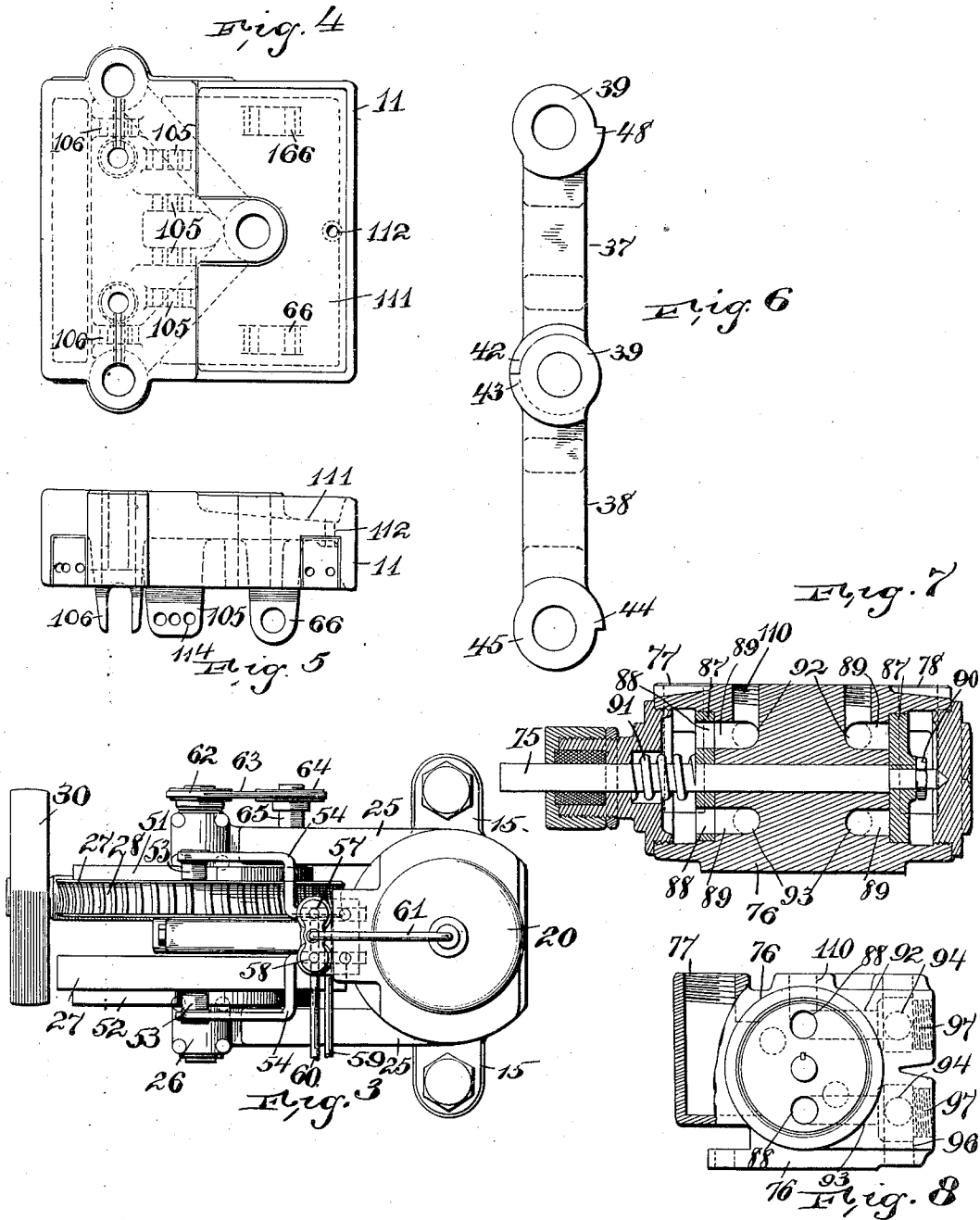


E. G. JEGGE.
 POWER PRESS.
 APPLICATION FILED OCT. 31, 1910.

986,174.

Patented Mar. 7, 1911.

2 SHEETS—SHEET 2.



WITNESSES:
 E. A. Pell
 M. A. Johnson.

