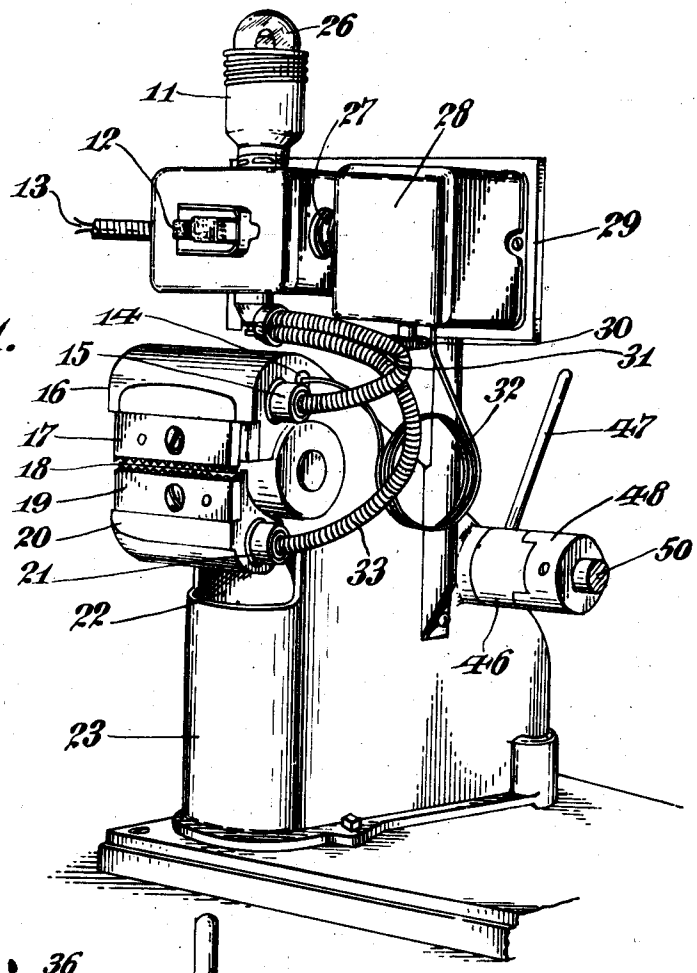
April 18, 1939. C. J. WESTIN 2,155,029

TUBE SEALING PRESS

Filed July 20, 1935 2 Sheets-Sheet 1

Fig. 1.



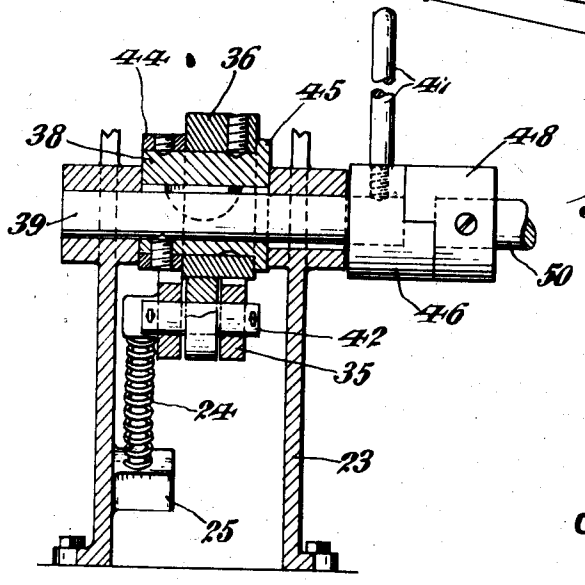


Fig. 3.

