Oct. 30, 1945. F. TAGER 2,387,782

ROTARY MOLD FILLING MACHINE

Filed April 3, 1942 2 Sheets-Sheet 1

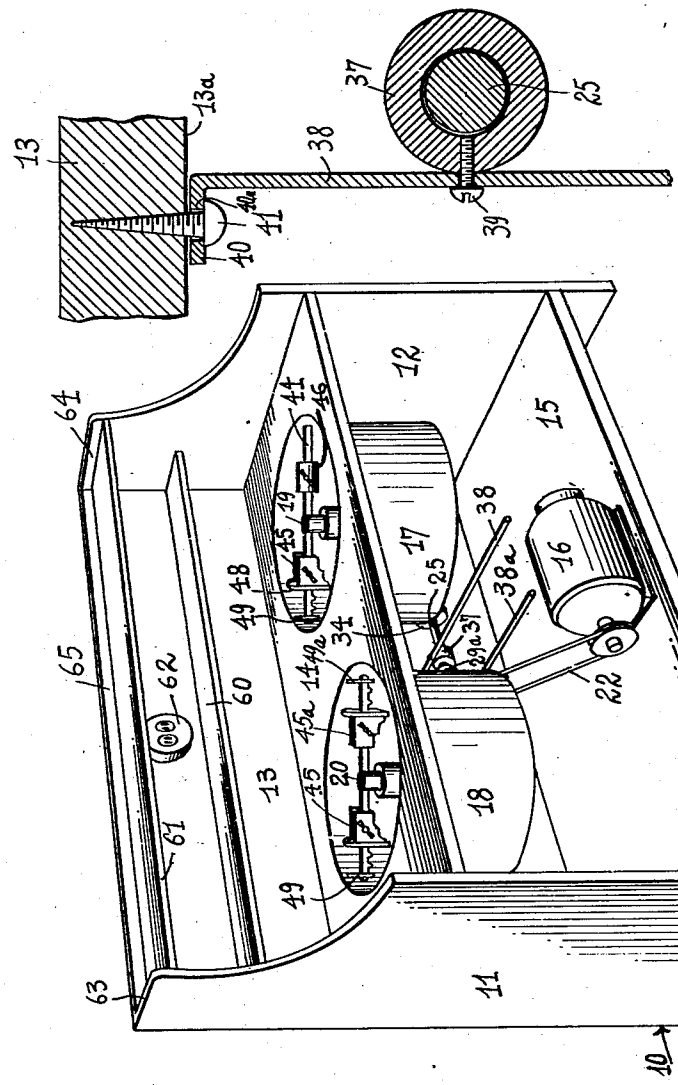


FIG. 6.

FIG. 1.

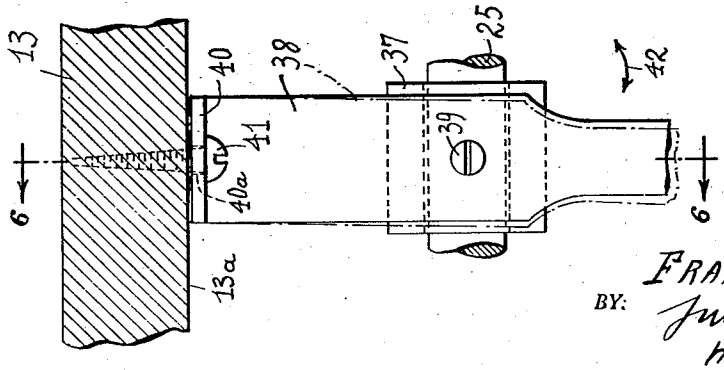


FIG. 5.

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ROTARY MOLD FILLING MACHINE

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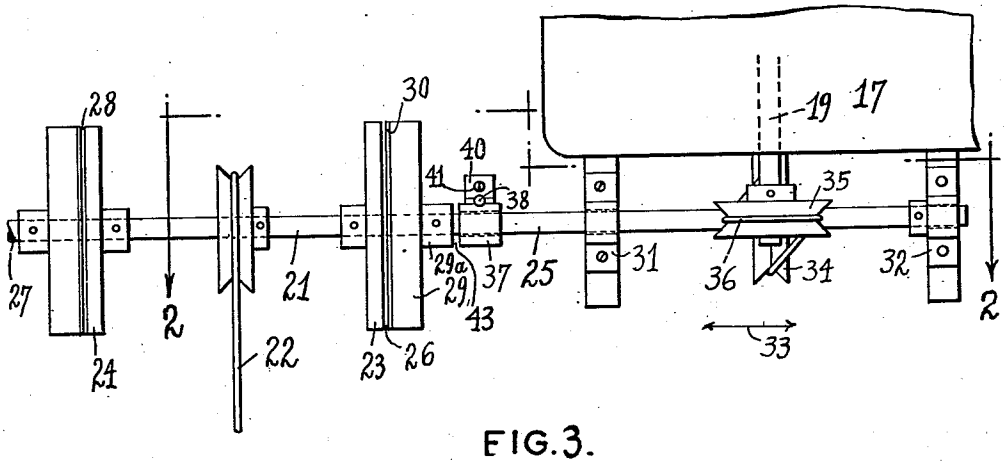


