March 27, 1956 W. STRAUSS 2,739,349

PRESS

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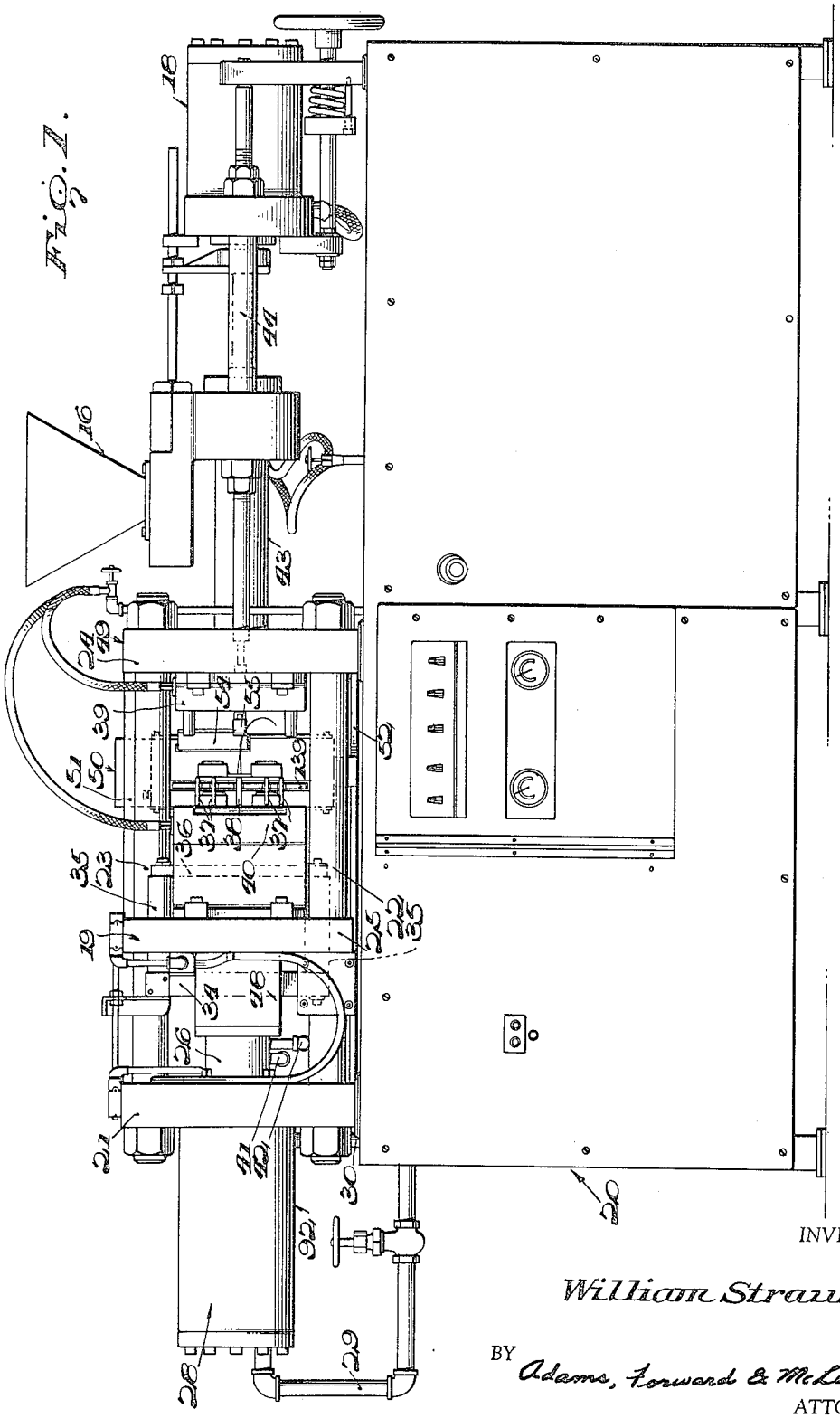
Fig. 1.



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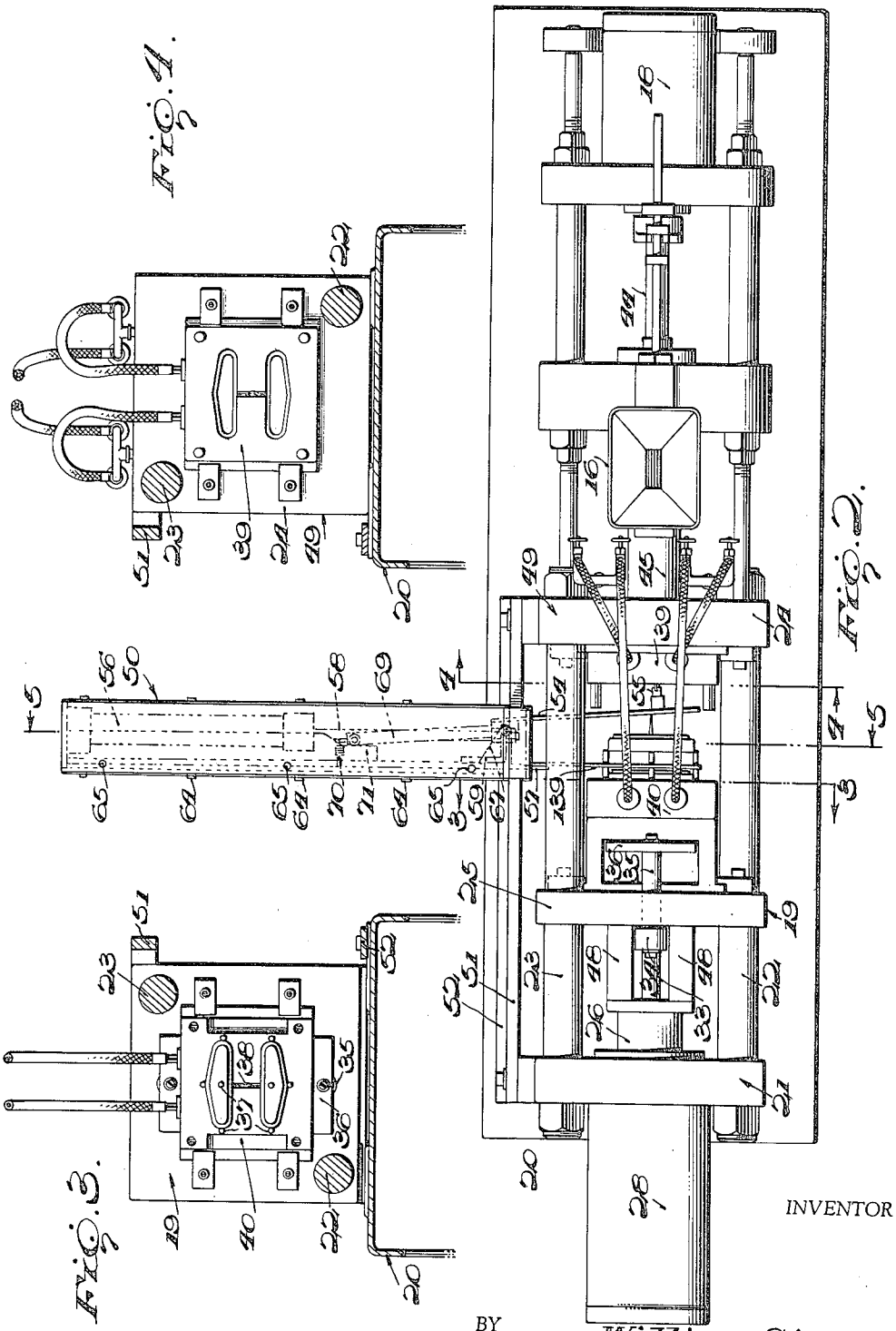

Fig. 1.

