 is mounted gear 37^a with which a pinion 37^b is in mesh; pinion 37^b is in turn rigidly mounted on a stub shaft passing through wheel 13^a, the pinion 37^c being mounted on the outer end of this stub shaft. Pinion 37^c is in mesh with gear 37^d which is rigidly mounted on shaft 37^e on the outer end of which is rigidly mounted pinion 38 in mesh with rack 39. Shaft 37^e at its position between gear 37^c and pinion 38 passes through bracket 22 and on its inner end extends into the end of shaft 12. Rack 39 is connected to the piston of an air cylinder 40. In order to raise or lower the grid, air is admitted to one or the other of the sides of the piston, this actuating the rack and causing the rotation of the sleeve 37 (through the gears and pinions just described) and causing the winding or unwinding of the cable thereon.

In order to provide for the removal of the flasks and contained mold, I provide a hydraulic cylinder 41, having a platform 42 thereon, this platform carrying tracks 43, registering with permanent tracks 44, on which a car 45 is adapted to be carried. It will be seen that the shafts 24 are adapted for movement within the slotted bearings 23, and in order to restrain the shafts and keep them in their proper positions, I provide plugs or fillers 46, which may be inserted into and fill the portions of the slotted bearings not occupied by the ends of shafts 24.

The operation of the machine is as follows: It will be seen that in the position D, a flask and pattern plate are in reversed position and a car 45 on platform 42 is elevated by the action of cylinder 41 to receive the flask and remove the same after the releasing of the clamps 28. After the flask is removed, the pattern plate 25^a, due to the weight of lugs 26, will automatically right itself. A flask is then placed on the pattern plate by an suitable means such as a crane and after being suitably fastened thereon, the device is caused to rotate. While in the position D, the gears 25 and 19 are not in mesh, due to the mutilation of gear 19. However, as soon as rotation of the device has begun, the gears are brought into mesh and remain in mesh until position C is reached. When the device has been rotated until the flask is beneath the sand hoppers, sand is admitted to fill the flask and the rotation is then continued until position C is reached. At this point the jolter 34 is elevated, thus lifting the weight of the flask and pattern plate and permitting the removal of the fillers 46. The flask and contained sand are then jolted, the grid being lowered and lying upon the top of the sand. After being jolted sufficiently, the jolter is elevated to permit the insertion of the fillers 46 and the rotation again continued. However, as the gears 19 and 25 are not in mesh, due to the mutilation of the former, the flask and the pattern plate will automatically turn bottom up, due to the fact that the flask is heavier than the pattern plate. In this position the flask will arrive at position D, and, after being unclamped, will be removed by the car 45.

It will be understood that the operation just described deals with only one molding operation and that while the steps described are being carried out, the same steps are also being carried out in proper sequence upon other flasks carried by the same machine and that the operations are continuous. It will also be understood that the mechanism herein shown is only typical and that many modifications may be made therein without departure from the spirit of my invention.

I claim:

1. In a device of the class described, the combination of a rotatable member, a pattern plate carried by said member, and means for automatically maintaining said pattern plate in a succession of parallel planes during the rotation of said member, substantially as described.

2. In a device of the class described, the combination of a rotatable member, a pattern plate carried by said member, means for automatically maintaining said pattern plate, in a succession of parallel planes during the rotation of said member, and means for allowing the free rotation of said pattern plate during a portion of the rotation of said member, substantially as described.

3. In a device of the class described, the combination of a rotatable member, a pattern plate carried by said member, means for automatically maintaining said pattern plate in a succession of parallel planes during the rotation of said member, means for allowing the free rotation of said pattern plate on its own axis during a portion of

the rotation of said member, and balancing means whereby said pattern plate, when free to rotate, will automatically adjust itself in a predetermined position, substantially as described.

4. In a device of the class described, the combination of a rotatable wheel, a pattern plate rotatably mounted on said wheel, a gear on said pattern plate, and a second gear mounted on said wheel and in mesh with the gear of said pattern plate whereby the latter will be maintained in a succession of parallel planes during the rotation of said wheel, substantially as described.

5. In a molding machine, the combination of a rotatable wheel, a pattern plate rotatably mounted on said wheel, a gear associated with said pattern plate, a second gear mounted on said wheel and in mesh with the gear of said pattern plate, and means for rotating said second gear whereby said pattern plate will be maintained in horizontal position during the rotation of said wheel, substantially as described.

6. In a molding machine, the combination of a rotatable wheel, a pattern plate rotatably mounted on said wheel, a gear associated with said pattern plate, a second gear in mesh with the gear of said pattern plate, a relatively stationary gear, and means connecting said stationary gear with said second gear whereby when said wheel is rotated said pattern plate will be maintained in a succession of parallel planes, substantially as described.