FIG. 3.

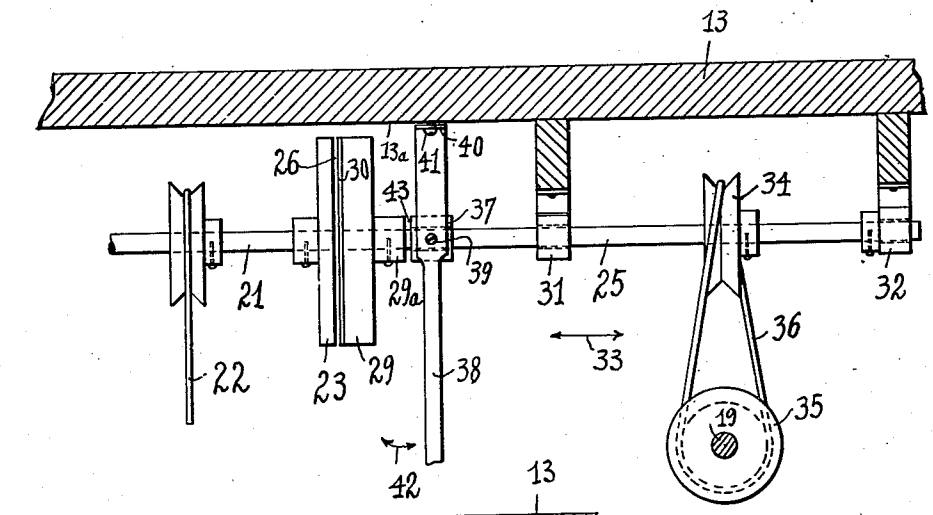


FIG. 2.

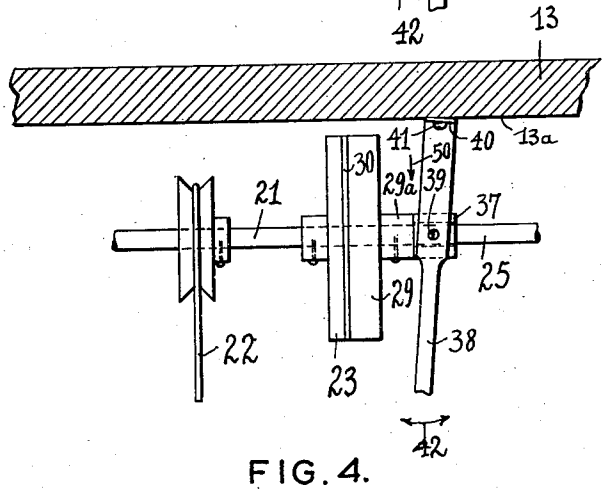


FIG. 4.

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UNITED STATES PATENT OFFICE

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ROTARY MOLD FILLING MACHINE

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Application April 3, 1942, Serial No. 437,520

4 Claims. (Cl. 18—26)

This invention relates to devices for filling cavities of mold with a molten material, like wax, metal, and the like, and it particularly relates to such devices for the jewelry trade, and has for its main object to provide a device of this character which will be more efficient than the devices now used for such purpose.

Another object of my invention is to provide a device, as characterized hereinbefore, which will be mechanically operated, easily and quickly set in motion, and which will have automatic means embodied therein to stop said motion very quickly, thereby avoiding any waste of time, effort and needless use and wear of machinery.

Still another object of my invention is to provide a device of this type which will be double acting, that is, which may fill two molds simultaneously or in succession, using the same mechanical means for setting both of them into motion.

Still a further object of my invention is to provide automatic means to terminate or cut-off the rotation of a machine element set into such rotation in a pre-determined manner.

Other objects of my invention will be apparent as the specification of the same proceeds, and among others I may mention: to provide a device of the above nature, which will be simple in construction, inexpensive to manufacture, to install and to operate, and which will be particularly adapted and arranged for the jewelry trade, having a novel frame construction and working bench embodied therein.

