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G. VON WEBERN
ROTARY MOLD MECHANISM

1,832,066

Filed May 12, 1930

2 Sheets-Sheet 1

FIG. 2.

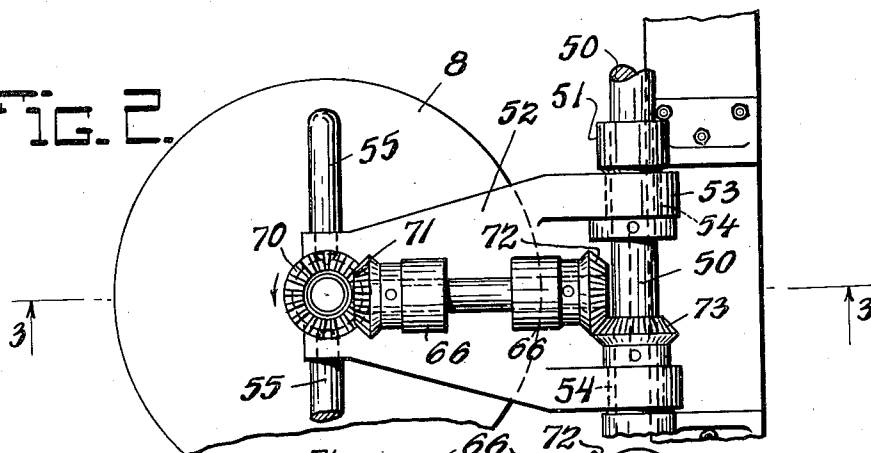
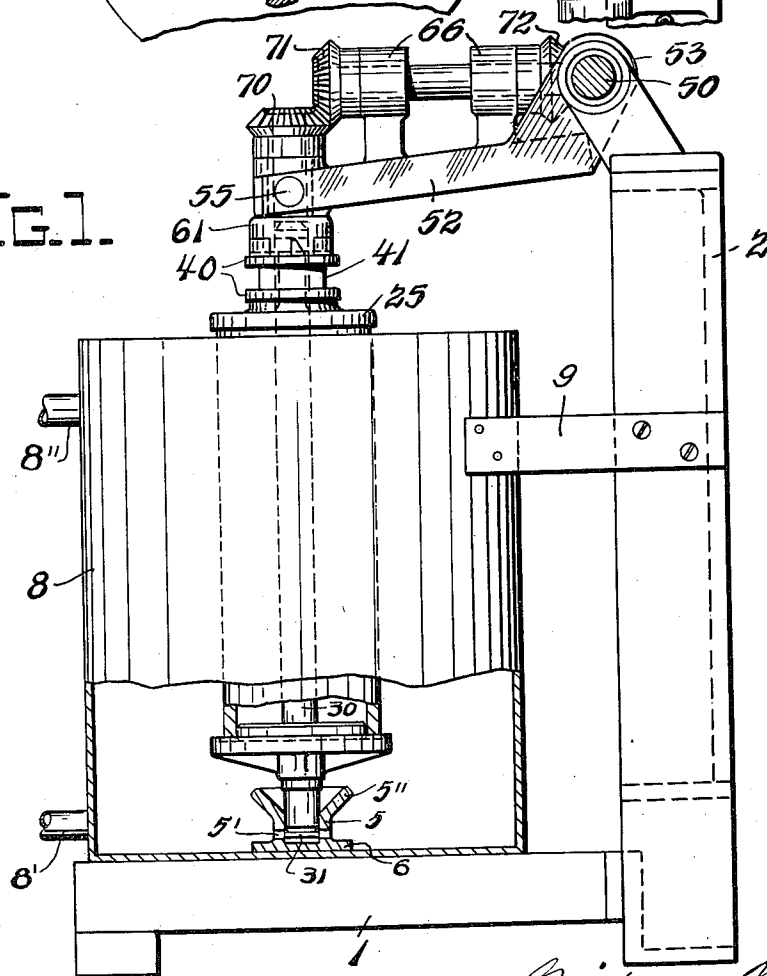


FIG. 1.



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FIG. 4.

