Oct. 4, 1932. C. E. FRANTZ 1,880,380

MOLD SEPARATING DEVICE

Filed Feb. 27, 1930 3 Sheets-Sheet 1

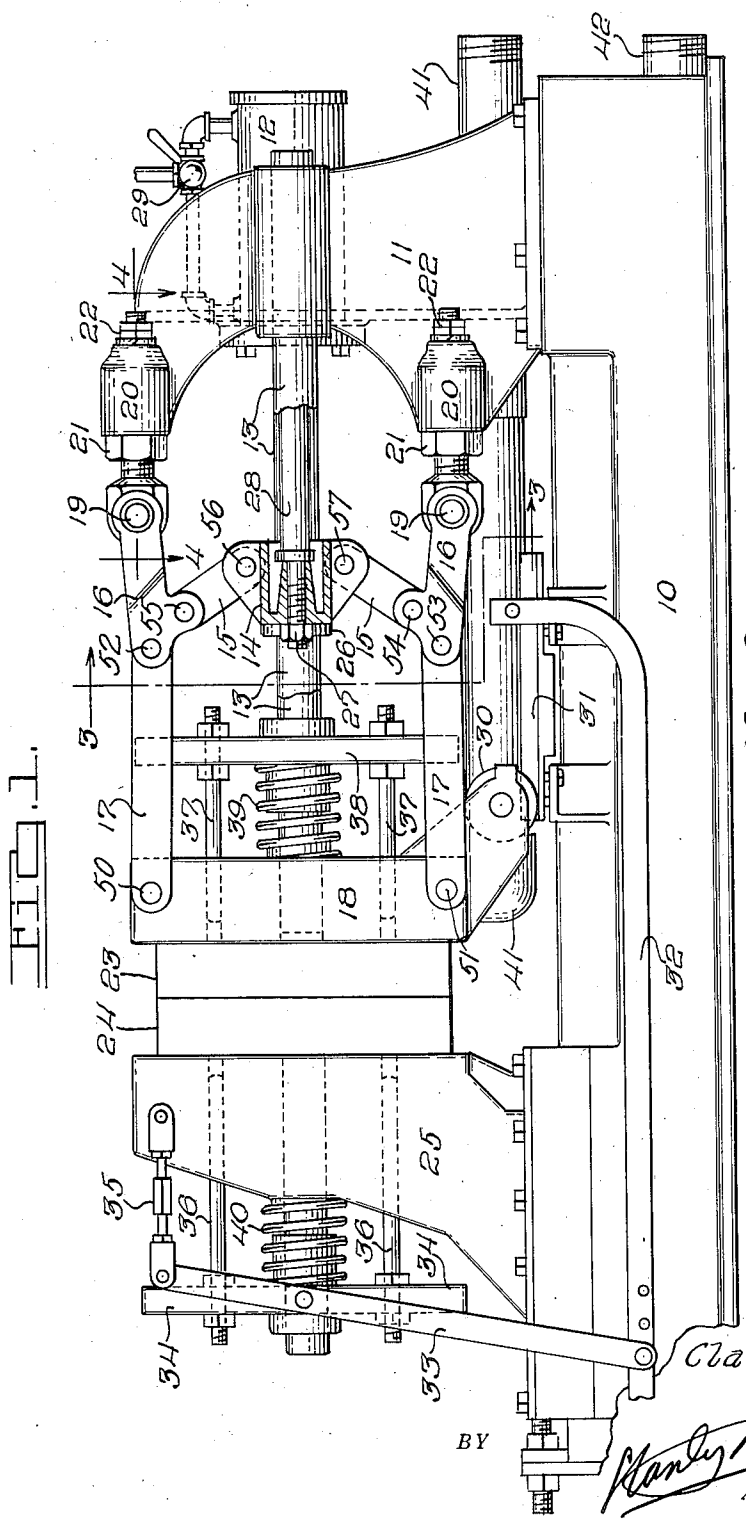


FIG. 1.

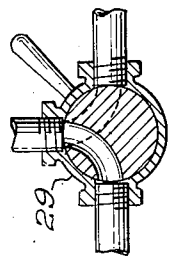


FIG. 7.