Fig. 2.

Fig. 3.

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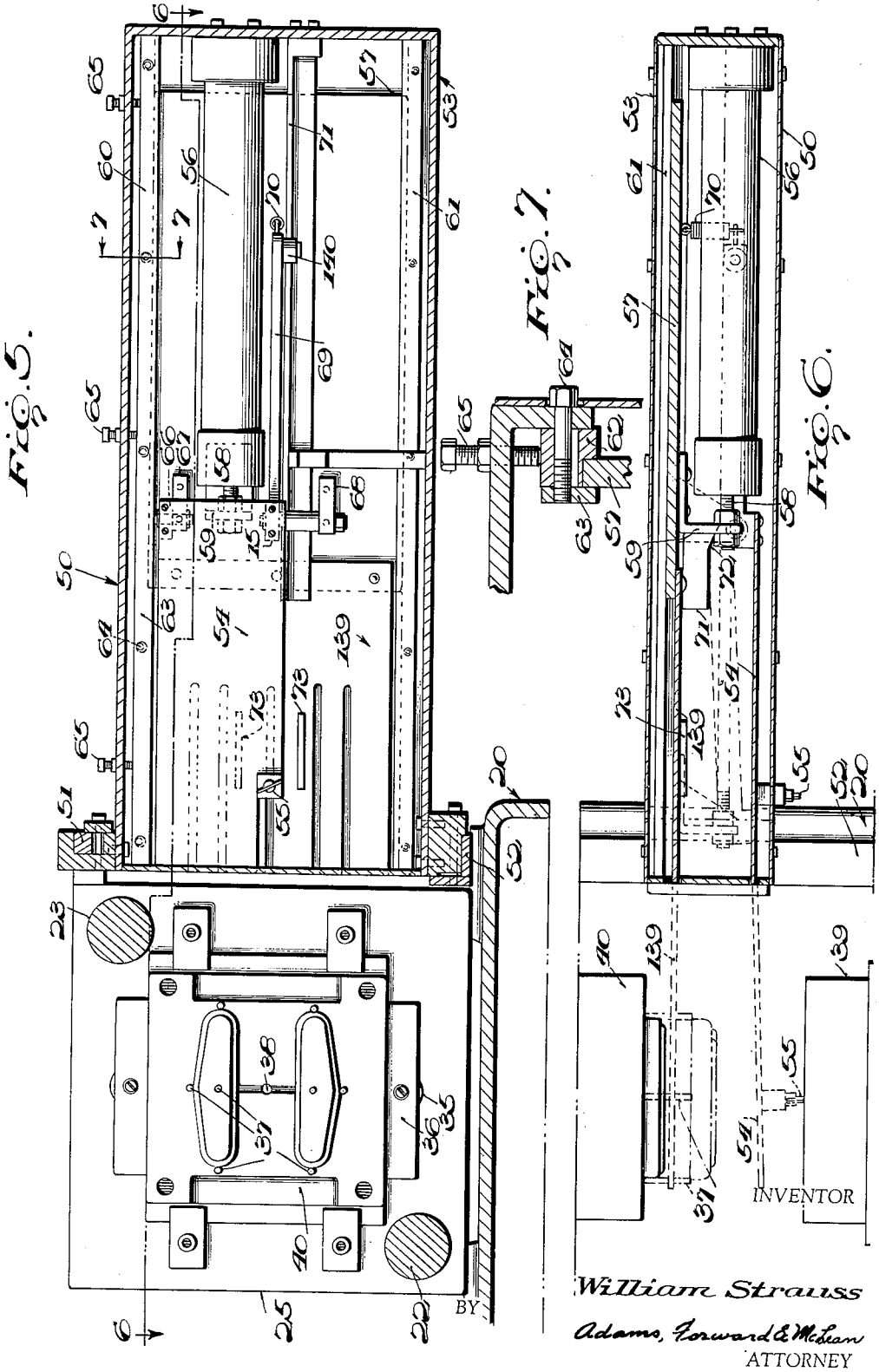

Fig. 5.

Fig. 7.

Fig. 6.

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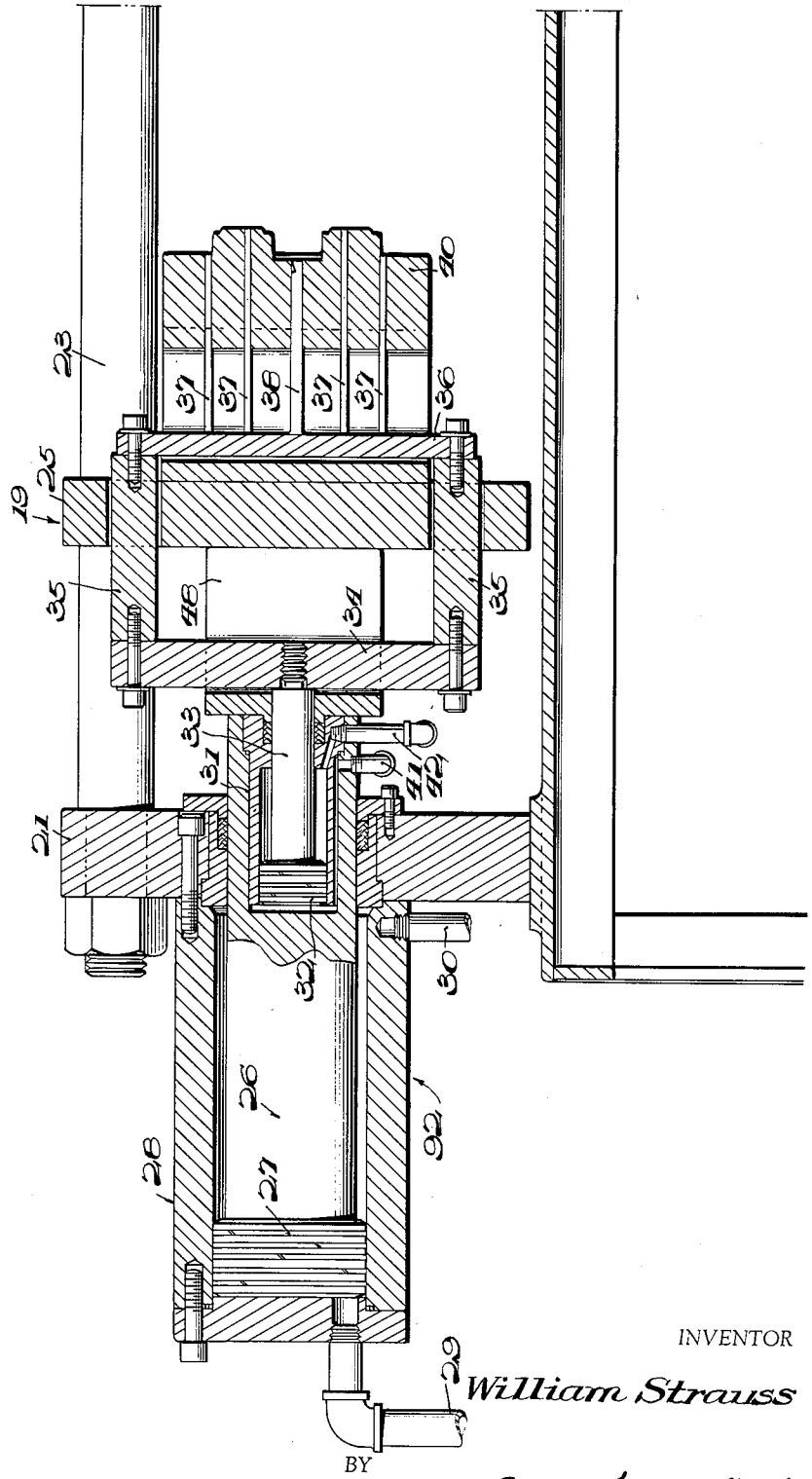

FIG. 8.