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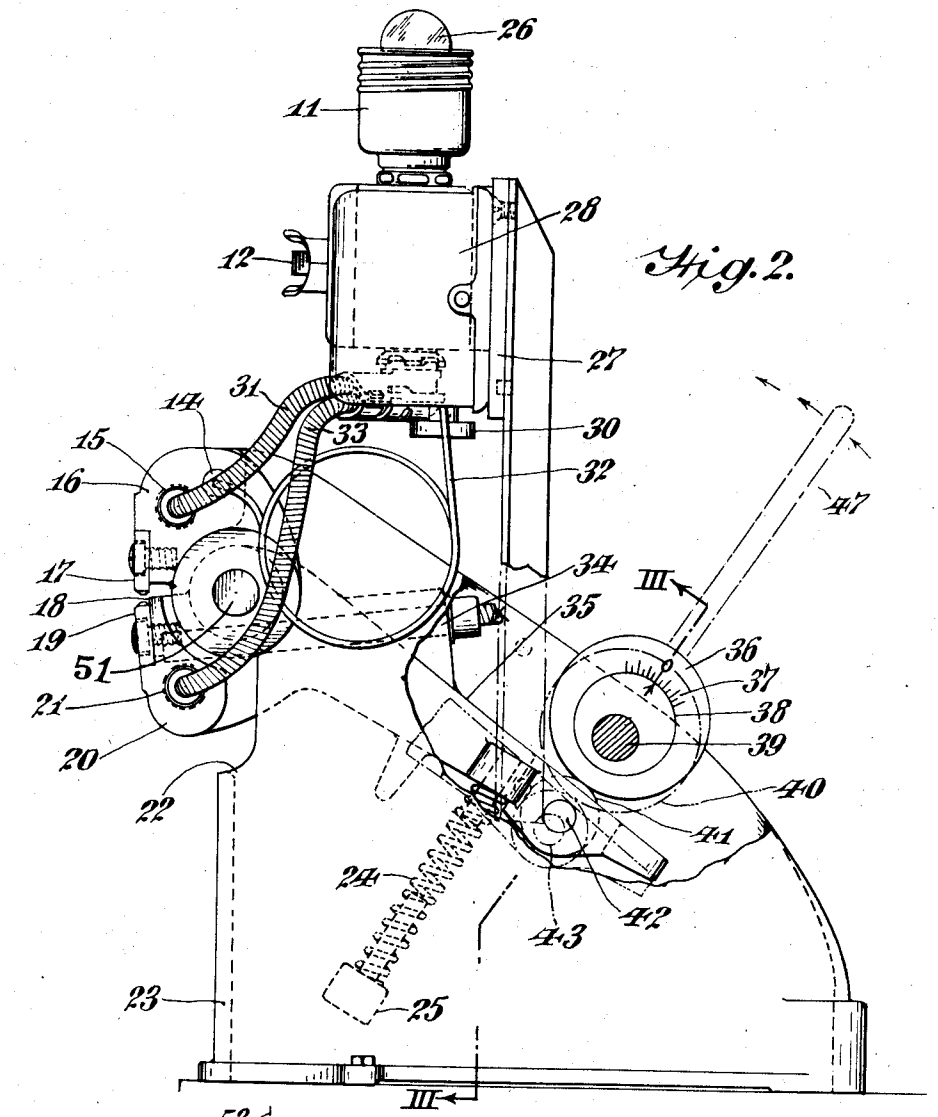


Fig. 2.

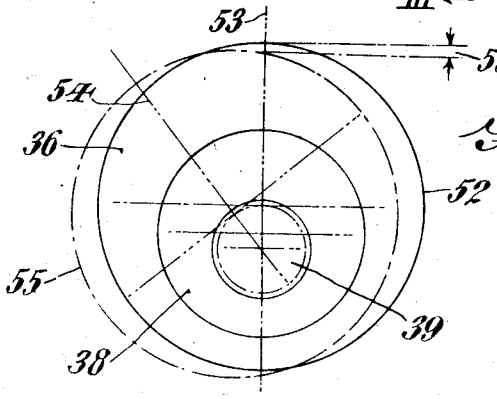


Fig. 4.

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Patented Apr. 18, 1939 2,155,029

UNITED STATES PATENT OFFICE

2,155,029

TUBE SEALING PRESS

Charles J. Westin, Philadelphia, Pa., assignor to F. J. Stokes Machine Company, Philadelphia, Pa., a corporation of Pennsylvania

Application July 20, 1935, Serial No. 32,383

8 Claims. (Cl. 113—1)

This invention pertains to a collapsible tube sealing press and particularly to improvements in presses used to emboss and seal containers having clipless closures and/or clipless cement-sealed closures.