Clair E. Frantz
INVENTOR

BY Stanley M. Udale.
ATTORNEY

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MOLD SEPARATING DEVICE

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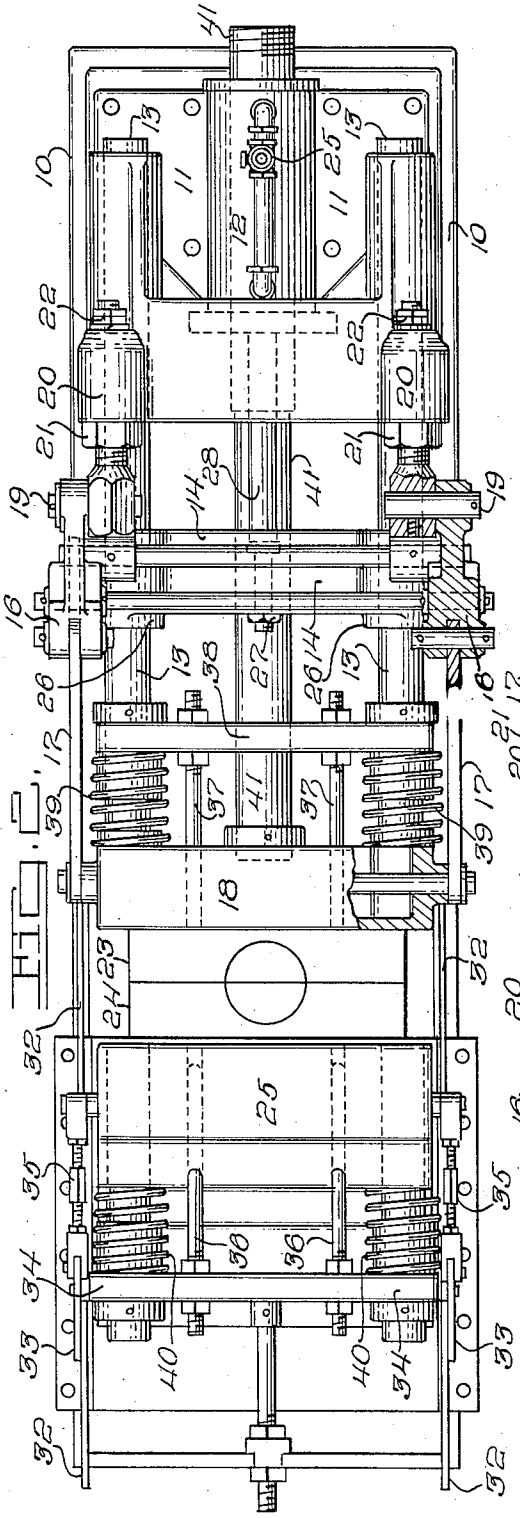


FIG. 3.

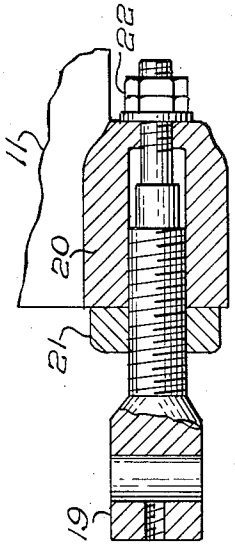


FIG. 4.

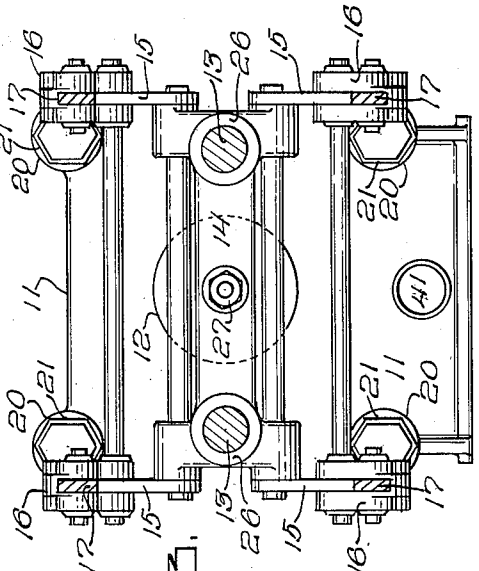


FIG. 5.

