Dec. 19, 1922.

1,439,607.

F. COATES.

AUTOMATIC DIE PRESS.

FILED APR. 27, 1921.

2 SHEETS—SHEET 1.

Fig. 1.

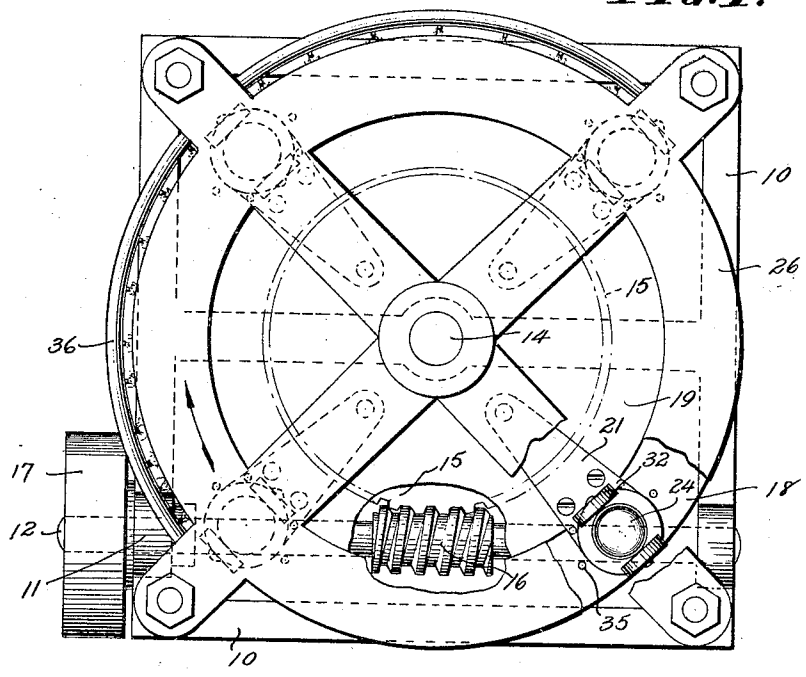
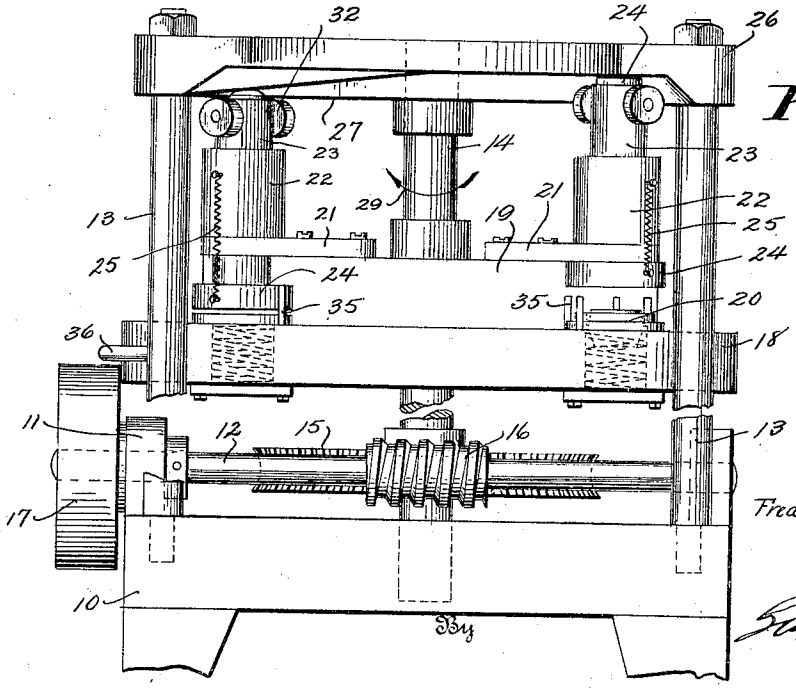


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

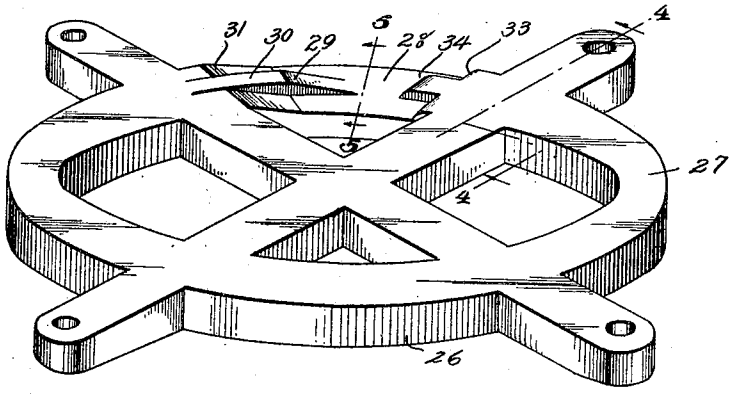


Fig. 4.