INVENTOR
 Emil G. Jegge,
 BY
 Wm. A. Campfield,
 ATTORNEYS

UNITED STATES PATENT OFFICE.

EMIL G. JEGGE, OF NEWARK, NEW JERSEY.

POWER-PRESS.

986,174.

Specification of Letters Patent.

Patented Mar. 7, 1911.

Application filed October 31, 1910. Serial No. 589,975.

To all whom it may concern:

Be it known that I, EMIL G. JEGGE, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Power-Presses; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to figures of reference marked thereon, which form a part of this specification.

This invention relates to that class of machines which presses by means of a knuckle-joint consisting of toggle-levers, which knuckle-joint is made and broken by moving the toggle-levers. The toggle-levers when substantially alined are moved with the center of the toggle slightly beyond the joints at the ends of the levers and have co-acting abutting portions so that the forcing means for the toggle-lever, that is, the means that makes and breaks the joint, is not subjected to any strain when the toggle-levers, after being substantially alined, are moved longitudinally by a suitable press which is actuated by fluid pressure. The admission and relieving of the pressure of the fluid pressure press is regulated by means connected with the means that makes and breaks the knuckle-joint.

The device also consists in an improved style of frame for the press, the construction of which permits ready access to the parts of the apparatus and which consists of an upper frame, which is constructed to be compact and rigid, which is supported by suitable posts on the bottom member.

The device further consists of dies actuated by the press, which dies have means for alternately heating and cooling them so that plastic material can be heated when the pressure is applied, and can be automatically cooled before the pressure is relieved so that the material will not stick to the dies when the pressure is relieved and can be easily removed.

The invention further consists of automatically operated means for lifting the material from the die after the pressure is released and after the material has been cooled. The lifting means is adjustable so that the amount of elevation imparted to the lifting means on the lower die can be regu-

lated according to the depth of the die which in turn varies with the material that is being pressed. This press is particularly adapted for plastic material for the making of buttons and the like which are made in considerable quantities, at one impression, by means of an upper and lower die being forced together by the aforesaid knuckle-joint.

The invention further consists in the particular arrangement of the toggle-levers which form the knuckle-joint, these toggle-levers being provided with shoulders that abut on each other, and on their extremities, with shoulders that engage the head of the fluid pressure press, and with the upper die so that when the parts are alined, or substantially alined, and pressure is imparted to them, these shoulders transmit the pressure and the pivotal rods are relieved of pressure and any shearing strain, which is likewise true of the means which actuates the toggle-levers to make and break the knuckle-joint.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side view of the press, and Fig. 2 is a front view thereof. Fig. 3 is a top view with part of the mechanism left off. Figs. 4 and 5 are a top view and a side view of the table portion of the frame. Fig. 6 is a side view of the toggle-levers in their substantially alined position showing how the pivotal connection between the two toggle-levers passes beyond the line of the end joints, that is, over its center so as to bring the shoulders in contact. Fig. 7 is a vertical longitudinal section of a valve used to regulate the admission of heating and cooling means to the dies, and Fig. 8 is an end view of the valve partly broken away and with one end plate removed.

The press consists of a frame which is supported on the legs 10, and on these legs is mounted a table portion 11 which comprises the lower member of the frame, which table has arranged thereon a support 12 for the lower die 13, which support and die are fixed in position. Posts 14 project from the table portion 11 in any suitable number, but preferably to the number of three, one on each side, and one somewhat to the rear, each of these posts supporting a flange 15, which flanges project from the frame of the upper member 16 of the press, which upper member consists of side pieces which are provided with ways 17 in which slides the

upper support 18 of the movable die 19. The upper ends of the side pieces are formed into a head 20 which has a chamber 21 which forms a fluid pressure press and in which is arranged a piston 22 which is actuated, as will be described hereinafter, by means of the fluid which is admitted under pressure to the press. At the bottom of the piston 22 is a piston plate 23 which is oblong, being longer than it is wide, and which is placed between the side pieces and put into position at right-angles to its normal position so that it passes between the supporting bars 24 and when in position is twisted so that the ends of the piston plate 23, in the direction of its greatest length, projects beyond the supporting bars 24, as shown in Figs. 1 and 2, and in this way the movement of the whole lever mechanism is limited by the engagement of the piston plate 23 with the supporting bars 24.