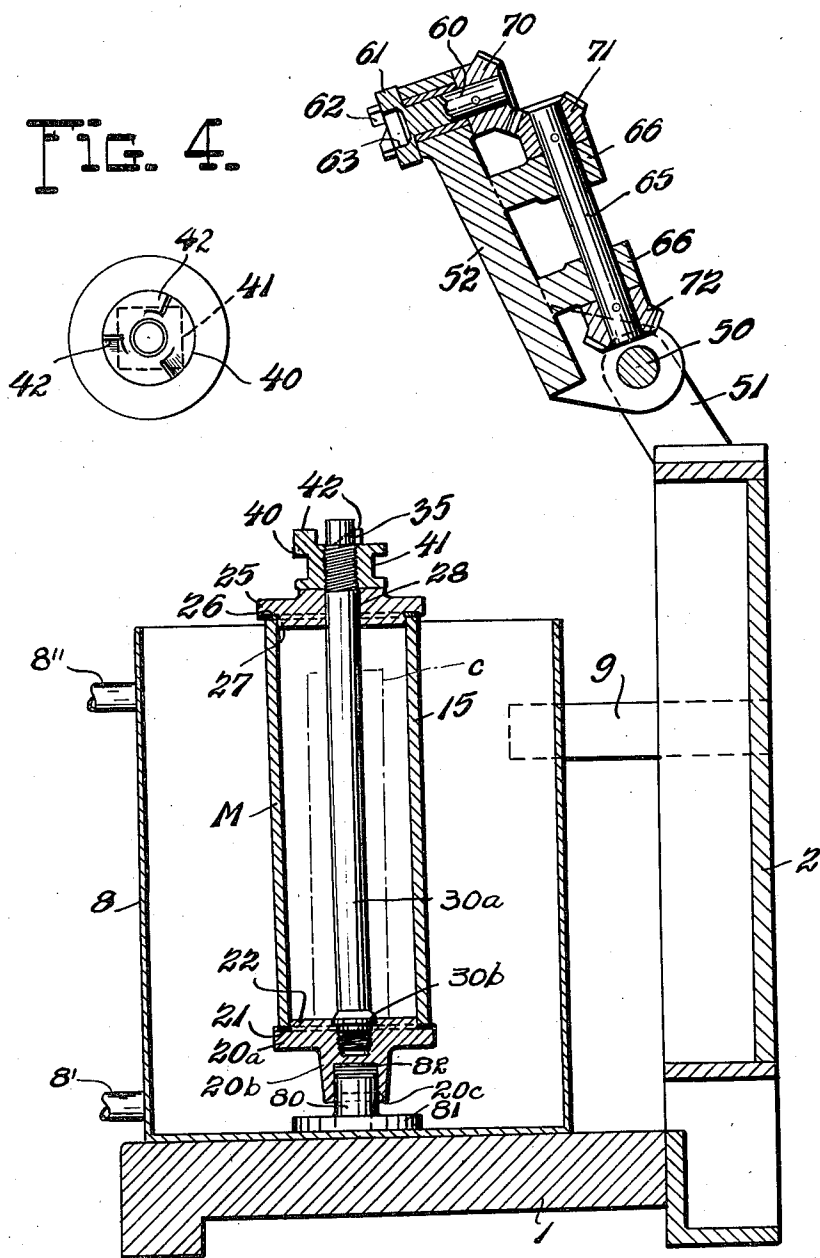


FIG. 3.

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ROTARY MOLD MECHANISM

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This invention is concerned with mechanism for forming composition rolls for use with printing machines, such as graining machines, and particularly to mechanism 5 for use in forming continuous surface composition rolls. It is practically essential that the working surface of a composition roll be free from irregularities, such as pockets and ridges. It is already known 10 that when molten composition roll material is rapidly rotated in a mold having an interior surface complementary to the surface which is desired for the roll, gas and air bubbles will be forced inwardly toward the 15 core of the roll and remain there after the composition solidifies. In this manner the bubbles are prevented from leaving pockets at or near the working surface of the rolls.

An object of my invention is to provide a 20 composition roll forming mechanism operable on the above principle and by which a large number of rolls may be finished in a comparatively short period of time and with comparatively simple and inexpensive equipment. 25

A further object is to provide a machine of the character above mentioned by which the finished roll is easily and quickly removed and a new roll forming operation 30 started without substantial loss of time.

A specific object is to provide an improved and simple arrangement, in a power driven rotary mold mechanism, for quickly removing and replacing composition roll mold 35 units.

A still further object is to provide a simple device for preventing leakage of the composition material from a sectional mold, which device will not impede stripping the 40 finished roll from the mold.