It is also to be understood that my invention is highly useful in the novelty, dental and all other trades where comparatively light castings are to be made in mold cavities.

In the drawings forming a part of this specification and accompanying the same:

Fig. 1 is a perspective view of my novel mold filling machine, particularly designed for the jewelry, novelty, dental and other trades and having two operating units therein;

Fig. 2 is a fragmentary sectional view on an enlarged scale of a driving shaft and its associated parts used in my machine, the section being taken as indicated by the line 2—2 in Figs. 1 and 3;

Fig. 3 is a fragmentary front elevational view of the mechanism shown in Fig. 2, and

Fig. 4 is a detail, showing said mechanism set into an operative position;

Fig. 5 is a fragmentary elevation of an operating lever used in my device, and being shown on a still larger scale, and

Fig. 6 is a sectional elevation thereof, the section being taken on the line 6—6 of Fig. 5.

Referring now to the drawings more in detail by characters of reference, my mold filling machine in its preferred form, as shown in Fig. 1, consists in a frame or bench construction, generally indicated by the numeral 10, having two side walls 11 and 12, a rear wall 13, a table 14, and possibly a lower support 15 on which may be secured the driving motor 16 for my device, as will be understood by those versed in this art.

Two downwardly depending containers 17 and 18 are secured in the table 14, and rotating vertical shafts 19 and 20, respectively, are arranged in the centers of the containers 17 and 18.

A longitudinally extending shaft 21 is secured on and in front of the central portion of the rear wall 13 between said two containers and to the rear and below them. Said shaft 21 is adapted to be rotated by the motor 16, as through the endless belt 22, as will be understood. At the right hand end of the shaft 21 is secured a clutch disc 23, and a similar, but oppositely placed clutch disc 24 is secured at the left end of the shaft 21.

To the right of the shaft 21, a right hand longitudinal shaft 25 is secured on the rear wall 13 in axial alignment with the shaft 21, but separated therefrom by a comparatively narrow space 26, and a similar, but oppositely placed longitudinal shaft 27 is placed to the left of the central longitudinal shaft 21 separated therefrom by the narrow space 28.

The right hand shaft 25 is used to drive the mold filling mechanism in the container 17 when desired, and the shaft 27 at the left side is used to drive the mechanism in container 18. The two containers and their driving mechanisms are entirely identical, only, of course, oppositely placed at the two sides of the central drive shaft 21, therefore, a detailed description of one will be sufficient.

Proceeding now to the description of the right hand driving mechanism for the mold filling device in container 17, shaft 25 is provided with a clutch disc 29 adapted to cooperate with the clutch disc 23 secured oppositely thereto at the right hand end of the central drive shaft 21, and for this purpose, it may have an appropriate leather lining or inlay 30, as will be understood by those versed in this art.

Shaft 25 is slidable in its bearings 31 and 32, secured on the rear wall 13, the right hand and left hand possible slide movements of the shaft being indicated by the double arrow 33. A vertical belt pulley 34 is secured on the shaft 25 and

a horizontal cooperating belt pulley **35** is secured at the lower end of the vertical shaft **19** of the container **17**, and an endless belt **36** transmits the rotation of shaft **25** to shaft **19** through the pulleys **34** and **35**, as will be understood.

A slidable ring or sleeve **37** is also arranged on the shaft **25** in close proximity to the clutch disc **29**, and a rockable or pivoted lever **38** is secured to said ring **37**, as by the securing element **39**. Said lever **38** preferably is provided with an upwardly turned transverse flat projection or end flange **40** which is loosely secured on the rear wall **13** as by the screw **41**, said flat, preferably rectangular upward flange **40** being spaced apart from the inner surface **13***a* of the rear wall **13** to a small distance and also having a hole or aperture **40***a* therein slightly larger than the diameter of the screw **41** at that place, so that said lever **38** may be rocked in a right hand or left hand direction when desired and as indicated by the double arrow **42**. The clutch disc **29** may have a hub **29***a* secured thereon, and in the normal inactive or central position of the lever **38**, a small space **43** is left between the opposing faces of the sleeve **37** and hub **29***a*.