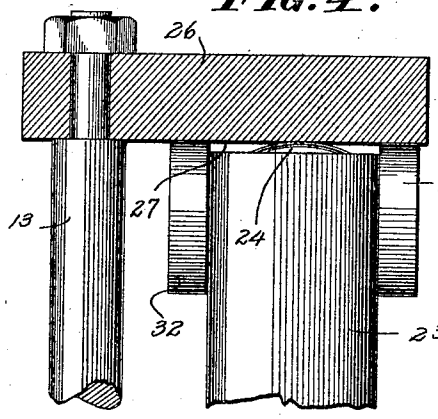
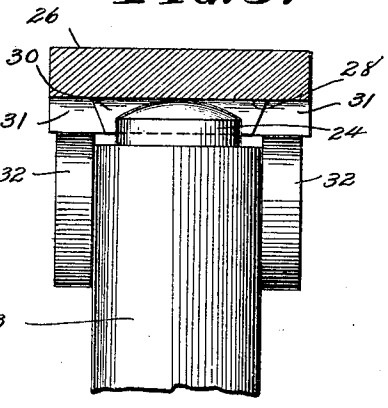


Fig. 5.



Inventor

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Patented Dec. 19, 1922. 1,439,607

UNITED STATES PATENT OFFICE.

FREDERICK COATES, OF CINCINNATI, OHIO, ASSIGNOR TO FEDERAL PRODUCTS COMPANY, OF CINCINNATI, OHIO, A CORPORATION OF OHIO.

AUTOMATIC DIE PRESS.

Application filed April 27, 1921. Serial No. 464,837.

To all whom it may concern:

Be it known that FREDERICK COATES, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, has invented certain new and useful Improvements in Automatic Die Presses, of which the following is a specification.

This invention relates to the manufacture of paper cartons or cans and has special reference to a die-press for forming the end closures of such cartons or cans.

One important object of the invention is to provide an improved device wherein blanks may be placed successively and which will properly form said blanks automatically.

A second important object of the invention is to provide an improved form of such device wherein the blanks for the end closures may be placed in a plastic or wet state and, while under the action of the dies, dry in good shape.

A third important object of the invention is to provide an improved means for successively operating a series of forming dies.

With the above and other objects in view, the invention consists in general of certain novel details of construction and combinations of parts hereinafter fully described, illustrated in the accompanying drawings, and specifically claimed.

In the accompanying drawings, like characters of reference indicate like parts in the several views, and:—

Figure 1 is a plan view of the invention, certain of the parts being broken away to better disclose the construction.

Figure 2 is a side elevation similar to Figure 1.

Figure 3 is an inverted perspective view of a certain cam ring used herewith.

Figure 4 is a section on the line 4—4 of Figure 3.

Figure 5 is a section on the line 5—5 of Figure 3.

In carrying out this invention there is provided a base 10 whereon is mounted spaced bearings 11 in which a shaft 12 is journalled. Extending upwardly from the corners of the base 10 are posts 13 and centrally disposed of the base is a vertical shaft 14 carrying a worm wheel 15 which meshes with a worm 16 fixed on the shaft 12. The shaft 12 is provided with a pulley 17 or some other suitable driving means. Fixed on the shaft 12 is a revolving head or die carrier 18 having a reduced upper portion 19. On the lower portion of the carrier 18 are located a series of female dies 20 while brackets 21 fixed to the reduced portion 19 of the carrier, support sleeves 22 wherein slide tubular die supports 23 in each of which also slides a plunger 24, the die supports and plungers being arranged concentrically. The construction of the dies used herewith is fully and particularly described in my copending application, filed the 27th day of April and bearing the Serial Number 464,836. The outer or annular male die of that application is shown in the present case at 24 and the spring of the application which normally holds the dies raised is shown at 25 in this application.