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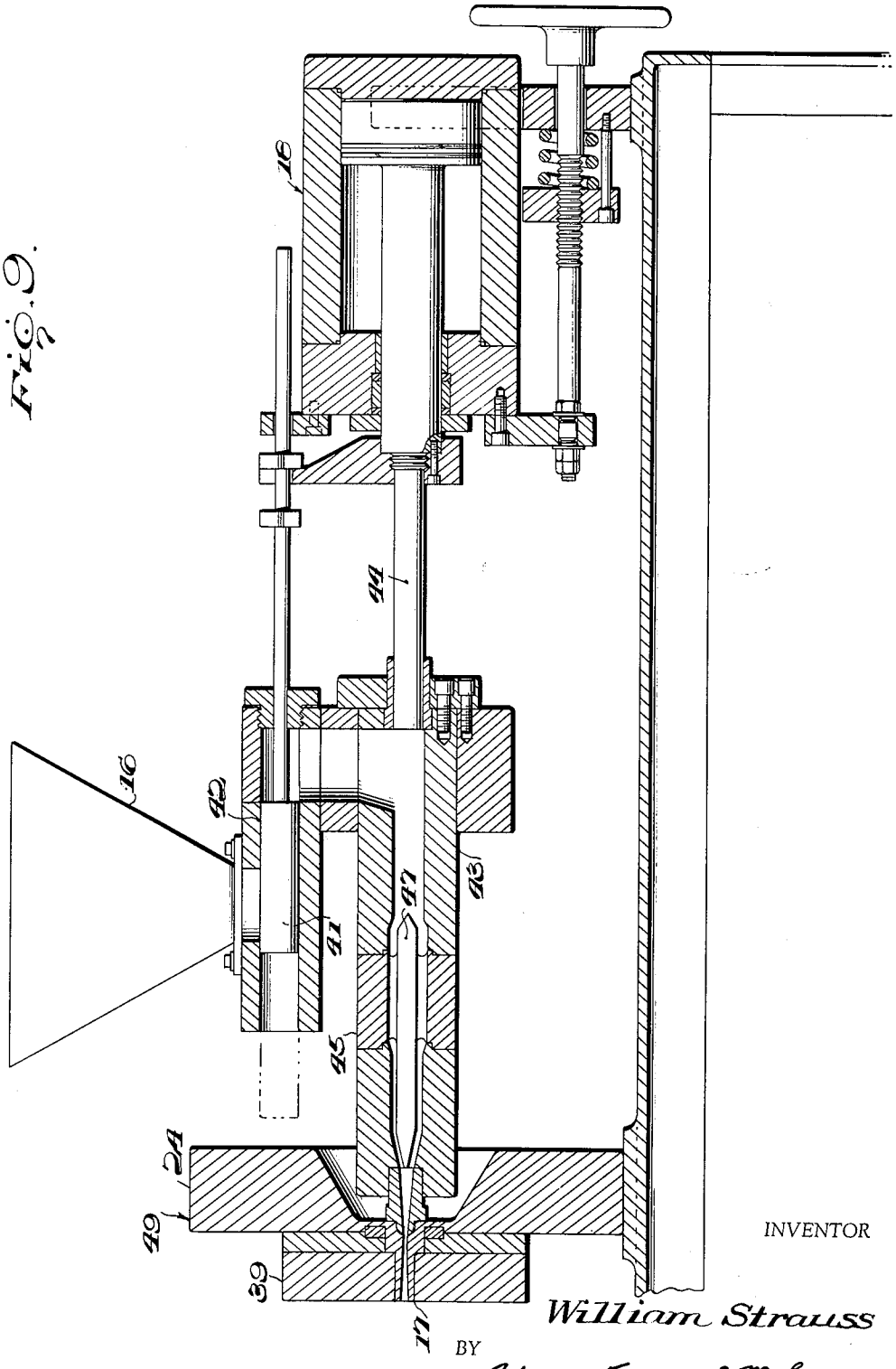
Fig. 9.



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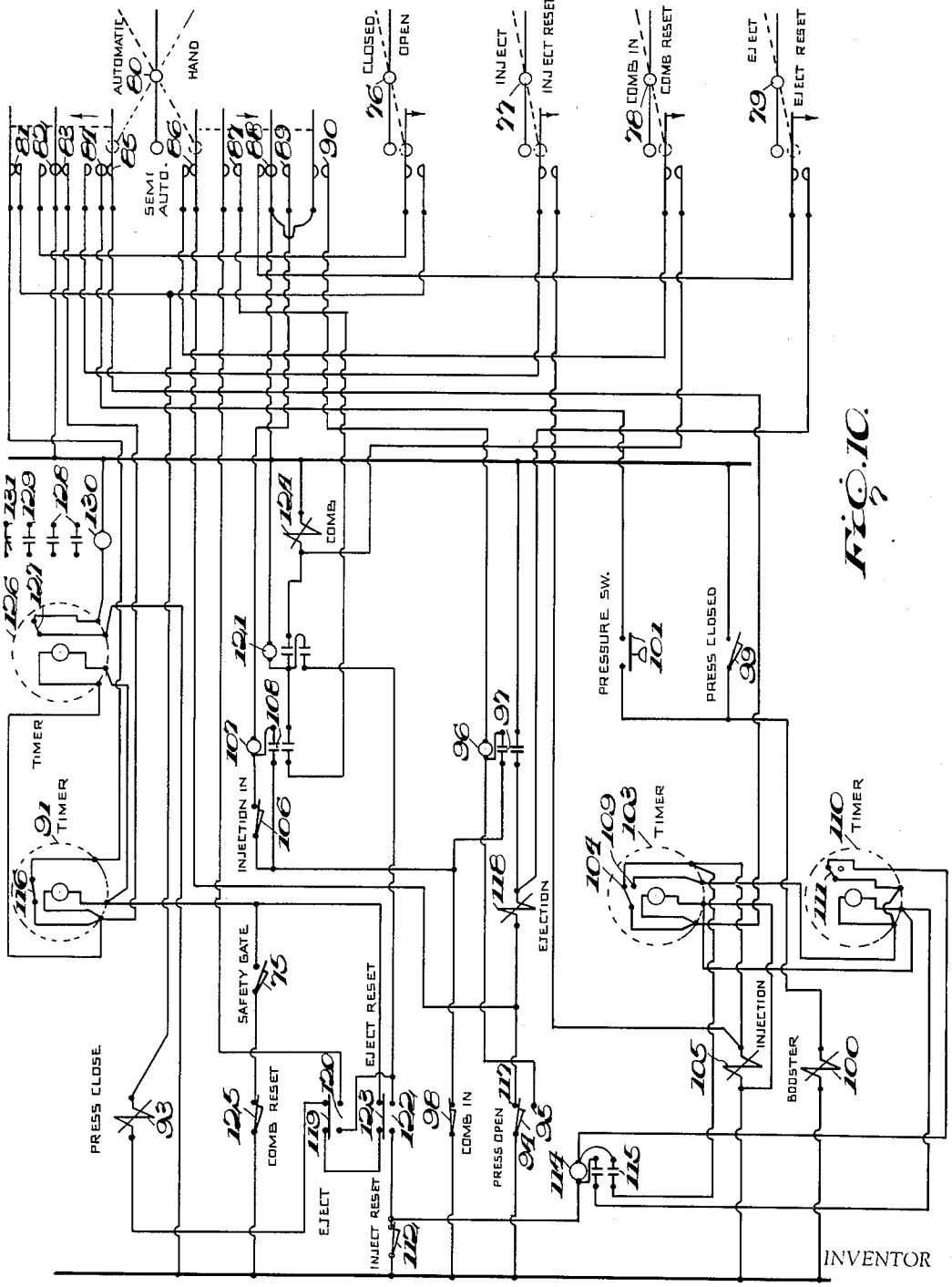