The purpose of this invention is to provide simple and conveniently adjustable but positive means:

For applying the proper pressure to the closure;

For setting the embossing or indenting punches to the exact and safe depth of impression; and

For controlling the time the pressure and/or heat and pressure are applied.

Heretofore simple presses which were hand or foot operated through levers and links have been used quite satisfactorily in sealing or crimping the conventional clips into place around the folds of the closure. When clips were used, it was not so important how the pressure was applied as long as it was sufficient to press the clip tightly around the folds. If too much pressure was applied, the stiffness of the clip tended to protect the softer metal in the folds and prevent crushing of this, while if insufficient pressure was applied this would be detected by the looseness of the clip; neither was the speed with which the pressure was applied of any particular moment.

In sealing the clipless closures, however, according to the methods disclosed in U. S. Letters Patent Nos. 1,989,031 and 1,989,032 granted to me on January 22, 1935, and No. 2,028,112, granted to me on January 14, 1936, as well as in my co-pending applications Serial Nos. 667,823; 667,824; and 696,145, it is very important to have dependable control over every factor in the crimping and sealing operations. For example, when flat sealing jaws are used and excessive pressure applied, the metal of the folds is crushed and cracks open at the creases of the folds; if excessive pressure is applied to indenting punches or they are allowed to come too close together, the metal in the folds will be punctured; and if the pressure is applied too suddenly—like a hammer blow—the metal between the indentations is not given a chance to flow naturally but is weakened and may be ruptured by the sudden stretching. In cement-sealed tubes, when heat is required, the time element is of considerable importance. The heat must be transferred by contact from the heated jaws into and through the folds in order to fuse or render this cement sufficiently plastic to form a perfect bond between the cement coated surfaces and this consumes appreciable time.

Through this invention the defects of the old devices are eliminated and several important improvements incorporated so that a safe and dependable sealing device is produced.

The attached drawings illustrate a preferred construction of my improved sealing press:

Fig. 1 represents a view in perspective.

Fig. 2 represents a side elevation with parts broken away so as to show the double cam.

Fig. 3 is a section taken on line 3—3 of Fig. 2.

Fig. 4 shows the cam assembly.

In its simplest form, the machine consists of a housing or frame 23 within the walls of which the parts are mounted. A lever having one long arm 35 carrying the roller 41 on pin 42 and a shorter arm 20 carrying the lower indenting punches 19 is fulcrumed at 51. Lever arm 20 extends out through an opening 22 in housing 23 and supports the lower indenting punch 19 in alignment with the upper indenting punch 17 which is supported on the rigid part 16 of the housing 23. An extension 18 of lever 20 extends up in back of the lower indenting punch 19 so as to form a stop for the collapsible tubes to be acted on as they are placed between the punches. Roller 41 bears against the double cam 36—38 which is fastened to the shaft 39. In this case a spring 24, supported by a lug 25 on housing 23, serves to press the lever bearing arm 35 and roller 41 against the cam surface.

The double cam consists of a central eccentric 38 keyed to shaft 39 and provided with a flange 45 which forms a guide for the adjustable outer cam 36 on this side. On the other side the adjustable cam 36 is guided by collar 44 fastened to inner eccentric 38. The outer cam 36 may also be an eccentric. By moving it in relationship to the inner eccentric 38 so that the zero mark of the graduations 37 is either on the left or the right-hand side of the arrow, the stroke imparted by turning the cam assembly 180° or 360°, as the case may be, would naturally be varied in proportion to the distance the outer cam is moved away from the arrow. This cam may also be of irregular outline but with an extended face of uniform distance from the center of shaft 39 so as to keep the roller 41 pressed down a longer time and thus extend the time during which the indenting jaws are held together. As is best seen in Fig. 2, movement of cam 36 into the position shown in broken lines at 40 moves follower 41 and consequently shaft 42 into the position shown in broken lines at 43. The effect of changing the relative position between the eccentric 38 and the outer cam 36 may be seen to better advantage in Fig. 4, where cam