Supported on the upper ends of the posts 13 is a cam ring 26 which is of the same thickness throughout about one-fourth of its length so as to provide a cam surface 27 for depressing the respective die carrier and plunger 23 and 24. The remaining quarter of this die ring has a central portion 28 reduced in thickness to permit carriers and plungers 23 and 24 to rise. It will be seen that the dies travel in the direction of the arrow 29 in Figure 2 and that between surface 28 and the surface 27 there is provided a centrally disposed inclined cam surface 29 terminating in a flat cam surface 30 in the same plane as the surface 27 and there is also disposed a pair of lateral inclined cam surfaces 31, the parts being so arranged that the plunger 24 of each die will engage the cam surface 29 and move up said cam surface after which rollers 32 mounted on the die carrying a cylinder 23 will engage the surface 31. Thus as the carrier or head 18 rotates it causes the male die to revolve about the axis of the shaft 14 and, as each die reaches the inclined surfaces 29 and 31 the central plunger will first be depressed and carrying with it, as described in the aforesaid copending application, a die support or carrier 23. After this the roller 32 will engage the surface 31 and cause the die support or carrier 23 to move independently of the plunger. At the opposite end of the portion 28 of the cam a similar arrangement of inclined surfaces 33 and 34 is made these inclined surfaces being more abrupt so that in the course of the revolution of the dies

the outer member 23 is first permitted to rise and then the member 24 will rise.

In operation the attendant places a blank in its plastic state on the open die, positioning said blank by means of the stop pins 55. As a die revolves about the shaft 14 the male die comes down and forms the carton closure. When the dies again reach the portion 33 and 34 of the cam the male dies rise. The operator then removes the formed blank and places a fresh blank in the die. It is to be noted that through about one-half of the movement of these dies they receive heat from a gas burner 36 so that during the movement of the dies fixed to this burner they are heated up and dry out a plastic formed closure.

There has thus been provided a simple and efficient device of the kind described and for the purpose specified.

It is obvious that minor changes may be made in the form and construction of the invention without departing from the material principles thereof. It is not therefore desired to confine the invention to the exact form herein shown and described, but it is wished to include all such as properly come within the scope claimed.

Having thus described the invention, what is claimed as new, is:—

1. In a machine of the class described, a rotary die carrier, means to rotate said carrier, dies fixed to said carrier in series adjacent the periphery of the carrier, other dies movably mounted on and bodily movable with said carrier, each of said other dies including inner and outer concentric members arranged in axially alined operative relation to a respective die of the first series, a fixed cam track around which said second dies travel, said cam track being provided with cam surfaces arranged to primarily actuate the inner member and thereafter actuate the outer member and close the members successively on the respective first die, said cam ring also having cam surfaces arranged to permit release of the outer and inner die members in the order named, said cam surfaces being arranged to act directly and without eccentric thrust on said inner and outer members, and spring means constantly holding the second die members in engagement with the cam ring.

2. In a machine of the class described, a rotary die carrier, means to rotate said carrier, dies fixed to said carrier in series adjacent the periphery of the carrier, other dies movably mounted on and bodily movable with said carrier, each of said other dies including inner and outer concentric members arranged in axially alined operative relation to a respective die of the first series, a fixed cam track around which said second dies travel, said cam track being provided with cam surfaces arranged to primarily actuate the inner member and thereafter actuate the outer member and close members successively on the respective first die, said cam ring also having cam surfaces arranged to permit release of the outer and inner die members in the order named, said cam surfaces being arranged to act directly and without eccentric thrust on said inner and outer members, means constantly urging the second die members toward the cam ring, and means to heat the dies throughout a predetermined portion of their path of travel, said means comprising an arcuate gas pipe extending concentrically to and embracing substantially one-half of the path of said dies.

3. In a machine of the class described, a rotary die carrier, means to rotate said carrier, dies fixed to said carrier in series adjacent the periphery of the carrier, other dies movably mounted on and bodily movable with said carrier, each of said other dies including inner and outer concentric members arranged in axially alined operative relation to a respective die of the first series, a fixed cam track around which said second dies travel, said cam track being provided with cam surfaces arranged to primarily actuate the inner member and thereafter actuate the outer member and close the members successively on the respective first die, said cam ring also having cam surfaces arranged to permit release of the outer and inner die members in the order named, the cam surfaces actuating the inner member being arranged centrally of the ring and the cam surfaces actuating the outer member being arranged at the inner and outer side portions of the ring, said outer member being provided with rollers bearing on the last mentioned cam surfaces, and spring means constantly holding the second die members in engagement with the cam ring.

In testimony whereof I affix my signature.

FREDERICK COATES.