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2,748,434

MECHANISM FOR REPLACING DIES OF EJECTION MOULDING MACHINES

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2 Sheets-Sheet 1

Fig. 1.

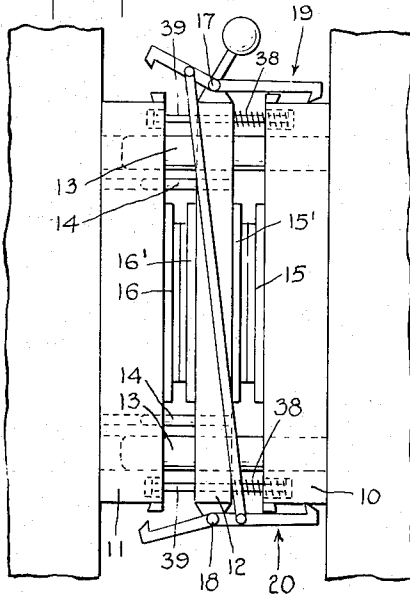


Fig. 2.

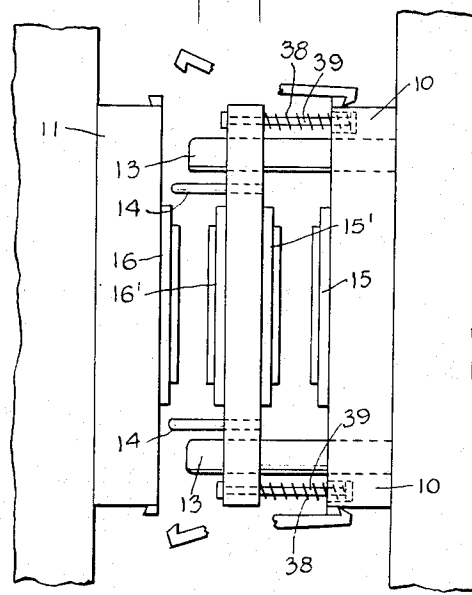


Fig. 3.

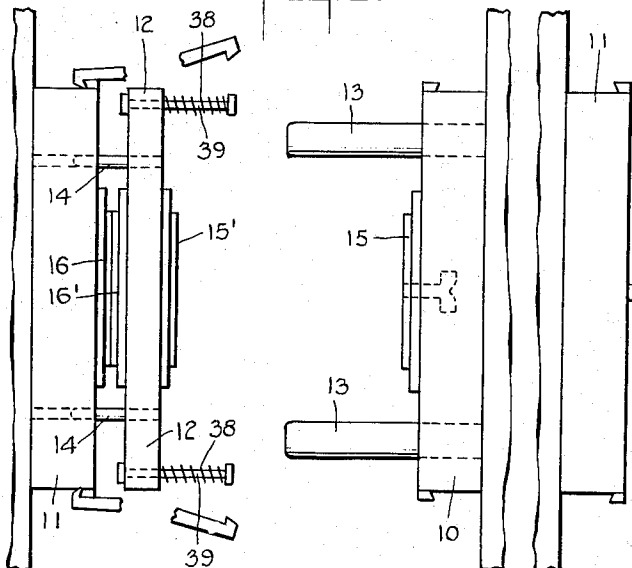
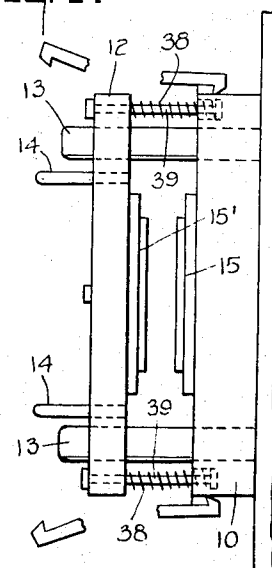


Fig. 4.