Clair E. Frantz
INVENTOR

BY Stanley M. Adale

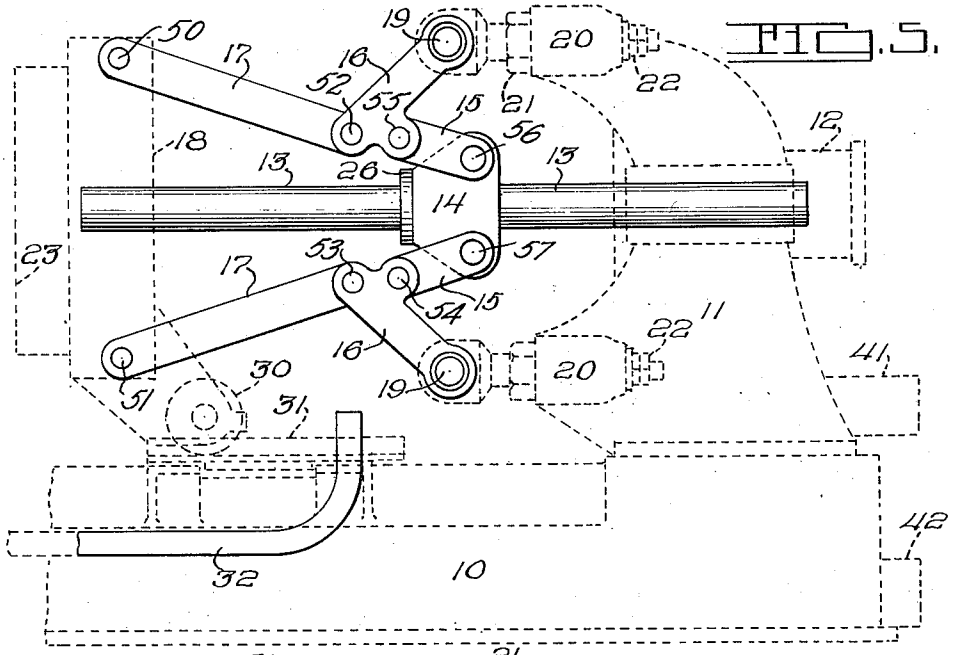
ATTORNEY

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MOLD SEPARATING DEVICE

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FIG. 5.



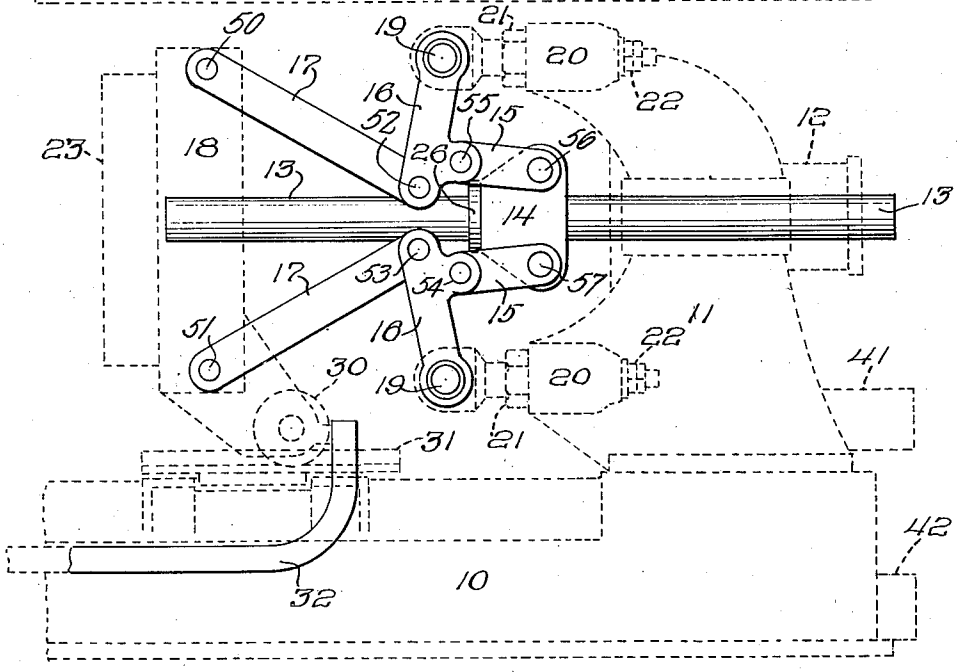


FIG. 6.

Clair E. Frantz
INVENTOR

BY

Stanley M. Udale
ATTORNEY

Patented Oct. 4, 1932

1,880,380

UNITED STATES PATENT OFFICE

CLAIR E. FRANTZ, OF DETROIT, MICHIGAN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO ERB-JOYCE FOUNDRY COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN

MOLD-SEPARATING DEVICE

Application filed February 27, 1930. Serial No. 431,723.

The object of this invention is

(*a*) To apply the maximum possible pressure between the molds.

(*b*) To give the molds the maximum possible opening.

(*c*) To operate the molds by means of an air piston which has the minimum stroke.

In the existing molding machines if the pressure is applied direct without magnification it is necessary to provide a very large piston, alternatively if the pressure is applied through a lever so that the pressure on the mold is many times the pressure on the piston then the stroke of the piston is abnormally long to compensate for the leverage of the mechanism. In this invention at the moments of closure the molds are held together by a pressure many times the pressure exerted for the piston. On the other hand when the molds are open they move at first slowly but later as they approach wide open position they move faster than the piston so that the opening of the molds corresponds approximately to the movement of the piston, whereas the pressure between the molds is many times the pressure on the piston due to the toggle action.

Figure 1 shows in outside elevation (with a small central portion in section) the molding machine with the molds in the closed position.

Figure 2 shows a plan view of Figure 1 with two small portions in section to show constructural details.

Figure 3 shows a sectional elevation on the plan 3—3 of Figure 1.

Figure 4 shows the detail of the anchorage of the toggle mechanism.

Figure 5 shows the outside elevation of the operating mechanism when the molds are half open.