FIG. 10.

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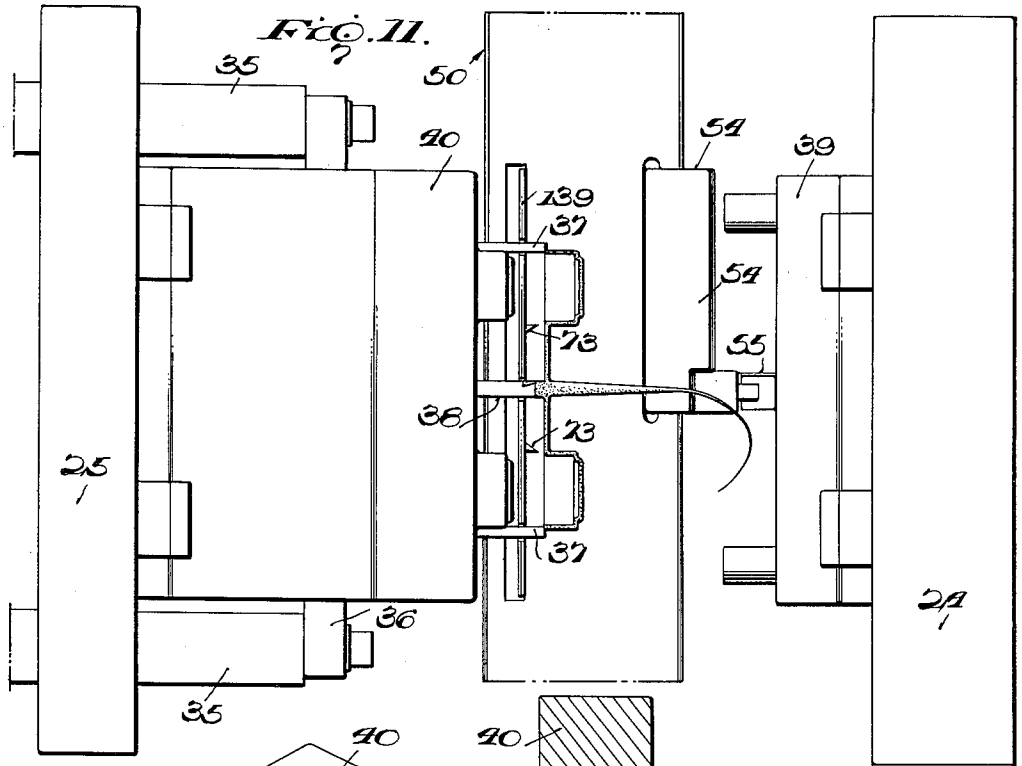
FIG. 11.



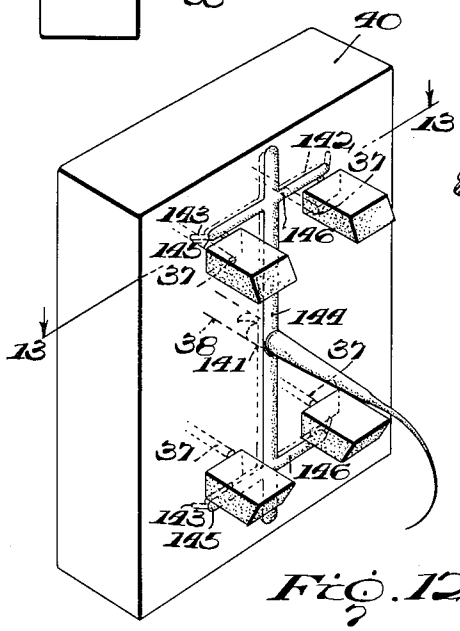


FIG. 12.

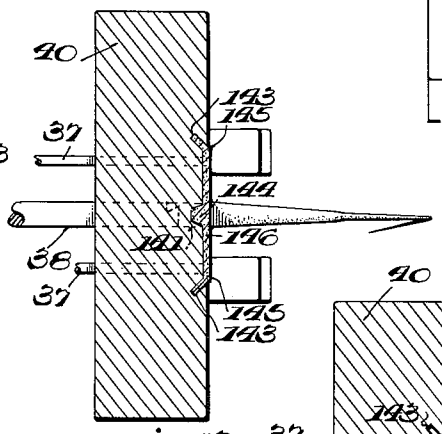


FIG. 13.

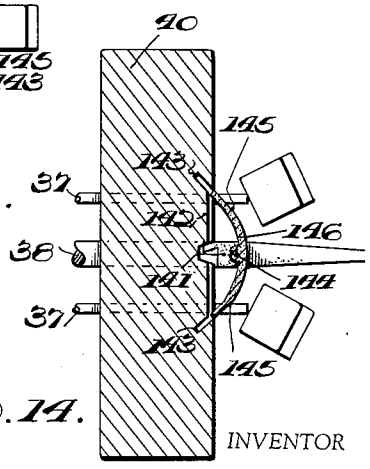


FIG. 14.

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United States Patent Office

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Patented Mar. 27, 1956

2,739,349

PRESS

William Strauss, Philadelphia, Pa., assignor to F. J. Stokes Machine Company, Philadelphia, Pa., a corporation of Pennsylvania

Application November 1, 1951, Serial No. 254,226

14 Claims. (Cl. 18—30)

My invention relates to a new machine for molding articles from plastic material in a manner which insures continuous and efficient operation. More particularly my invention relates to an injection molding press uniquely constructed to completely eliminate the usual shut-down periods caused by failure in the solid molding material removal operation, thereby enabling a large number of my machines to be operated by a single attendant.

In the past, considerable research and development work has been undertaken to produce a truly continuous injection molding press. One of the greatest obstacles has been the development of apparatus for positively and completely removing all of the solidified molding material from the dies. While meritorious advance has been made in this direction, it is significant to note that substantially equal activity has been directed toward the development of accurate checking devices for stopping the press upon failure of the previously developed solid material removal devices. It will be readily appreciated that these devices are quite complicated and involve a substantial initial investment, but the industry has found it necessary to accept this added cost to insure adequate protection of the dies which are, of course, quite expensive. In practice, it has been found that the continuous presses now in use require considerable attention due to stoppages caused by failure of the removal means, thereby limiting considerably the number of presses which may be operated by a single attendant. In summary therefore, it appears that developments in the continuous injection molding art have been compromising in nature and that a truly continuous horizontal injection molding press has not been developed to a degree acceptable to the industry.