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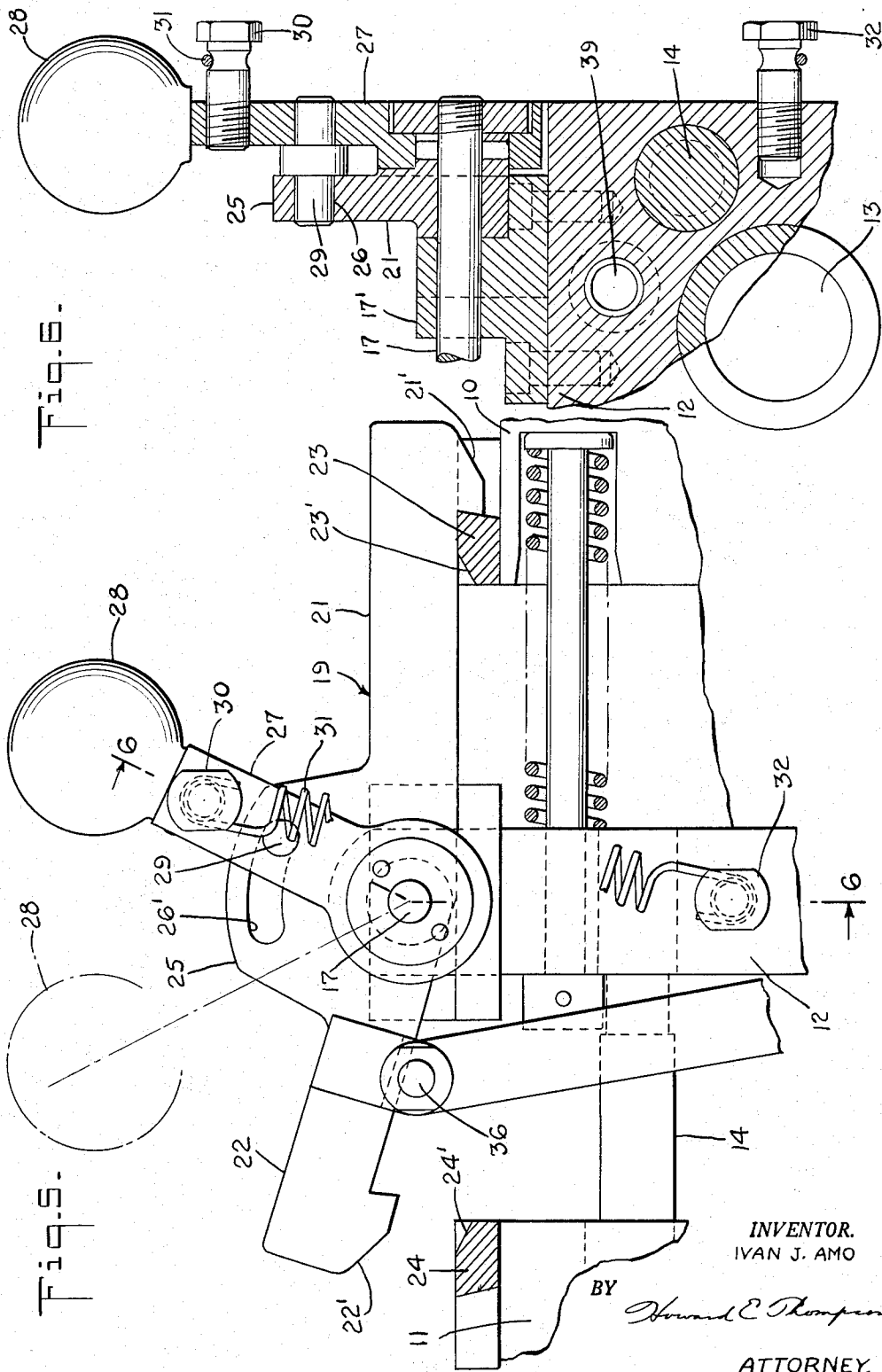
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MECHANISM FOR REPLACING DIES OF EJECTION MOULDING MACHINES

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6 Claims. (Cl. 22-149)

This invention relates to moulding machines of various kinds and classes employing two or more dies or plattens. More particularly, the invention deals with means for coupling and uncoupling die holders to facilitate quick coupling and uncoupling of dies or plattens in connection therewith.

Still more particularly, the invention deals with a mechanism of the character described, adaptable for use in conjunction with multiple die holders, whereby an intermediate floating die holder can be coupled and supported in connection with either of two other die holders in the operation of replacing dies or plattens thereon.

The novel features of the invention will be best understood from the following description, when taken together with the accompanying drawing, in which certain embodiments of the invention are disclosed and, in which, the separate parts are designated by suitable reference characters in each of the views and, in which:

Fig. 1 is a diagrammatic side view, generally indicating the assemblage, with the parts in coupled relationship or, in other words, in the position assumed by the parts in forming moulded products.