Further objects and features of the invention will become apparent from the following description relating to the accompanying drawings. The essential characteristics 45 are summarized in the claims.

In the drawings, Fig. 1 is a side elevation of a machine incorporating my invention, partly broken away to illustrate certain details relating to the mold support; Fig. 2 is 50 a fragmentary plan view of the machine;

Fig. 3 is a longitudinal vertical sectional view, as indicated by the line 3—3 on Fig. 2, and showing a modified form of lower bearing support for the mold unit, and Fig. 4 is a detail view of a suitable driving coupling 55 included in the mold driving mechanism.

Referring in detail to the drawings, 1 indicates a suitable horizontal base from which rises, preferably rigid therewith, an upright frame member 2. The base and upright 60 frame may be formed of suitable structural elements, such as channel and angle sections, or may comprise separate or unitary castings.

A rotary mold unit is shown at M supported for rotation on a substantially vertical axis. The lower bearing support for the mold unit is preferably, as shown in Fig. 1. Here there is a socketed bearing member 5 having an attaching flange 6 adapted to be 70 secured to the bottom wall of a tank 8, the tank in turn resting on and being secured to the horizontal base 1 on its upper side. The tank may be secured to the base in any suitable manner as by screws (not shown) and 75 may be braced against the upright frame member 2 as by side brace strips 9 connecting the upright with the tank. The tank may be modified to contain any desired number 80 of mold units.

The mold unit M is adapted to be rotated by a driving gearing, to be presently described, supported on the upright frame 2 and arranged to be swung down with a driving part thereof in contact with the upper 85 end of the mold so as to both guide the mold and turn it.

The preferred construction of the mold comprises a central hollow mold member or tube 15 of suitable material, such as brass, the 90 interior surface of which is, of course, finished to form a matrix for the composition roll. For making cylindrical rolls, the interior surfaces of the member 15 is preferably highly polished and I propose to lend 95 smoother and harder finish to this interior by electro-plating the same and polishing the deposited plate.

It will be understood that if a non-cylindrical roll is desired, the interior of the mold 100

will, of course, have the desired irregularities; for example, the interior of the mold member 15 may comprise a comparatively thin liner (not shown) having a pattern in relief or intaglio, by which such irregularities will be brought out in reverse relief on the molded roll.

Abutting the ends of the mold member 15, are end closure members 20 and 25. Both these members have under-cut channels in the faces thereof adjacent the mold members at 21 and 26 respectively, which channels are adapted to contain soft metal, such as babbitt metal, the purpose being to effect a tight joint between the tube 15 and the closure members, to prevent leakage of the molten composition material from the mold. The members 20 and 25 also have inward extensions, at 22 and 27 respectively, on reduced diameters, substantially fitting the interior of the tube 15, further providing tight joints.

The member 20 (Fig. 1) is centrally bored to receive the lower end of a central roll core supporting shaft 30 which, as shown in Fig. 1, extends through the member 20 into the socket of the support member 5. Suitable end thrust bearing members 31, preferably polished hardened discs, lie at the bottom of the socket, and the member 5 may have water vents at 5' to prevent water being trapped at the bottom of the socket which would of course obstruct the shaft. To facilitate placing the mold unit, the member 5 may have a conical flange 5'' at its upper end so arranged as to pilot the lower end of the shaft 30.

In order that the shaft may serve as a clamping member as well as a core support, the lower end of the shaft is made substantially rigid with the bottom closure member 20 while the upper end extends freely through the upper closure member 25 so that the shaft may carry a clamping nut member at or near its upper extremity. Such nut is shown at 40 and, as shown, is part of a dental coupling between the driving mechanism, to be presently described, and the mold. The nut member 40 is formed to receive a wrench or suitable tool, as by the squared off portion 41, above which it has spaced driving lugs 42.

It will be seen that the mold may be charged with composition material simply by taking off the nut member 40 and the closure member 25, leaving the tube 15 and the shaft 30 in place. The usual core for the roll, shown in broken lines at C fits over the shaft 30 and is retained centrally of the mold thereby. As shown, the upper end of the core is spaced from the upper inner end of the mold and only enough molten composition is poured in to cover this upper end of the core. If there is an excess of material

this may simply be trimmed off the finished roll even with the core.

The driving arrangement for the mold unit M comprises a main power shaft 50 supported on suitable brackets, two of which are shown (see Fig. 2) at 51. The brackets are mounted in any suitable manner on top of the frame member 2 and the number of brackets depends, of course, on the length of the shaft and the number of mold units in a single machine. A single shaft, such as 50, may serve to drive any number of mold units.