My invention positively overcomes the past difficulties and facilitates the operation of considerably more presses by a single attendant through the provision of a press including a removal means capable of completely and positively removing the solid molding material from the dies and the space between the dies in a certain and reliable manner. Further, my press is capable of degating the desired molded pieces during the removal operation thereby eliminating the expensive separate degating operation which has plagued the injection molding industry. This degating operation is accomplished by my press without sacrifice of the high reliability of the removal operation.

I accomplish the removal operation through a removal means which includes an independently operated ejection means for disengaging the solid material from one of the dies, and a stripper mechanism which severs the sprue thread formed when the dies are parted, covers the face of the other die to prevent contact of removed solid material therewith, and completely disengages the solid material from the ejection means. The ejection means is mounted in the main power ram which reciprocates the movable die and has an independent hydraulic system whereby ejector pins and a sprue base holder may be moved outwardly from the die face to push the solid

material away from the die irrespective of the position of the movable die. After the ejection means has reached its fully extended position, the stripper mechanism moves in transversely of the longitudinal center line of the machine to cut the sprue thread extending from an orifice in the face of the fixed die by means of a sprue cutter. Certain molding materials are prone to produce a rather tenacious sprue thread which must be cleanly severed at the orifice in a reliable manner to positively insure its complete removal from the space between the molds. Therefore, I have provided a means for biasing the sprue cutter into slidable engagement with the die face and over the orifice whereby the proper amount of cutting pressure is applied to insure the clean severance of even the toughest sprue thread.

After the sprue thread has been cut, the stripper mechanism continues across the space between the dies to a fully extended position wherein a die protecting cover is positioned between the die face of the fixed die and the solid molding material, and a comb is positioned astraddle the ejector pins and the sprue base holder. Upon retraction of the ejection mechanism, the solid material is sprung free of the sprue base holder and falls through a trajectory path into an appropriate receptacle. The die protecting cover interrupts the trajection of any solid material traveling toward the fixed die face and thereby prevents contact of the solid material therewith.

Degating of the desired molded articles is accomplished in my invention by the provision of cutter blades mounted on the comb which are appropriately positioned to contact the joints between the desired molded articles and the gates just prior to the engagement of the solid molding material with the face of the comb. In this manner the joints are cut and the desired articles fall away from their gates before the remaining solid molding material, that is, the sprue and gates, contacts the comb for the stripping operation.

Degating during the initial extending movement of the ejection means may also be accomplished by my invention. The solid molding material is somewhat flexible immediately after the dies are parted, due to the warm condition thereof, and I have discovered that the gates may be flexed considerably at this stage without breakage. By the provision of restraining means at the gate portions, the initial extending movement of the ejector pins and the sprue base holder cause the desired molded articles and portions of the gates to be flexed away from the die face while other portions of the gates are restrained. Before releasing the restrainment of these gate portions, the joint between the gates and the desired articles reach their breaking point thereby allowing the desired articles to fall free. In practice, I have found this feature of my invention to work very well by the provision of outwardly angularly disposed gate restraining holes in the die face by which gate leg ends are restrained upon initial extension of the ejection means, the central portion of the gate being bowed outwardly until degating occurs after which the gate extensions spring free of the restraining holes to allow completion of the removal operation.

I have found that for some types of molding operations, it is not necessary to have a die protecting cover which covers the entire face of the fixed die. The reason for this is that only the solid material positioned at the upper part of the movable die follows a trajectory path toward the fixed die face. The lower solid material drops out of the space between the dies and presents no problem.

Other further and more specific objects of this invention will become apparent from a consideration of the following description when taken in conjunction with the accompanying drawings wherein:

Fig. 1 is a side elevational view of my improved molding machine;

Fig. 2 is a plan view of my machine;

Fig. 3 is a view taken on line 3—3 of Fig. 2 rotated to the upright position;

Fig. 4 is a view taken on line 4—4 of Fig. 2 rotated to the upright position;

Fig. 5 is a view taken on line 5—5 of Fig. 2 and rotated to the upright position;

Fig. 6 is a view taken on line 6—6 of Fig. 5;

Fig. 7 is a view taken on line 7—7 of Fig. 5;

Fig. 8 is an enlarged vertical longitudinal midsectional view of the left end of the machine as viewed in Fig. 1, showing the hydraulic power means and the movable mold member;

Fig. 9 is an enlarged vertical longitudinal midsectional view of the right end of the machine as viewed in Fig. 1, and showing the plastic heating and injection means;

Fig. 10 is a wiring diagram for my machine suitable for controlling manual, semi-automatic, or automatic operation;

Fig. 11 is an enlarged front elevation showing the stripper and cover mechanism fully extended and the ejector mechanism partially retracted;

Fig. 12 is a perspective view of a movable die member designed to degate the molded pieces immediately upon ejection of the solid molded material therefrom;

Fig. 13 is a sectional view taken on line 13—13 of Fig. 12; and

Fig. 14 is a view similar to Fig. 13 but showing the ejector mechanism in a partially extended position.

Referring now to Figs. 1–8, it will be seen that my machine has a base 20 on which is rigidly mounted an abutment 21 from which extends a lower tie rod 22 and an upper tie rod 23, the inner ends of these tie rods being anchored to a fixed platen 24 of a fixed press member 49, rigidly mounted on the base 20. A movable press member 19, having platen 25, is slidably mounted on the tie rods 22 and 23 and is rigidly fixed to the main power ram 26 through the horizontally spaced side arms 48. Cooperating dies 39 and 40 are part of the fixed and movable press members respectively, and are appropriately removably secured to the opposing faces of the fixed platen 24 and the movable platen 25, respectively. As seen more clearly in Fig. 8, the hydraulic power unit 92 includes the main power ram 26 which has a piston 27 at its outer end positioned in a main cylinder 28. By appropriate regulation of hydraulic pressure through supply conduits 29 and 30 the movable platen 25 is caused to move horizontally to and from a closed position with the fixed platen.

The inner end of the main power ram 26 has an opening therein which forms an ejector cylinder 31 for housing the ejector piston 32 of an ejector mechanism. This ejector mechanism provides for the ejection of molded parts from the movable die irrespective of the position of the main power ram through an ejector piston rod 33 rigidly connected to an ejector plate 34 which is in turn connected to bars 35 slidably positioned in the movable member. Rigidly affixed to these bars 35 is an ejector pin plate 36 on which are mounted a plurality of ejector pins 37 and a knotched sprue base holder 38, which pass through appropriate passages in the movable die 40. Suitable hydraulic lines 41 and 42 are provided for powering the ejector mechanism.

Housed within the base 20 is an appropriate hydraulic pump (not shown) for applying a predetermined relatively low pressure to the movable member 19 until it reaches a partially closed position at which time a hydraulic booster pump (not shown) applies a relatively high pressure to move the movable platen from the partially closed position to a fully closed position for injection of the molding material. By this arrangement the complete closing of the die members is avoided if material is present between the mating faces of the die members as will be more fully explained hereinafter.