Figure 6 corresponds to Figure 5, and shows the position of the mechanism when the molds are wide open.

Figure 7 shows a two way valve for controlling the air cylinder.

Operating mechanism

In the figures 10 is the base of the molding machine, 11 is the head carrying the air cylinder 12 and the two parallel guide rods 13—13 upon which slides the cross head 14 which is connected through the links 15 with the toggle joints 16—17, the forward end of the toggle joints 16—17 are connected through the pins 50, 51 to the mold support 18, the rear end is pivotally connected to the adjusting anchor 19—19 (see Fig. 4) these anchors 19 are screwed into the bosses 20 which bosses are integral with the head 11, the anchors are adjustably held in place by the lock nuts 21 and 22. The links 16—17 are connected together through the pins 52, 53 and the links 15 are connected to the cross head 14 through the pins 56, 57 and to the links 16 through the pins 54, 55.

23 and 24 show in broken lines the location of a pair of molds, 25 being the support for the mold 24, 23 being supported on 18.

A cross head 14 is supported on the guides 13 by the bosses 26 and is held by the lock nut 27 to the piston 28 (see the small section elevation in the center of Fig. 1). The cylinder 12 is connected to the piston rod 28 and is controlled by the 2 way valve 29 (Figure 7) which alternatively admits compressed air on opposite sides of this piston in a well known manner. The mold support 18 is carried by the wheels 30, which roll on guides 31 so as to relieve the weight on the guides 13—13.

Knockout mechanism

The mold support 18 is arranged to engage with the knockout mechanism 32 (see Figs. 5 and 6). Specifically 18 engages with the link 32 which is connected through the lever 33, which is hinged onto the knockout frame 34. The lever 33 is anchored to the mold support 25 by means of the link 35, which forms the fulcrum for the lever 33. Knockout pins 36—36 are provided and connected to frame 34. Corresponding knockouts 37—37 are provided for the mold 18, and these knockouts are mounted on the frame 38. A spring 39 keeps these knockouts in the out position until the molds are open when the springs 39 are compressed and the knockout pins become operative. Spring 40 is similar to the spring 39 and keeps the

knockout pins 36 in the operative position until such time as the mold support 18 engages with the knockout links 32, 33, 34, 35, so as to render the knockout pins 36 operative. Cooling air for the mold 23 is admitted to the mold 18 through the pipe 41. A similar pipe 42 admits cooling air through 35 thru the mold support 25 to the mold 24.

Operation

In the position shown in Fig. 1 air is being admitted to the left hand side of the piston in cylinder 12 thereby moving the piston rod 28 and the cross head 14 to the right; this places the joint 16—17 in the position to cause the toggle to collapse as shown in Fig. 1. When the valve 29 is reversed as shown in Fig. 7 in broken lines, the piston 12 moves on the left and the connecting rod 14 at first causes the mold 23 to move more rapidly than the piston 12 by reason of the linkage 16—17. When the mold reaches the position shown in Fig. 5 its velocity slows down so that it only moves as fast as the piston 28. Finally when it reaches the position shown in Figure 1 the velocity with which molds 23 and 24 approach each other becomes quite slow and therefore the pressure between 23 and 24 becomes quite great. The reason for this is that the link 15 is pinned to the arm 16 between 19 and the link 17, hence 17 is at first moved faster than 14. Later on the reverse is true due to the obliquity of link 17. It will also be noted that when the molds are in the closed position (Fig. 1) not only do the links 17—16 form a toggle but 15—15 also form a toggle. The double toggle thereby formed greatly magnifies the effort exerted by the air cylinder 12, and thus the molds 23—24 are held together with enormous pressure so that leakage is prevented and even a slight amount of distortion is overcome.

What I claim is:

1. A molding mechanism comprising a stationary mold, a frame supporting said mold, a moving mold, a source of power for operating said moving mold mounted on said frame, a toggle interposed between said source of power and said mold, a link anchored to the frame, two links connected thereto, one of said links being connected at the end of the first link and to said movable mold, the other link being connected to the said source of power and to the first link intermediate the ends thereof, said toggle being adapted when the molds are closed to magnify the pressure exerted by the source of power on said molds, said toggle in the wide open position being adapted to magnify the velocity of the source of power whereby the molds are separated the maximum distance possible.

2. A molding machine comprising a stationary mold, a moving mold, an air cylinder, a frame supporting said molds and cylinder, linkage connecting the moving mold with said air cylinder comprising a piston within said cylinder, a cross head connected with said piston and moved thereby, four links pivoted symmetrically to the moving mold, four similar links pivoted to the frame and to the first four links, a third set of four links pivoted to the second set intermediate their ends whereby a double toggle is formed when the molds are in the closed position, and the molds are opened faster than the cross head moves when in the open position.

In testimony whereof I affix my signature.

CLAIR E. FRANTZ.