The upper member 16 of the frame has two projecting arms 25 which have bearings 26 on their ends, and between the arms are mounted a pair of actuating plates 27, one of which is provided with teeth 28 on its periphery, which mesh with a worm 29 which is driven by a pulley 30 which is the driving pulley of the press. On the inner faces of these actuating plates 27 are the alined slots 31, which slots are cam slots and receive a roller 32 mounted on a yoke 33, which yoke embraces and rests on the shaft 34 on which the actuating plates 27 are mounted. This cam slot acts, by means of the roller 32, to reciprocate the yoke 33 and force the end 35 of the yoke, which is pivoted by means of the bar 36, to the toggle-levers 37 and 38. The toggle-lever 37 is provided with ears 39 which fit on either side of an eye 40 which projects down from the piston plate 23, and the piston plate and the toggle-lever are provided with shoulders which come together, as at 41, when the toggle-levers are forced to their limit of their alined position, which is shown more clearly in Fig. 6 where the pivotal connection between the toggle-levers is shown forced beyond the "center" or the line of the outer pivotal connections of the toggle-levers. The toggle-levers 37 and 38 have the interlocking ears 39 which are finished on their outer edges, and each of the opposed toggle-levers is recessed to receive the opposite ear so that when the shoulders 42 and 43 come together to limit the movement of the toggle-levers, these shoulders and the interlocking ears receive the full force of the pressure that is applied by means to be hereinafter described, to force the toggle-lever, in its entirety, in a longitudinal direction. The bottom of the toggle-lever 38 is provided with ears 45 and a shoulder 44 which in turn co-acts in the same way with a shoulder 46 and ears 47 of the upper die member 18. It will be under-

stood that the ears 39 of the toggle-lever 37 and its shoulder 48, also act with the eye and with the projecting portions of the piston plate to form a solid structure when the toggle-levers are substantially alined, and in this way the pivotal rods or bars 36, 49 and 50 are relieved of any strain, except that incidental to breaking the knuckle-joint and actuating the knuckle-joint when pressure is not being applied thereto. The actuating plates are provided, on their outer faces, with cams 51 and 52, which cams are arranged to raise rollers 53 on the ends of arms 54, which arms are pivoted at 55 to the upper member of the frame and actuate the valve stems 56 which are two in number, and are attached, one to the inlet valve 57 and the other to the outlet valve 58 which are connected to the inlet pipe 59 and the outlet pipe 60. (See Fig. 3.) The valves are suitably connected, in any well known manner, to the pipe 61, and in the rotation of the actuating plates, after the knuckle-joint is made and the center bar 36 has been forced beyond its center and the shoulders of the toggle-lever are in engagement, the valve stem 56 is raised by its roller 53 which in turn is actuated by its cam 51, and fluid under pressure, preferably water, is admitted through the pipe 61 to the chamber 21 of the fluid pressure press, and the piston 22 and the toggle-levers and the upper member of the die and the upper die 19 are all forced downward, and hydraulic pressure is thus applied to the die. While the press is holding the toggle-levers and the die down tightly, the shaft 34 is rotating and with it a pulley 62 which rotates, by means of a suitable connection 63, a pulley 64 on the lower shaft 65, which lower shaft rotates in the bearings 66, shown more particularly in Fig. 5, this shaft having a cam 67 thereon, which cam is provided with a cam groove 68 which operates the roller 69 of a yoke 70, and thus rocks the lever 71 which transmits, through a shaft 72, its motion to a segmental gear 73 which rocks a pinion 74 fastened to a shaft 75 of the valve 76.