The injection mechanism for feeding fluent molding material to the mold, shown enlarged in Fig. 9, is connected to the fixed platen 24 in fluid communication with the fixed die member 39 and has a hopper 16 from which material flows in measured quantities past a feed piston 41 into a feed cylinder 42. The material is then drawn back and dropped into heating cylinder 43 and fed inwardly by an injection plunger 44 into the mold. The injection plunger 44 is hydraulically operated through the injector hydraulic means 18. Suitable heating means (not shown), such as electrical or hot oil heating means, is preferably mounted around the heating chamber 45 to accomplish the heating necessary to fluidize the molding material, and a spreader 47 is positioned in the center of the plasticizing chamber to insure uniformity of heating. Enough material for several molding cycles is present in the heating cylinder 43 at any given time and the newly introduced material becomes increasingly plasticized as it approaches the injection nozzle 17 under the injection and stuffing action of the injection plunger 44.

A stripper mechanism 50 (Figs. 5–7) is mounted on an upper slide rail 51 and a lower slide rail 52 for adjustable movement along the longitudinal axis of the machine. The stripper mechanism 50 has a housing 53 which encloses a power means for moving a die protecting cover 54 into and out of the space between the die members when parted. The die protecting means 54 prevents ejected solid material from contacting and residing on the vertical mating face of the fixed die member 39 and thereby positively avoids all shutdowns arising from the solid material removal operation. A sprue cutter 55 is mounted on the die protecting cover 54 for movement into slidable engagement with the fixed die member 39 for cutting the sprue thread extending therefrom when the dies are parted. The power means, which also reciprocates a stripper comb 139 between the dies, has a hydraulically powered cylinder 56, mounted on the housing 53, which reciprocates a carriage 57 through the piston rod 58 and the angle connector 59, the carriage 57 being guided in its movements by an adjustable upper guide 60 and a lower track 61. As seen in Fig. 7, the upper guide 60 has a main bar 62 and a cover bar 63 which are joined by studs 64 to form a slot in which the upper edge of the carriage 57 is slidably retained. By means of the adjusting studs 65 and the enlarged holes in the main bar 62 through which studs 64 pass, the proper clearance may be set to insure smooth reciprocating movement of the carriage 57.

The die protecting cover 54 is pivotally mounted on the carriage 57 through an upper bearing block 66 and a lower bearing block 15 which are mounted on cooperating journal blocks 67 and 68, respectively, affixed to the carriage 57.

The lower bearing block 15 has a roller arm 69 which extends along the carriage 57 and is connected thereto at its end portion by a spring means 70. Under the action of the spring 70 the sprue cutter 55 is biased toward the sprue orifice in the fixed die 39. To control the movement of the sprue cutter 55 toward and away from the fixed die 39 by the spring means 70, a guide rail 71 is provided which restrains pivotal movement of the cover member 54 until the sprue cutter 55 is close to the sprue orifice, at which time the roller 140 contacts the angular cutaway portion 72 of the guide rail 71 thereby allowing the spring 70 to pivot the cover member and bring the sprue cutter into engagement with the face of the die member 39. As seen in Fig. 2, the sprue cutter 55 is yieldably urged into sliding engagement with the face of die member 39 by the spring 70, thereby eliminating the need of complicated adjusting devices for preventing damage to the die. It will be appreciated also that the angular cutaway portion 72 of the guide rail 71 eliminates all but the required amount of abrasive sliding contact of the sprue cutter with the fixed die.

Referring now to Fig. 11, it will be seen that the sprue

cutter 55 has just severed the sprue thread and that the cover member 54 is moving across the face of the fixed die 39 to interrupt the trajectory path of the solid molded material as it is removed by ejection and stripping. Upon return of the knotched sprue base holder 38 into the movable die 40, the complete molded structure of solid molding material is drawn toward the comb 139 which is equipped with cutter blades 73, the blades being arranged to contact and sever the joint between each of the molded parts and its gate before any part of the molded structure contacts the comb. In this manner, the desired molded article is cleanly and completely degated in an efficient and automatic manner.

A degating arrangement is shown in Figs. 12–14, which causes the desired molded articles to be ejected gate-free from the mold prior to the sprue cutting and stripping operation. The movable die has the usual sprue base hole 141 and gate passages 142 and is further equipped with angularly disposed gate restraining means or holes 143. Upon initial movement of the ejection means, the ejector pins 37 engage the desired molded articles and move them away from the movable die 40, and the knotched sprue base holder 38 similarly moves the sprue and the central portion 144 of the gate away from the movable die. The outer ends 145 of the gate arms 146 are releasably retained in the angularly disposed holes 143, thereby causing the gate arms 146 to bow as shown in Fig. 14. The bowing of the gate arms 146 under the action of the ejection means and the gate restraining means causes the breakage of the gate from the desired molded article at the joint therebetween. The removal of the remaining solid molding material may then be accomplished in the manner previously described.

Contacting, making and breaking devices may be arranged at various parts of my machine to operate relays for the control of suitable time-controlled valves so that the sequence of operation will follow in the proper order and with the proper timing. In Fig. 10 is shown the wiring diagram for my machine which permits operation either by hand, semi-automatically or completely automatically. It will be noted that a safety switch 75 is provided which must be closed by the operator before the press is placed in operation. This switch may be in the form of an appropriate safety gate of any suitable design. Fig. 10 shows the control switches in the positions assumed when the machine is completely shut down and the safety gate is open.

In hand operation, any single moving member of the press may be actuated by tripping its control switch. All circuits are safety interlocked, that is, a movable member cannot be actuated unless all other movable members are in their proper positions.

In semi-automatic operation, the electrical circuit is arranged to automatically produce the molded structure and open the press to allow operator control of the ejection mechanism and the stripper and cover mechanism 50.

In automatic operation, the press is sequence operated, that is, the completion of the stroke of one movable member will complete the circuit for actuating the member of the succeeding operation.

To facilitate an explanation of the wiring diagram and the operating sequence of my machine, it will be assumed that the safety switch 75 is closed, the press is set for hand operation, and it is desired to start an automatic cycle. To accomplish this, it is necessary that switch 76, which allows manual control of the movable platen, be in the open position. Also, switches 77, 78 and 79, which allow manual control of the injector mechanism, the stripper and cover mechanism, and the ejector mechanism respectively must be in the Reset or Open position.

To start the completely automatic operation of my press, switch 80 is moved to Automatic, thereby opening contacts 82, 84, 86 and 88 and closing contacts 81, 83, 85, 87, 89 and 90. The timer 91 is started when contacts 83 are closed for regulating the length of time the press remains closed for cooling the molded articles. Through contacts 81 the valve magnet 93 is energized to allow the movable platen 25 to be moved to a partially closed position by the hydraulic power unit 92.

As soon as the press starts closing, switch 94 is released to close contacts 95 and energize relay 96 which remains energized until and during part of the removal operation through holding contacts 97 and switch 98.

A safety feature is included in my machine which prevents destruction of the die members by a high pressure advance of the movable platen 25 toward the fixed platen 24 when any obstructions such as unejected parts are present between the die members. As previously explained, the movable platen is moved to a partially closed position by low hydraulic pressure. Upon reaching this position, switch 99 is closed to energize the booster valve magnet 100 which causes a hydraulic booster to produce a high pressure for completely closing the press and maintaining it in this position during the injection cycle and cooling period.