Pivoted about the axis of the shaft there is shown a swingable frame 52 having rearwardly extending ears 53 embracing the shaft, the ears preferably being provided with bushing bearings at 54 to allow free rotation of the shaft. The swingable frame 52 preferably has suitable arms 55 extending outwardly therefrom parallel to the shaft 50 at the outer end of the frame, whereby the operator may swing the frame up and down.

In alignment with the shaft 30 (with the frame swung down), there is a short shaft 60 having rigid therewith a driving head 61 below the swingable frame 52. On the head are driving lugs 62 adapted to be brought in meshing engagement with the lugs 42 on the nut member 40 of the mold unit. The head is centrally recessed as at 63 to receive the upper end of the shaft 33 as a pilot to determine and maintain the axis of rotation of the mold.

To provide a driving connection from the shaft 60 to the main drive shaft 50, I preferably provide an overhead shaft 65 on suitable brackets 66 rising from the frame 52, the remote ends of the shaft 55 having bevel gear connections with the shafts 50 and 60 respectively. As shown, there is a bevel gear 70 fast on the shaft 60, and which meshes with a beveled gear 71 fast on the outer end of the shaft 65. The inner end of the shaft 65 has fastened thereto a beveled gear 72 which meshes with a bevel gear 73 (see Fig. 2) fast on the shaft 50. The lug formations on the nut member 40 and driving head 61 are preferably arranged similar to ratchet teeth so that the mold will only be rotated in one direction. The vertical and inclined faces on the lugs are in such relation that the power shaft 50 has to rotate counter clockwise (as illustrated in Figs. 1 and 3), which rotation tends to urge the swinging frame downwardly toward the mold unit, due to friction at the bearings 52.

Referring to the modification with respect to the lower bearing support for the mold unit, namely, that shown in Fig. 3, this is substantially the reverse of the arrangement of Fig. 1. The mold closure member, designated 20a, is extended as at 20b on its lower side and recessed to fit over a short shaft 80 rising from the bottom of the tank and supported as on a flange formation 81 which

may be in turn screwed to the bottom of the tank. The recess in the extension 20b may be beveled as at 20c to facilitate placing the mold unit on the short shaft. Interposed
 5 between the short shaft and the recess in the closure member 20a are a plurality of thrust bearing discs 82 which, as in the previously described construction, are preferably hardened and polished. The discs may be retained in the recess of the closure member
 10 20a in any suitable manner. In this construction, the core supporting and mold clamping shaft 30a is threaded into the top side of the mold closure member 20a and has a beveled shoulder at 30b to center the roll
 15 core C in case the opening therein is somewhat larger than the shaft.

In operation, it will be understood that sufficient heat is maintained in the tank to keep the composition in molten state during
 20 the rotation of the mold. Hot water at suitable temperature, say 160° F. may be pumped into the tank through the inlet line 8', excess water being let out of the tank at the overflow line 8".

The mold is preferably rotated at approximately 200 revolutions per minute for about fifteen minutes. The air and gas bubbles in the composition are thereby driven inwardly
 30 toward the core and remain there. Then the hot water is let out of the tank and the tank filled with cold water either through the same inlet as receives the hot water or a separate inlet as desired. The cold water
 35 is kept in the tank for a sufficient period to cool the mold enough to enable it to be handled by the operator. The operator then swings the frame 52 and driving gearing back out of the way and lifts the mold unit
 40 straight out of its lower bearing support and the tank. The tank may then be immersed in a separate chilling tank and left there a sufficient period for the composition to entirely congeal.

It will be understood that a number of mold units may be used with a single machine, such as illustrated, keeping one or several molds charged with a molten composition and ready to be inserted into the machine as soon as one mold unit is taken out,
 50 thus speeding up production.

To strip the congealed composition from the mold, it is of course necessary to remove the nut member 40 and top closure member
 55 45, after which the central shaft with the lower mold closure member may be withdrawn from the mold tube 15 and the composition. The completed composition roll, including the core, may then be shoved out of
 60 the tube ready for use in a suitable printing machine.