A transverse element **44** is secured to the upper end of the vertical shaft **19** and a molten wax or metal receiving container or device **45** is secured on said transverse element **44** to the left side of the shaft **19**, while a counterbalancing weight **46** is secured thereon to the right side of said shaft. Container **45** has an opening in its outer surface or face **47**, as indicated by the dotted lines **48**, and an adjustable receiving device **49** is secured on the outer left end of the transverse member **44**. The mold to be filled by the molten material, like wax or metal, is placed into the receiver **49**, (not shown), and the filling of the mold will be executed by ejecting or shooting the molten wax or metal from the container **45** into the mold in the receiver **49** by centrifugal action upon a quick rotation of the shaft **19**, the mold being made and arranged in such a manner that it will have an opening opposite to the opening **48** for the molten material, through which openings the molten material may travel from its container **45** into the mold.

There is nothing new in this operation, since filling molds with molten wax by arranging them on a rotating arm together with a container of the molten wax in the manner as described hereinbefore, has been practiced in the jewelers and other trades for some time past; such an operation is well known in this art and will be fully understood from the herein description.

The rotation of the carrying element with the molten material container and the mold thereon has been produced hereinbefore in the jewelers and other trades when the same was practiced by arranging an appropriate spring around the shaft of the rotating device, the operator manually turning the same against the tension of the spring and then permitting it to rotate backwards on the influence of the spring tension and at a comparatively high speed, thereby causing the molten wax to be shot by centrifugal action into the cavity of the mold.

The drawbacks of this device and operation have been many. The operator had to wind up the spring at every operation in a slow, awkward and laborious manner; then when the spring was free, the device would rotate in the opposite direction quite a long time, the time of said reversed or filling rotation and its amount being entirely uncertain more or less at each time, and the operator had no means to figure it and to reduce it to a desired minimum, thereby causing great loss of time, effort and operation of the machinery. The spring after a comparatively short use became loosened or entirely worthless and it had to be frequently exchanged, and, in general, frequent adjustments and repairs were needed. Finally, very often, the speed of the rotation was not sufficient to completely and perfectly fill the mold, and this operation was not adapted for heavier materials, like molten metal, but only for a comparatively light flowing wax.

Now the use and operation of my device may be described as follows:

The mold to be filled is placed in the receiver **49** on the transverse member **44** with its filling opening towards the molten material, like wax container **45**, the molten wax is poured into said container, the opening of said container being in registering relation with the opening in the mold, as has been indicated hereinbefore.

Now the operator will move the lever **38** in a left hand direction, thereby causing the respective surfaces of the sliding ring **37** and of the hub **29***a* to be engaged, at a very slight left hand pressure. The hub **29***a*, the clutch disc **29** and the whole shaft **25** on which they are secured is moved in a left hand direction, as indicated by the arrow **33**, to a slight extent, however, until the leather lining or inlay **30** will reach the opposite clutch disc **23** on the rotating shaft **21**, and through the frictional engagement between the clutch discs **23** and **29**, shaft **25** will be set into rotation, as will be understood.

Through the belt **36**, shaft **25** will set vertical shaft **19** in the container **17** into rotation and the transverse member with the mold and molten metal container will rotate therewith, whereupon the centrifugal force acting on the molten wax or other material will cause the same to be shot with appropriate velocity and force into the cavity of the mold and fill the same.

The leftward moving of the arm or lever **38** will cause the same to take up a somewhat leftwardly inclined position with reference to the shaft **25**, as indicated in Fig. 4.

Upon the release of the lever **38** by the operator, however, said lever at once will return into its normal position, substantially perpendicular to the shaft **25**. Such an immediate return of the lever **38** upon the releasing of the same by the operator has been my experience, and I may explain the same in the following manner:

It may be caused or aided simply by the upstanding flat and broad flange **40** at the inner end of the lever **38** hitting the rear wall **13** with its left marginal portion and rebounding from the same. Since the operator will move the lever **38** for a very short time, practically for an instant only to the left, because the slightest connection between sleeve **37** and hub **29***a*, and the slightest movement thereof to the left is sufficient to set the earlier described shafts and the transverse member into appropriate rotation, the left hand movement of the lever **38** will be very quick, short, and a slight one, permitting such a rebound.

However, I believe the main cause of such an immediate automatic return of the lever **38** will be caused by the rotation of the hub **29***a*, the rotation of which will be transmitted through frictional action to the sleeve **37**, whereby sleeve **37** will receive a force acting thereon at right angle to the shaft **25**, as indicated by the arrow **50** in Fig. 4, and the action of this force on the in-

clined lever 38 will cause the same to return into a normal position at right angles to the shaft 25, as will be understood by those versed in this art.