When the movable platen reaches the fully closed position, the high pressure closes pressure switch 101 which starts timer 103 through switch 85. Closing pressure switch 101 also completes a circuit through contact 104 in timer 103 to energize valve magnet 105 which causes the injection plunger 44 to be moved inwardly thereby forcing material into the mold cavity. At the time the injection plunger 44 advances inwardly, the feed piston 41 is carried inwardly a predetermined distance to allow raw material to flow into the feed cylinder 42 from whence on the return stroke, it is dropped into the heating cylinder 43. When the injection plunger has moved inwardly the required distance, switch 106 is tripped closed thereby energizing relay 107. The injection plunger will remain in this inward position for the time period of timer 103, at the end of which contact 104 will open de-energizing valve magnet 105 thereby returning the injection plunger to reset position. When the injection plunger returns to reset position releasing switch 106, the relay 107 is held closed through holding contacts 108 and switch 98.

The opening of contact 104 closes contact 109 to start timer 110 and complete the circuit through contacts 111 thereof. On reaching its reset position, the injection plunger also trips switch 112 to energize relay 114 thereby energizing the valve magnet 105 again through contacts 115 to cause the injection plunger to move inwardly again for the stuffing operation. As soon as the plunger 44 starts to advance, switch 112 is released to open position, the holding circuit for relay 114 being accomplished through switches 111 and 109.

When timer 110 times out, switch 111 will open de-energizing relay 114 and opening contact 115 thereby de-energizing valve magnet 105 to return the injection plunger to Reset position.

The press will then remain closed until timer 91 runs out to complete the cooling of the molded articles. At the end of this cooling time, switch 116 will open de-energizing valve magnet 93, thereby causing the movable platen to be moved outwardly to its open position. When the movable platen reaches full open position, switch 94 is tripped to engage contact 117 to energize valve magnet 118 which causes the ejector pins 37 and sprue base holder 38 to push the molded structure away from the movable die 40. When the ejector mechanism reaches its completely advanced or extended position, switch 119 is tripped to close contacts 120 and hold relay 121, which is made possible through contacts 122 of switch 123 which are closed when the ejector mechanism advances initially and through relay 107 which is being held closed at this time as explained above. With the ejector mechanism in the fully advanced position and switch 119 tripped, the circuit is completed to energize valve magnet 124 which causes the stripper mechanism to be ad-

vanced between the dies, the stripper comb 139 being astraddle the extended ejector pins and sprue base holder. As the cover 54 moves in, the sprue cutter 55 severs the sprue thread at the face of the fixed die 39 as previously explained.

After the sprue thread has been completely severed from the fixed die 39 and the die protecting cover 54 has moved across the fixed die to protect the face thereof, the ejector mechanism is withdrawn thereby pulling the molded structure into abutting engagement with the stripper comb 139. It will be understood that cover members may be of various sizes to cover the upper portion of the die or the whole die as required. This is accomplished upon the opening of switch 98 when the stripper mechanism reaches the fully extended position between the dies. When switch 98 is opened, the holding circuit of relay 96 is interrupted thereby de-energizing the valve magnet 118 which causes the ejector mechanism to be withdrawn to its reset position within the movable die 40. Also, upon opening switch 98, the holding circuit of relay 107 is interrupted.

Upon reaching its reset position, the ejector mechanism trips switch 123 away from contacts 122 to interrupt the holding circuit of relay 121 and de-energize valve magnet 124 to cause the stripper mechanism to return to reset position within housing 53. On reaching reset position, this mechanism trips switch 125 closed to complete the circuit to start timer 91 and begin a new cycle.

If an obstruction exists between the mold members, the movable member 19 will not reach the partially closed position to close switch 99, and therefore no high pressure will be applied to move the movable member to the fully closed position. The press will remain in the partially closed position until timer 91 times out at which time the press will open, the ejector mechanism will advance, and then all operation of the press will stop, because the normal electrical sequence has been interrupted.

If the injection plunger 44 does not advance inwardly the required distance, a short shot and a partially filled mold is the result. Switch 106 will not be tripped by the injection plunger 44 and the press will stop after opening and ejecting the pieces, because normal electrical sequence was interrupted.

To accomplish complete disconnection of my machine from all power sources upon automatic stoppage due to an interruption of the normal cycle, I have provided a delay timer 126 which starts timing at the same moment as timer 91, but which is set to run for a longer period of time so that it will not completely time out during normal operation. By this arrangement, switch 127 of delay timer 126 remains closed to maintain energization of relay 130 which completes the circuits to the heaters (not shown) of the molding material heating cylinder 43 and the main power source of the press through switches 128 and 129, respectively. If there be any interruption of the normal cycle, the press will stop after opening and removing the pieces. Delay timer 126 will then time out, opening switch 127 and de-energizing relay 130. Upon the de-energization of relay 130, switch 128 will be opened to prevent burning of the material in the heating cylinder and switch 129 will be opened to secure the main power source, thereby preventing accidental movement of any members during repair work. An alarm switch 131 may also be provided to signal the complete disconnection of my machine from all power sources.

It will be readily appreciated that the contact making and breaking devices shown in Fig. 10 are appropriately mounted on the press for actuation by their respective elements of the press when these elements reach their predetermined positions as described hereinbefore.

While I have described a preferred form and application of my invention, I do not wish to be limited or restricted to the specific details herein set forth, but wish to cover all changes and modifications which do not constitute departures from the spirit and scope of my invention.

I claim:

1. In an injection molding press, the combination of first and second relatively movable press members, each having a die, the die of the second press member having an orifice in its face through which fluent molding material is delivered, means positioned in said first die for withdrawing the resultant sprue from said orifice as the press members are parted thereby forming a sprue thread extending from said sprue into said orifice, and means for severing said sprue thread at said orifice including a movable cutter blade adapted for slidable contact with said face over said orifice.

2. In an injection molding press, the combination of first and second relatively movable press members, each having a die, the die of the second press member having an orifice in its face through which fluent molding material is delivered, and removal means for completely disengaging the solid molding material from the die of the first press member after the press members are parted, said removal means including means for severing the resultant sprue thread extending from said orifice.

3. In a horizontal injection molding press, the combination of first and second relatively movable press members, each having a die, the die of the second press member having an orifice through which fluent molding material is delivered, and removal means for completely disengaging the solid molding material from the die of the first press member after the press members are parted, said removal means including a vertical die protecting cover for covering the upper portion of the second die and means for moving said cover into the space between the press members to prevent contact of the removed solid molding material with the die of said second press member.

4. In a horizontal molding press, the combination of first and second relatively movable press members, each having a die, the die of said second press member having an orifice through which fluent molding material is delivered; and removal means including means for maintaining engagement of the solid molding material with the die of said first press member during separation of the press members, means for completely removing the solid molding material from said first press member, a vertical die protecting cover for covering the upper portion of the second die, and means for moving said cover into the space between the press members and adjacent the face of the die of said second press member to prevent contact of the removed solid molding material with said second press member.

5. In a molding press, the combination of first and second relatively movable press members, each having a die, the die of said second press member having an orifice in its face through which fluent molding material is delivered; and removal means including means for maintaining engagement of the solid molding material with the die of said first press member during separation of the press members, sprue cutter means, and means for moving said sprue cutter means across the face of the die of said second press member for severing the resultant sprue thread pulled by movement of the solid sprue from said orifice upon separation of the press members.