Fig. 2 is a view similar to Fig. 1, omitting parts of the construction and showing the three die holders in separated relationship in the ejection or removal of the moulded products.

Fig. 3 is a view similar to Fig. 2, showing the movable and floating die holders in coupled relationship to each other in removal of dies or plattens from one side of the floating die holder and the surface of the stationary die holder.

Fig. 4 is a view similar to Fig. 3, showing the floating die holder coupled with the stationary die and the removal of the dies or plattens from the movable die holder and the surface of the floating die holder.

Fig. 5 is an enlarged detail view of the upper portion of the structure, with the parts generally in the position indicated in Fig. 2 and indicating parts in a different position in dot-dash lines; and

Fig. 6 is a broken sectional view on the line 6-6 of Fig. 5 of one corner portion only of the structure.

In illustrating one adaptation and use of my invention, I have shown, in the several drawings, a mechanism suitable for simultaneously producing two disc records by injection of heated plastic material simultaneously into two cavities arranged between dies or plattens supported upon opposed surfaces of a floating die holder and adjacent surfaces of a stationary die holder and a movable die holder.

In the drawings, 10 diagrammatically illustrates the stationary die holder, 11 the movable die holder and 12 the floating die holder.

Die holders of this general type and kind are disclosed in detail in application Serial Number 249,179, filed October 1, 1951, now U. S. Patent No. 2,698,460. For this reason, the structure of the several die holders is not specifically disclosed, nor defined in the present applica-

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tion, as my invention deals with the means for coupling and supporting the die holders for the purpose of quickly and easily removing and replacing the dies or plattens. This is particularly desirable in producing products of the type and kind under consideration where, in a run of a machine, a predetermined number of records are produced and, then, other dies or plattens are placed in the machine for producing runs of other disc records. This can be accomplished by replacing either two of the dies or plattens or by replacing all four dies or plattens at any one changing operation.

The stationary die holder 10 has four large diameter guide posts arranged adjacent corner portions of the die holder and, in the present drawing, two of these posts, at one side of the dies, are indicated at 13. These posts are long enough to extend into the movable die holder 11 when the parts are in the pressure closed position, as shown in Fig. 1, in the operation of pressure injecting the plastic material into the die cavities in simultaneously forming two moulded records.

Supported upon the floating die holder are four smaller diameter supporting pins, two of which are seen at 14 in the drawing, these pins extending in the direction of the moving die holder and serve to support the floating die holder upon the moving die holder, when the parts are in the position as seen in Fig. 3 of the drawing, in other words, when the floating die holder and moving die holder are out of engagement with the main guide posts 13.

Supported upon the adjacent surfaces of the stationary die holder 10 and the floating die holder 12 are dies or plattens 15, 15', which, when brought together in the manner illustrated in Fig. 1 of the drawing, collectively form a cavity for the production of one complete moulded disc record. In like manner, supported upon adjacent surfaces of the moving die holder 11 and floating die holder 12 are other dies or plattens 16, 16', these latter dies or plattens collectively forming another cavity, in which one complete disc record will be formed. The two records are simultaneously formed in one injection operation of the machine, after which, the die holders are separated into the position shown in Fig. 2 of the drawing, and the records are simultaneously discharged from the machine, after which, the parts are returned to the position shown in Fig. 1 in the production of the next successive moulding operation. These operations intermittently continue through a production series and, as and when it is desirable to remove either or both pairs of dies or plattens, I have provided means, whereby the several die holders can be coupled and uncoupled, so as to facilitate this operation and this coupling and uncoupling is diagrammatically shown in Figs. 3 and 4 of the drawing.

Suitably supported on upper and lower surfaces of the floating die holder are two elongated shafts 17 and 18, one of the supports or bearings for the shaft 17 being illustrated at 17' in Fig. 6 of the drawing.

Mounted on these shafts are latch elements 19 and 20. The element 19 has angularly disposed latches 21 and 22 adapted to engage lugs 23 and 24 on upper surfaces of the stationary die holder 10 and movable die holder 11. The element 19, between the two latches, has a raised plate 25 with an arc-shaped groove 26 therein. Rotatably mounted on the shaft 17 is a latch operating lever 27 having, at its outer end, a knob or handgrip portion 28. The lever 27 has a pin 29 operating in the elongated aperture 26 in throwing the latches 21 or 22 into operative position.