In any case, as soon as the operator so to say, touches the hub 29a with the sleeve 37, by moving the lever 38 to a very short distance to the left, the space 43, normally left between the hub 29a and the sleeve 37 being very small, shaft 25, and ultimately the transverse member 44 with its associate parts will at once be set into rapid rotation and the operator then at once will release or free the lever 38 and may attend to other duties, whereupon lever 38 will return to its normal inoperative position carrying with it the sleeve 37, thereby disconnecting the same from the hub 29a, and such a right hand movement of the sleeve 37, by its friction on the shaft 25, will cause said shaft also to move in a right hand direction to a slight extent, whereupon the connection between the clutch discs 23 and 29 will also be terminated, and shaft 25 will stop its rotation, thereby terminating the rotation of the associated parts and ultimately of the mold, and the filling container, whereupon the ready filled mold may be removed, a new one inserted into the device, and the operation in the container 17 repeated.

I may remark that the disconnecting of clutch disc 23 and 29 and the return sliding of shaft 25 may be aided or entirely caused by the rotation of disc 23 against the uneven leather lining or inlay 30 on disc 29.

In the drawings I show a double acting device, as has been mentioned hereinbefore, having a second container 18 with a rotating shaft 20 and all the other parts described for container 17. In this manner, one operator may conveniently handle two filling outfits and while shaft 19 in container 17 rotates, the device in container 18 may be prepared with molten material and mold and then set in rotation by moving a sliding ring 37 on driving shaft 27 for the vertical shaft 20, in a right hand direction by the lever 38a, as will be understood.

It is also to be noted that instead of the counterweight 46, a second molten material container 45a, and mold receiver 49a, may be placed on the opposite end of transverse member 44, in a reverse manner, as shown for the container 18, thereby filling two molds at every rotation.

Upper shelves 60 and 61 may also be provided on my bench construction 10 for obvious purposes and uses, electric outlets 62 being provided through the rear wall 13 preferably between said shelves. The side walls 11 and 12 and rear wall 13 also preferably are continued in vertical flanges 63, 64 and 65 around three sides of the top shelf 61.

What I claim as new, is:

1. In a centrifugal mold filling machine, in combination, a vertical shaft with a transverse member carrying the mold to be filled, a first axially slidable horizontal shaft, a yielding driving connection between said two shafts, permitting an axial sliding of said horizontal shaft, a second horizontal shaft in axial alignment with said first horizontal shaft, but disconnected therefrom, means to permanently rotate said second horizontal shaft, cooperating clutch elements at the adjacent ends of said two shafts, normally being disconnected, a stationary member in said machine having a substantially vertical surface to the rear of said first horizontal shaft, a lever pivoted on said vertical surface and pivotedly connected to said first slidable horizontal shaft, a substantially vertical transverse member carried by said lever, adjacent to said vertical surface whereby a rocking of said lever will cause said slidable horizontal shaft to move towards said permanently rotating shaft, thereby connecting said two clutch members and causing said first shaft and said vertical shaft to rotate, said transverse member on the pivoted end of the lever at the same time striking said vertical surface and rebounding from the same, instantly and automatically disconnecting said slidable horizontal shaft from said permanently rotating shaft.

2. In a centrifugal mold filling machine, as set forth in claim 1, said stationary member with the vertical surface being in the form of a vertical wall, and being a part of the frame of the machine, and said slidable horizontal shaft being secured thereon.

3. In a centrifugal mold filling machine, as set forth in claim 1, said stationary member with the vertical surface being in the form of a vertical wall, and being a part of the frame of the machine, and said slidable horizontal shaft being secured thereon, said lever being in the form of a flat strip of material, said transverse member thereon shaped by a vertical flange bent from the same at the inner end thereof, and said pivot on said vertical surface being formed by a bolt secured thereinto and passing through a hole in said flange.

4. In a centrifugal mold filling machine, as set forth in claim 1, said stationary member with the vertical surface being in the form of a vertical wall, and being a part of the frame of the machine, and said slidable horizontal shaft being secured thereon, said pivot connection between said lever and said first horizontal shaft being formed by a sleeve slidable on said shaft, cooperating radial surfaces on said sleeve and on the clutch member of said first horizontal shaft, whereby a rocking of the lever will move said sleeve on said horizontal shaft and also slightly incline it to the axis of the shaft, the engagement of the radial surfaces moving said clutch member and said shaft into engagement with said second permanently rotating horizontal shaft, and said momentary inclined position of said sleeve then causing its radial surface to be acted upon by the rotation of said clutch member and its radial surface to axially reversely move said sleeve and said first shaft connected therewith, thereby aiding and accelerating the disconnection of the shafts through said rebounding action of the lever.

FRANK TAGER.