6. In a horizontal injection molding press, the combination of first and second relatively movable press members, each having a die, the die of said second press member having an orifice in the face thereof through which fluent molding material is delivered; and removal means for completely disengaging the solid molding material from the die of the first press member when the press members are parted including a power means, die protecting means operably connected to said power means for movement into the space between said press members when parted and alongside said second press member to prevent solid material from contacting the die face of said second press member upon removal by said removal

means, and sprue cutter means movable by said power means into sliding engagement with the die face of said second press member to cleanly sever the resultant sprue thread extending from said orifice.

7. In a horizontal injection molding press, the combination of first and second relatively movable press members each including a die; ejection means mounted in the first press member, the die of the second press member having an orifice in the face thereof through which fluent molding material is delivered; and a stripper mechanism positioned for access of the space between said press members when parted including power means, a comb mounted on said power means for movement into said space for stripping solid molding material from said ejection means upon relative movement therebetween, a die protecting cover operably connected to said power means for movement into said space to interrupt the trajection of ejected and stripped solid material and thereby prevent its contact with the die face of said second press member, a sprue cutter mounted on said die protecting cover and extending toward said die face, and means connected to said die protecting cover for biasing said sprue cutter into slidable engagement with said die face and over said orifice to cleanly sever the resultant sprue thread.

8. In a horizontal injection molding press, the combination of first and second relatively movable press members each including a die; ejection means mounted in the first press member for movement between an extended position and a reset position, the die of the second press member having an orifice in the face thereof through which fluent molding material is delivered; and a stripper mechanism positioned for access of the space between said press members when parted including power means, said power means having guide means mounted therein, a carriage slidably mounted in said guide means and means connected to said carriage for transversely reciprocating the carriage toward and away from said space, a comb mounted on said carriage for movement into said space for stripping solid molding material from said ejection means upon movement of said ejection means to said reset position, a die protecting cover pivotally mounted on said carriage and movable therewith into said space to interrupt the trajection of ejected and stripped solid material and thereby prevent its contact with and residence on the die face of said second press member, a sprue cutter mounted on said die protecting cover and extending toward said die face, and means connected to said die protecting cover for biasing said sprue cutter into slidable engagement with said die face and over said orifice to cleanly sever the resultant sprue thread.

9. In a horizontal injection molding press, the combination of first and second relatively movable press members each including a die; ejection means mounted in the first press member for movement between an extended position and a reset position, the die of the second press member having an orifice in the face thereof through which fluent molding material is delivered; and a stripper mechanism positioned for access of the space between said press members when parted including power means, a comb mounted on said power means for movement into said space for stripping solid molding material from said ejection means upon movement of said ejection means to said reset position, a cutter blade mounted on said comb for severing a desired molded article from its gate prior to engagement of the remaining solid molding material with said comb, and a die protecting cover operably connected to said power means for movement into said space to interrupt the trajection of ejected and stripped solid material and thereby prevent its contact with the die face of said second press member.

10. In a horizontal injection molding press, the combination of first and second relatively movable press members each including a die; ejection means mounted in the first press member for movement between an extended position and a reset position, the die of the second press member having an orifice in the face thereof through which fluent molding material is delivered; and a stripper mechanism positioned for access of the space between said press members when parted including power means, a comb mounted on said power means for movement into said space for stripping solid molding material from said ejection means upon movement of said ejection means to said reset position, a cutter blade mounted on said comb for severing a desired molded article from its gate prior to engagement of the remaining solid molding material with said comb, a die protecting cover operably connected to said power means for movement into said space to interrupt the trajection of ejected and stripped solid material and thereby prevent its contact with the die face of said second press member, a sprue cutter mounted on said die protecting cover and extending toward said die face, and means connected to said die protecting cover for biasing said sprue cutter into slidable engagement with said die face and over said orifice to cleanly sever the resultant sprue thread.

11. In a horizontal injection molding press, the combination of first and second relatively movable press members each including a die; ejection means mounted in the first press member for movement between an extended position and a reset position, the die of the second press member having an orifice in the face thereof through which fluent molding material is delivered; and a stripper mechanism positioned for access of the space between said press members when parted including power means, said power means having guide means mounted therein, a carriage slidably mounted in said guide means and means connected to said carriage for transversely reciprocating the carriage toward and away from said space, a comb mounted on said carriage for movement into said space for stripping solid molding material from said ejection means upon movement of said ejection means to said reset position, a cutter blade mounted on said comb for severing a desired molded article from its gate prior to engagement of the remaining solid molding material wih said comb, and a die protecting cover pivotally mounted on said carriage and movable therewith into said space to interrupt the trajection of ejected and stripped solid material and thereby prevent its contact with the die face of said second press member.

12. In a horizontal injection molding press, the combination of first and second relatively movable press members each including a die; ejection means mounted in the first press member for movement between an extended position and a reset position, the die of the second press member having an orifice in the face thereof through which fluent molding material is delivered; and a stripper mechanism positioned for access of the space between said press members when parted including power means, said power means having guide means mounted therein, a carriage slidably mounted in said guide means and means connected to said carriage for transversely reciprocating the carriage toward and away from said space, a comb mounted on said carriage for movement into said space for stripping solid molding material from said ejection means upon movement of said ejection means to said reset position, a cutter blade mounted on said comb for severing a desired molded article from its gate prior to engagement of the remaining solid molding material with said comb, a die protecting cover pivotally mounted on said carriage and movable therewith into said space to interrupt the trajection of ejected and stripped solid material and thereby prevent its contact with the die face of said second press member, a sprue cutter mounted on said die protecting cover and extending toward said die face, and means connected to said die protecting cover for biasing said sprue cutter into slidable engagement with said die face and over said orifice to cleanly sever the resultant sprue thread.

13. In an injection molding press, the combination of first and second relatively movable press members, the first press member including a first die, the second press member including a second die, a molding cavity defined

between said dies, a gate passage defined between said dies leading to said cavity, an orifice in the face of said second die through which fluent molding material is delivered to said gate passage, whereby said press forms an integral solid molded piece including a desired molded article in said cavity, a gate portion in said gate passage and a sprue in said orifice, a die protecting cover positioned for movement between said press members when parted, a sprue cutter mounted on said die protecting cover, means connected to said cover for moving said cover over the face of said second die to prevent removed solid molding material from contacting said second die and for moving said sprue cutter into slidable engagement with the face of said second die to cleanly sever the resultant sprue thread extending from said orifice, ejection means movably mounted in the first press member for pushing the molded article away from the face of the first die when the press members are parted, said first die having gate restraining means for delaying complete movement of the gate portion upon the initial pushing action of the ejection means whereby the joint between said gate portion and the desired molded article is broken.

14. In an injection molding press the combination of first and second relatively movable press members, the first press member including a first die, the second press member including a second die, a molding cavity defined between said dies, a gate passage defined between said dies leading to said cavity, an angularly disposed hole in the face of said first die leading to said gate passage, an orifice in said second die through which fluent molding material is delivered to said gate passage, whereby said

press forms an integral solid molded piece including a desired article in said cavity, a gate portion in said gate passage, a gate restraining portion in said angular hole and a sprue in said orifice; and ejection means mounted in said first press member comprising a sprue base holder for engaging said solid molded piece and an ejector pin for engaging and moving the desired molded article away from the face of the first die when the press members are parted, said sprue base holder and ejector pin being slidably mounted in said first die, said sprue base holder maintaining the solid molding material in position at the first die during separation of the press members, and means for moving the sprue base holder and the ejector pin beyond the face of the first die whereby the desired molded article is broken from its gate portion which is initially restrained from complete movement by residence of said gate restraining portion in said angularly disposed hole.

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