7. In a molding machine, the combination of a rotatable wheel, a plurality of pattern plates rotatably mounted on said wheel, and means for maintaining said pattern plates in parallel positions during the rotation of said wheel, substantially as described.

8. In a molding machine, the combination of a rotatable wheel, a plurality of pattern plates rotatably mounted on said wheel, a gear associated with each of said pattern plates, a plurality of gears carried by said wheel and in mesh with the respective gears of said pattern plates, and means for actuating the gears carried by said wheel during the rotation of the latter whereby said pattern plates will be maintained in parallel positions, substantially as described.

9. In a molding machine, the combination of a rotatable wheel, a pattern plate rotatably carried by said wheel, a gear associated with said pattern plate, a second gear carried by said wheel and in mesh with the gear of said pattern plate, said gear having a portion of its periphery mutilated, and means for actuating said second gear during the rotation of said wheel whereby said pattern plate will be maintained in a succession of parallel planes while said second gear is in mesh with the gear of said pattern plate and said pattern plate will be free to rotate when the mutilated portion of said second gear is brought into register with the gear of the pattern plate, substantially as described.

10. In a molding machine, the combination of a frame, a rotatable wheel carried by said frame, a pattern plate rotatably mounted on said wheel, a gear associated with said pattern plate, a shaft carried by said wheel, a pair of gears on opposite ends of said shaft, one of said gears being in mesh with the gear of said pattern plate, and a relatively stationary gear in mesh with the gear mounted on the opposite end of said shaft whereby when said wheel is rotated said pattern plate will be maintained in a succession of parallel planes, substantially as described.

11. In a molding machine, the combination of a rotatable wheel, a pattern plate rotatably mounted on said wheel, removable means for maintaining the axis of said pattern plate at a pre-determined distance from the axis of said wheel the removal of said means allowing radial movement of said pattern plate, and means for jolting said pattern plate when the wheel is rotated to a pre-determined position and said removable means are withdrawn, substantially as described.

12. In a molding machine, the combination of a rotatable wheel, a pattern plate rotatably mounted on said wheel, means for supplying sand to said pattern plate, means for jolting the sand on said pattern plate when said wheel is rotated to a pre-determined position, and packing means adapted to be lowered on to the sand on said pattern plate, substantially as described.

13. In a molding machine, the combination of a rotatable wheel, a pattern plate rotatably carried on said wheel, removable means for holding said pattern plate in a pre-determined radial position, means for supplying sand to the surface of said pattern plate, a sand packing grid, means for lowering said grid on to the sand on said pattern plate when said wheel is rotated to a pre-determined position, and means for jolting said pattern plate on the withdrawal of said removable means, substantially as described.

14. A molding machine comprising, in combination, a base, a multiple pattern carrier movable with relation to said base, means for maintaining said patterns in parallelism during a portion of the travel of said carrier, means for supplying sand to said patterns, means for jolting sand on said pattern, and means for drawing said patterns, substantially as described.

15. A molding machine, comprising in combination, a multiple rotary pattern carrier movable with relation to said base, means for maintaining said patterns in par-

allelism during a portion of the travel of said carrier, means for supplying sand to said patterns, means for jolting sand on said pattern, and means for drawing said patterns, substantially as described.

16. A molding machine comprising, in combination, a base, a multiple rotary pattern carrier mounted on said base, said pattern carrier including parallel motion means whereby said patterns are maintained in parallel relation, flasks for said pattern, means for securing said flasks over said patterns, means for supplying sand to said flasks, means for jolting sand in said flasks, and means for drawing said patterns, substantially as described.

17. A molding machine comprising, in combination, a base having anti-friction elements thereon, end wheels carried by said anti-friction elements on said base, said wheels being joined by shafts, pattern plates carried by said shafts, and a parallel motion device carried by one of said wheels and arranged to maintain said pattern plates in parallel relation during a portion of the travel of said wheels, substantially as described.

18. A molding machine comprising, in combination, a base having anti-friction elements thereon, end wheels having radial slots rotatably mounted on said anti-friction elements, shafts connecting said wheels and seated in said slots, pattern plates carried by said shafts, and means for maintaining said pattern plates in parallel relation during a portion of the travel of said wheels, substantially as described.

19. A molding machine comprising, in combination, a base having anti-friction elements thereon, radially slotted wheels cooperating with said anti-friction elements, shafts seated in slots in said wheels, said shafts carrying pattern plates and being provided with a gear on one end thereof, mutilated gears carried by one end wheel and meshing with the gears on the ends of said shafts whereby said pattern plates are maintained in parallel relation during a portion of the travel of said wheel, substantially as described.

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