Coupled with the lever is an outwardly projecting headed pin 30, with which one end of a coil spring 31 is coupled. Another similar pin 32 is fixed centrally with respect to the side surfaces of the floating die holder

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12 and supports the other end of the spring 31. The pin 32 is arranged directly below the shaft 17, so that the spring 31 will yieldably urge either latch 21 or 22 into operative position.

It will be noted from a consideration of Fig. 5 that the outer end of each latch 21 and 22 have bevelled surfaces 21', 22' to facilitate riding over correspondingly bevelled surfaces 23' and 24' on the lugs 23 and 24 in automatic movement of the latches into coupling engagement with the die holders. In other words, with the parts in the position shown in Figs. 1, 2 and 4 of the drawing, the floating die holder can be automatically coupled with the stationary die holder, should the latch elements 19 and 20 be in the position shown in said figures, rather than in the position shown in Fig. 3 of the drawing.

It will be noted from a consideration of Fig. 1 of the drawing that the latch 21 is free to ride over the upper surface of the stationary die holder 10 in movement of the dies into the closed position shown in said figure.

It will, of course, be apparent that the same automatic coupling is provided between the floating die holder and the movable die holder when the latch elements are in the position shown in Fig. 3 of the drawing.

The latch element 20 has two latches 33 and 34, which are generally similar to the latch elements 21 and 22, with the exception that the element 20 does not include the plate 25 and other parts operating in conjunction therewith. The two elements 19 and 20 are coupled together by a connecting rod 35, which is disposed at one side of the die holders, the rod being pivotally coupled with the latch 22 of the element 19, as seen at 36, and with the latch 33 of the element 20, as seen at 37, so that, when the latch 21 is thrown into operative position, the latch 33 will simultaneously be brought into the same position and, when the latch 22 is moved into operative position, as indicated in dot-dash lines in Fig. 5, the latch 34 will be moved into operative position.

Two other latch elements, which would be generally similar to the element 20, are arranged upon the other end portions of the shafts 17 and 18, so that the coupling engagement is maintained at both sides of the die holders. However, as it would simply be a matter of duplication of parts, the latch elements, at the other sides of the dies, are not shown, as it would be quite apparent that, with common elements fixed to the shafts 17 and 18, they would function precisely the same as the elements here shown. In this connection, it will also be apparent that only one connecting rod 35 is essential.

In order to aid in separation of the dies or platens 15, 15' and the stationary die holder 10 and floating die holder 12, four coil springs 38 are employed on rods 39 at the corner portions of the die holders, the springs 38 bearing against the surface of the floating die holder 12 and are compressed, as the floating die holder is moved in the direction of the stationary die holder 10. It will be understood that the moving die holder is positively actuated and, thus, freed from the floating die holder. However, the moving die holder is actuated under pressure to move all of the dies or platens into firm engagement with each other, as shown in Fig. 1 of the drawing, in the the operation of pressure injecting the moulding material into the cavities of the dies.

From the foregoing description, it will be apparent that, when it is desired to remove or replace the dies or platens 15, 15', the latch elements are actuated to couple the latches 22, 34 with the movable die holder 11 in the manner illustrated in Fig. 3 of the drawing, after which, the movable die holder and the floating die holder then coupled therewith are moved into wide spaced relationship with respect to the stationary die holder, as diagrammatically seen in Fig. 3 of the drawing, to give free access to the dies or platens 15, 15' in the replacement thereof.

To replace the dies or platens 16, 16', the latches 21

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and 33 are coupled with the stationary die holder 10 and the movable die holder 11 is moved away from the other coupled die holders, thus giving access for free removal and replacement of the dies or platens 16, 16', as diagrammatically seen in Fig. 4 of the drawing.

It will be apparent that, by the latch mechanism herein disclosed, considerable time is saved in moulding machines of the kind under consideration to avoid the necessity of completely tearing down the machine in order to replace dies or platens. This is particularly important in the production of cast or moulded products that are produced in relatively short runs, necessitating periodic changing of dies or platens. Again, my method of latching is particularly advantageous in machines of the kind under consideration employing what may be termed multiple die holders or at least in which a floating die holder is disposed between a movable die holder and a stationary die holder, as illustrated in the accompanying drawing.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In moulding machines employing fixed, movable and floating die holders with cooperating dies on adjacent surfaces of the stationary and floating die holder and movable and floating die holder, forming two independent cavities for simultaneously producing two moulded products in the operation of the machine, means for supporting and coupling the floating die holder with each of the fixed and movable die holders to give access to dies supported thereon for replacement of said dies, said means comprising guide posts on the stationary die holder operatively engaging the moving and floating die holders with the stationary die holder, supporting pins mounted on the floating die holder and operatively engaging the moving die holder in support of the floating die holder with the moving die holder when said die holders are coupled together, and said coupling means comprising latch elements pivotally supported upon upper and lower edges of the floating die holder and operatively engaging said fixed and movable die holders.