The valve 76 is shown in detail in Figs. 7 and 8, and comprises a casing in which the shaft 75 rocks. This casing has a steam inlet 77 and a water inlet 78. The valve, by its operation, automatically and alternately admits steam and water, the steam through the steam inlet pipe 79, and the water through the water inlet pipe 80, as shown in Fig. 2, and permits the steam and water to pass through the pipes 81 and 82 to the upper and lower dies, and when they pass through these dies, they escape through the exhaust pipes 83 and 84. The amount of steam and water passing through these pipes is regulated by suitable valves 85 and 86, shown in Fig. 1. To permit this regulation, I supply the shaft 75 of the valve

76 with valve plates 87 on each end, which valve plates are provided with perforations 88, shown in Figs. 7 and 8, which are adapted to be thrown into and out of register with the passages 89 on each side of the casing. One side of the casing is for the admission of steam, and the other side for the admission of water, and the valve plates 87 are held tight up against the casing both by the pressure that is supplied against them, and also by the action of a nut 90 on one end, and a spring 91 on the other end. These valve plates are secured to the shaft 75 and rock in unison, and when one is shut, the other is open.

Each of the passages 89, at the top and the bottom, are connected with a transverse duct or passage. In the case of the upper passage 89, they connect with a duct 92, and in the case of the lower passage 89, they connect with a duct 93, each of which ducts 92 and 93 are connected by a longitudinal passage 94, these longitudinal passages being connected to each other, and in the case of the top ones, 94, leading into an outlet 95 which feeds the pipe 82, and in the lower ones, with a passage 96 that feeds the pipe 81. The connections 97 permit the installation of the valves 85 and 86 which are shown in Figs. 1 and 2, which valves regulate or throttle the amount of steam or water that is fed. It will be evident by the operation of this valve that while these dies are down the disk 87 can be so arranged that steam is admitted through the passages 89 to feed both the top and bottom dies with steam just before and while the pressure is being applied, and to shut off the steam and feed cold water to the dies after the dies have come together and while they are being separated.

The material that is used in these presses is plastic when heated and becomes polished and hard when cooled, and this automatic feeding of the heating and cooling medium permits of a ready pressing of the article and a chilling of it so that the pressed material is removed from the die easily. To facilitate this removing, a vertically movable die plate 98 is adapted to raise the pressed material from the bottom die plate after the pressure has been relaxed and when the knuckle-joint has been broken and the upper die raised. The die plate 98 is raised by a stem 99 which rests on a transverse bar 100 which is supported on the standards 101 which are mounted on a rod 102 which is in turn raised and lowered by the forked ends 103 of a pair of levers 104, these levers 104 reciprocating between bearings 105 shown more particularly in Figs. 4 and 5, the rod 102 being guided between the posts 106. The levers 104 are provided on their ends with rollers 107 which are actuated by cam slots 108 in the cams 109. This cam

is so adjusted on its shaft that the operating mechanism and the die plate 98 are raised after the pressure is released and after the upper die has been elevated out of contact with the lower die. The valve 76 can be provided with additional openings 110 which ordinarily can be provided with caps or plugs, but can be used for feeding water and steam to the die where a greater feed is desired than can be supplied through the pipes 81 and 82, in the case of heavy articles being stamped, or where a sudden heating and a sudden chilling is desired which requires the feeding of more fluid to the dies.

The table portion 11 of the frame is adapted to catch leakage from the pipes and from the dies, and is provided with an inclined basin portion 111 which has a perforation 112 in it which is connected to a suitable drip pipe 113, as will be noted from Fig. 1. The valves 57 are not illustrated in detail, since their operation is against the pressure in the fluid pressure press, and they are held shut ordinarily by the pressure, and are opened by the levers 54, one to admit pressure and the other to relieve the pressure. A series of holes 114 are arranged in each of the levers 104, and in each of the brackets 105, so that by shifting the point of the pivot the leverage can be increased or diminished so as to vary the throw of the die plate which ejects the material from the top die as has been hereinbefore described.

Having thus described my invention, what I claim is:—

1. A press comprising a knuckle-joint consisting of toggle-levers, the toggle-levers having co-acting means for limiting the movement when they are forced slightly beyond alinement whereby the center of the knuckle-joint is forced beyond the line of the pivotal connections at the ends of the toggle-levers, means for alternately making and breaking the knuckle-joint, and a fluid pressure press to force the knuckle-joint longitudinally when the knuckle-joint is made and for relieving the pressure before the knuckle-joint is broken.