I claim:

1. In a rotary mold mechanism, a supporting frame, a rotary mold, means on the support forming a bearing for one end of the

mold from which the mold is detachable by endwise movement of the mold; a power driving device swingably mounted on the supporting frame and having a driving part arranged to detachably engage the opposite
 70 end of the mold to complete the support, said driving device being arranged to be manually swung entirely clear of the mold to effect disengagement of the driving part therefrom and to permit free endwise removal of the
 75 mold from the first named bearing.

2. In a rotary mold mechanism, a tank, a rotary mold disposed within the tank and having a lower bearing support within the tank, a frame adjacent the tank, a power
 80 driving device swingably mounted on the frame and having a driving part adapted to lie above and engage the mold and turn the same when the device is swung to one position, said device being arranged to entirely
 85 clear the mold and permit free endwise removal thereof from the tank when said device is in another position.

3. In a rotary mold mechanism, a mold adapted to turn on a vertical axis, a frame
 90 for supporting the mold, a power shaft on the frame extending substantially at right angles to the mold axis and disposed in offset relation thereto, mold driving mechanism, comprising a swingable frame, pivoted about
 95 said power shaft, and swingable toward and away from the mold, a mold driving shaft carried on the swingable frame in such manner as to be swung thereby into alignment with the mold, gearing constantly connecting
 100 the mold driving shaft with the power shaft, and quickly detachable cooperating coupling members on the mold driving shaft and the mold.

4. In a composition roll forming machine, 105 a rotary mold, a frame, a bearing carried by the frame, supporting one end of the mold and guiding the same for rotation, a swingable driving mechanism at the opposite end of the mold pivotally carried on said frame
 110 and including a driving and a driven element and constantly connected gearing coupling said elements, the driven element having a clutch member and the mold having a cooperating clutch member, said clutch members being brought together when the driving
 115 gearing is swung to position the driven element in alignment with the mold.

5. In a composition roll mold, a sectional mold unit, comprising separable parts and
 120 adapted to turn on a vertical axis, a frame, and means supported by the frame providing a lower guiding bearing for the mold on which the mold may turn freely, a power shaft in fixed position on the frame and a
 125 driving connection, including a swingable frame member pivoted about the driving shaft and including a driving part drivably coupled with the shaft and arranged to engage the mold to turn the same when the
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- frame member is swung to substantially horizontal position, said driving part having means thereon forming the entire upper bearing for the mold, whereby when the swingable frame is raised, the mold unit may be lifted out of place for removal of the formed composition roll.
6. In a rotary mold, a frame having an upright portion and a horizontal portion, a tank on the horizontal portion, the sectional mold unit disposed within the tank and having a bottom bearing therefor in the tank to permit the unit to be turned bodily on a vertical axis, and a driving device, including a power shaft in fixed position on the upright portion of the frame, a frame member pivoted about the power shaft, and a bevel gear system, including a driving part, and gears connecting the same with the power shaft, said driving part being adapted to engage the upper end of the mold and turn the same when the frame member is swung to horizontal position, the movement of the frame member being such that the entire gear system may be swung clear of the mold unit to permit free endwise removal of the unit.
7. In a rotary mold, for forming composition rolls, a hollow mold body and separable end closures therefor, a roll core supporting shaft extending through the body and one of the closure members, and being substantially rigid with the other, a nut on the shaft arranged to forcibly draw both closure members into contact with the body, there being driving lugs on the nut adapted for association with a mold driving device to rotate the mold.
8. A rotary composition roll mold construction, comprising a hollow mold body and end closures therefor, a roll core supporting shaft extending through the body and engaging both closure members, the shaft being substantially rigid with one of said members and extending through the other, means associated with the shaft at the end thereof which extends through a closure member as aforesaid to forcibly draw the closure members into contact with the body, each of said closure members having an annular groove adjacent the body, there being relatively soft metal inserts in each of the grooves, forming a packing to prevent leakage of material from the mold when the same is rotated.
9. In a rotary mold, a mold unit, comprising a tube, and top and bottom closures therefor abutting the tube, a bearing support for the unit to guide the unit for rotation on a vertical axis, a shaft substantially rigid with the bottom closure and extending through the sleeve and said top closure, a clamping nut threadingly engaging the upper end of the shaft and acting on the top closure to clamp the aforesaid mold parts together, said nut having a clutch formation thereon and a driving device movably positioned above the unit and including a driving part with a clutch formation adapted to engage the aforesaid clutch formation and turn the mold through the said clamping nut.
- In testimony whereof, I hereunto affix my signature.
- GUIDO VON WEBERN.

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