2. In moulding machines employing fixed, movable and floating die holders with cooperating dies on adjacent surfaces of the stationary and floating die holder and movable and floating die holder, forming two independent cavities for simultaneously producing two moulded products in the operation of the machine, means for supporting and coupling the floating die holder with each of the fixed and movable die holders to give access to dies supported thereon for replacement of said dies, said means comprising guide posts on the stationary die holder operatively engaging the moving and floating die holders with the stationary die holder, supporting pins mounted on the floating die holder and operatively engaging the moving die holder in support of the floating die holder with the moving die holder when said die holders are coupled together, said coupling means comprising latch elements pivotally supported upon upper and lower edges of the floating die holder and operatively engaging said fixed and movable die holders, each of said latch elements comprising angularly disposed latches operatively engaging lugs on the fixed and movable die holders, a connecting rod coupling upper and lower latch elements, and an operating lever for simultaneously moving all of the latch elements into operative positions.

3. In moulding machines employing fixed, movable and floating die holders with cooperating dies on adjacent surfaces of the stationary and floating die holder and movable and floating die holder, forming two independent cavities for simultaneously producing two moulded products in the operation of the machine, means for supporting and coupling the floating die holder with each of the fixed and movable die holders to give access to dies supported thereon for replacement of said dies, said means comprising guide posts on the stationary die holder operatively engaging the moving and floating die holders with the stationary die holder, supporting pins mounted on

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the floating die holder and operatively engaging the moving die holder in support of the floating die holder with the moving die holder when said die holders are coupled together, said coupling means comprising latch elements pivotally supported upon upper and lower edges of the floating die holder and operatively engaging said fixed and movable die holders, each of said latch elements comprising angularly disposed latches operatively engaging lugs on the fixed and movable die holders, a connecting rod coupling upper and lower latch elements, an operating lever for simultaneously moving all of the latch elements into operative positions, and means coupled with said lever for yieldably maintaining the latch elements in operative engagement with respective die holders in different positions of said elements.

4. In moulding machines employing a plurality of relatively movable die holders supporting a plurality of dies in simultaneously forming a plurality of moulded products in each operation of the machine, means for alining the die holders with respect to each other in injection of moulding material into the dies supported by said holders, means independent of said alining means for supporting two of the die holders with respect to each other, when said die holders are spaced with respect to another die holder, means for coupling adjacent die holders with each other in wide spreading of adjacent surfaces of adjacent die holders to give access to the dies supported thereon in removal or replacement thereof, said last named means comprising latch elements supported upon upper and lower surfaces of one intermediate die holder, operatively engaging die holders on opposed surfaces of said intermediate die holder, and tensional means for maintaining the latch elements coupled with engaged die holders.

5. In moulding machines employing a floating die holder movable between a stationary and a movable die holder, the floating die holder supporting parts of two different dies, means for coupling the floating die holder

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with either of said other die holders in wide spreading of said stationary and moving die holders with respect to the floating die holder in acquiring access to the dies of said holders for replacement, means comprising guide posts on the stationary die holder for supporting the floating die holder in connection with the stationary die holder, when coupled together, and means comprising supporting pins on the floating die holder operatively engaging the moving die holder in support of the floating die holder, when coupled with said moving die holder.

6. In moulding machines employing a floating die holder movable between a stationary and a movable die holder, the floating die holder supporting parts of two different dies, means for coupling the floating die holder with either of said other die holders in wide spreading of said stationary and moving die holders with respect to the floating die holder in acquiring access to the dies of said holders for replacement, means comprising guide posts on the stationary die holder for supporting the floating die holder in connection with the stationary die holder, when coupled together, means comprising supporting pins on the floating die holder operatively engaging the moving die holder in support of the floating die holder, when coupled with said moving die holder, and said coupling means comprising latch elements supported on and movable with said floating die holder and having angularly disposed latches operatively engaging lugs on said stationary and moving die holders.

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