2. A press comprising a knuckle-joint, the knuckle-joint consisting of a pair of toggle-levers, a fluid pressure press pivotally connected to one end of the toggle-levers, a die connected to the other end of the toggle-levers, the toggle-levers being pivotally connected together, shoulders on the toggle-levers where they are connected together and acting to limit the movement of the toggle-levers at a point slightly beyond a line extending from the pivotal connections at the ends of the toggle-levers, a connection between the fluid pressure press and the knuckle-joint whereby the fluid pressure press can force the knuckle-joint longitudinally, and means for automatically admit-

ting fluid under pressure to the press when the knuckle-joint is alined and for relieving the pressure before the knuckle-joint is broken.

5 3. A press comprising a frame, a lower die fixed in the frame, an upper die arranged to slide in the frame, means for operating the sliding die to force it against the fixed die and to remove it therefrom, and
10 means for automatically feeding a heating medium to the dies when they are about to be forced together and when they are making contact, said means acting to shut off the heating medium and admit a cooling medium
15 while the pressure is applied and when the dies are moved apart.

4. A press comprising a frame, a fixed die in the frame, a movable die in the frame, means for moving the second die to force it
20 in contact with and remove it from the fixed die, a valve, pipes connecting the valve with the dies, and means for operating the valve for automatically admitting a heating medium to the pipes to heat the dies when
25 they are about to be forced together and while they are making contact, said valve also acting to shut off the heating medium and admit a cooling medium after the contact is made and when the dies are separated.
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5. A press comprising a frame, a fixed die on the frame, a movable die on the frame, means for sliding the movable die in and out of contact with the fixed die, a valve, pipes
35 connecting the valve with the dies, pipes leading into the valve, one pipe conducting a heating medium to the valve, the other pipe conducting a cooling medium to the valve, a shaft in the valve arranged to rock,
40 valve plates in the valve, the valve having passages therein, the valve plates being perforated and so disposed on the shaft that when the shaft rocks they are alternately thrown into and out of register with the
45 passages in the valves whereby the heating medium and the cooling medium are allowed to alternately pass through the valve and through the pipes into the dies, and means for actuating the valve to admit the heating
50 medium to the dies before and when contact is made and for shutting off the heating medium and admitting the cooling medium to the dies after contact is made until the contact between the dies is broken.

55 6. A press comprising a frame, a fixed die on the frame, a movable die on the frame, means for sliding the movable die in and out of contact with the fixed die, a valve, pipes connecting the valve with the dies, pipes
60 leading into the valve, one pipe conducting a heating medium to the valve, the other pipe conducting a cooling medium to the valve, a shaft in the valve arranged to rock, valve plates in the valve, the valve having pas-
65 sages therein, the valve plates being perfo-

rated and so disposed on the shaft that when the shaft rocks they are alternately thrown into and out of register with the passages in the valves whereby the heating medium and the cooling medium are allowed to alter-
70 nately pass through the valve and through the pipes into the dies, a pinion on the shaft, a segmental gear in mesh with the pinion, a crank for actuating the segmental gear, a yoke secured to the crank, a cam operating
75 the yoke, and means connecting the die operating means with the cam for rotating the cam whereby the valve is actuated to admit the heating medium to the dies before and when contact is made and for shutting off
80 the heating medium and admitting a cooling medium after contact is made and when it is broken.

7. A press comprising a frame having a table portion, separated posts projecting
85 from the table portion, an upper member resting on and supported by the posts, a fixed die on the table member, a sliding die in the upper member, a fluid pressure press at the top of the upper member, toggle-le-
90 vers connecting the fluid pressure press and the movable member of the die, means for making and breaking the knuckle-joint formed by the toggle-levers whereby the dies are alternately forced into and out of con-
95 tact, means for admitting fluid under pressure to the fluid pressure press when the knuckle-joint is made and for relieving the pressure before the knuckle-joint is broken, and means for automatically admitting a
100 heating medium to the dies when the dies are forced into contact, said means acting to cut off the supply of heating medium and supply a cooling medium after the dies are in contact.
105

8. A press comprising a table member, separated posts on the table member, an upper member mounted on the posts, a fluid pressure press at the top of the upper member, a piston in the fluid pressure press, a
110 fixed die on the table member, a movable die sliding in the upper member, toggle-levers connecting the movable die and the piston and forming a knuckle-joint, co-acting means on the elements of the knuckle-joint
115 for limiting the movement of the knuckle-joint when its center passes slightly beyond a line passing through the centers of the pivotal connection at its ends, means for alternately making and breaking the knuckle-
120 joint, and means for automatically admitting fluid under pressure to the press when the knuckle-joint is alined and for relieving the pressure before the knuckle-joint is broken.
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9. A press comprising a table member, separated posts on the table member, an upper member mounted on the posts, a fluid pressure press at the top of the upper member, a piston in the fluid pressure press, a
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fixed die on the table member, a movable die sliding in the upper member, toggle-levers connecting the movable die and the piston and forming a knuckle-joint, co-acting means on the elements of the knuckle-joint for limiting the movement of the knuckle-joint when its center passes slightly beyond a line passing through the centers of the pivotal connection at its ends, means for alternately making and breaking the knuckle-joint, bearings projecting from the rear of the upper member, actuating plates mounted to rotate between the bearings, means connecting the actuating plates and the knuckle-joint for alternately making and breaking the knuckle-joint, valves for admitting and relieving pressure to and from the fluid pressure press, levers for operating the valves, and cams on the actuating plates for moving the levers whereby fluid under pressure is automatically admitted to the press when the knuckle-joint is made and for relieving the pressure before the knuckle-joint is broken.

10. A press comprising a table member, separate posts on the table member, an upper member mounted on the posts, a fluid pressure press at the top of the upper member, a piston in the fluid pressure press, a fixed die on the table member, a movable die sliding in the upper member, toggle-levers connecting the movable die and the piston and forming a knuckle-joint, co-acting means on the elements of the knuckle-joint for limiting the movement of the knuckle-joint when its center passes slightly beyond a line passing through the centers of the pivotal connection at its ends, means for alternately making and breaking the knuckle-joint, bearings projecting from the rear of the upper member, actuating plates mounted to rotate between the bearings, means connecting the actuating plates and the knuckle-joint for alternately making and breaking the knuckle-joint, valves for admitting and relieving pressure to and from the fluid pressure press, levers for operating the valves, cams on the actuating plates for moving the levers whereby fluid under pressure is automatically admitted to the press when the knuckle-joint is made and for relieving the pressure before the knuckle-

joint is broken, and means for automatically conducting a heating medium to the dies before and when the knuckle-joint forces them together, said means acting to shut off the heating medium and admit a cooling medium after contact between the dies is made.

11. A press comprising a knuckle-joint consisting of toggle-levers, a die on which the toggle-levers are adapted to operate, and means for moving the toggle-levers longitudinally when the knuckle-joint is made and the toggle-levers are substantially alined, the toggle-levers having recesses and also having ears that pass into the recess of the opposing lever, the ears and recesses being adapted to receive the thrust when the joint is moved longitudinally.

12. A press comprising a table member, separated posts on the table member, an upper member mounted on the posts, a fluid pressure press at the top of the upper member, toggle-levers arranged in the upper member, means for actuating the toggle-levers to make and break the knuckle-joint which they form, a fixed die on the table member, a sliding die in the upper member, and means for automatically admitting fluid under pressure to the fluid pressure press to force the alined toggle-levers toward the dies.

13. A press comprising a pair of dies adapted to receive fluid, means for causing the dies to be moved toward and from each other to operate them for pressing material, and means operated from the die operating mechanism for alternately admitting a heating and then a cooling medium to the dies.

14. A press comprising a frame with a fixed die thereon, a movable die arranged in the frame, means for actuating the movable die alternately toward and from the fixed die, and means operated from the die actuating mechanism for alternately admitting a heating and then a cooling medium to the dies.

In testimony, that I claim the foregoing, I have hereunto set my hand this 15th day of October 1910.

EMIL G. JEGGE.

Witnesses:

WM. H. CAMFIELD,
E. A. PELL.