36 is shown in position 52 having its major axis 53 coincident with the major axis of inner cam or eccentric 38. By moving the major axis 53 of outer cam 36 about 30° or to a position 54, the outer cam by this change takes the position 55. The resulting change in height of stroke produced by a revolution of the cam assembly might be assumed to be about ⅛" or as shown at 55. The lever 20, 35 is so fulcrumed that its proportions are one to four, the cam 36 acting on the longer arm 35. As suggested above, if the stroke is reduced ⅛" by changing the relative position of the cams, the effect of this change on the stroke of the short arm 20 would only be $\frac{1}{32}$". The above change of stroke was the result of changing the position of the major axis about 30°. If the change of the relative position is only about 1°, the effect on the relative closeness to which the jaws come would be only .001". This sensitiveness in adjustment of the closeness to which the jaws can be adjusted is very desirable because the wall thickness of collapsible tubes is only a few thousandths of an inch and, therefore, a change of a few thousandths if in the wrong direction, would be very destructive as far as the tightness of the closure is concerned.

When using presses of this type for sealing collapsible tubes treated with thermo-plastic cement, the heat for fusing the cement is transmitted to and through the folds by the direct contact of the tube folds with the indenting punches. The tube must be kept in contact with the sealing punches sufficiently long to permit sufficient transfer of heat to raise the mass in the folds of the tubes to the same temperature as the indenting punches. The temperature of the indenting punches must be maintained at the fusing heat and this should completely permeate through the folds. If the temperature of the indenting punches is increased above the fusing temperature of the cement, the outside will be burned and destroyed.

Heat may be supplied to the indenting punches by the use of electric heaters. For the upper indenting punch 17 a heater 15 is placed in a chamber machined in the solid part 16 of housing 23. For the lower punch 19 heater 21 is placed in the chamber provided in the lever extension 20. The heater 15 is connected to switch 12 through cable 31 and heater 21 is connected to switch 12 through cable 33.

Some sort of heat control must be used and this may be either a rheostat, thermostat or a bi-metal type of control. In this case I have shown a thermostat with the bulb placed in a chamber at 14 and connected through a tube 32 to the thermostat at 28. Temperature variations are obtained by adjusting the knob 30. In some cases, it is desirable to have individual controls for each heater and a chamber 34 is, therefore, provided also in lever arm 35. The line current is connected to switch 12 at 13 and carried from the switch through 27 to the thermostat 28. For convenience in checking whether the current is on or not, a pilot lamp 26 is placed in a socket 11 which is connected in line with the switch. All the control devices may be mounted on a panel 29 which is supported on the housing in any convenient way. The cam shaft 39 may be operated either manually by a handle 47 or it may be connected to a prime-mover through couplings 46, 48, 46 being attached to the cam shaft 39 and the mating part 48 to the shaft 50 of the prime-mover. It is, of course, preferable to have the press operated by means of a constant speed motor so that the rotation of the cam shaft will be persistently uniform, giving the required time of contact between the indenting punches. In this lever type of sealing press, it has proved of decided advantage to actuate the lever by means of a cam even with manual operation. The reason for this advantage is that the lever 47 must be swung around at least 180° and back again for each seal, which consumes ordinarily a satisfactory length of time for producing the proper seal. It also positively prevents the hammer blow effect because of the very gradual closing and opening of the lever supporting the indenting punch.

I do not intend to be limited save as the scope of the prior art and of the attached claims may require.

I claim:

1. In a tube sealing press, the combination comprising, a pair of indenting punches movable relative to each other, operating means for moving said punches relative to each other, electric heaters arranged so as to heat said punches and being located within and electrically insulated from said punches, heat responsive means located adjacent one of said punches so as to be responsive to the heat of said punch, heat control means connected to said one of said heaters to control the heat of said heater and connected to said heat responsive means so as to be controlled by said heat responsive means, and an adjustable cam operatively interposed between said punches and said means so as to limit the movement of said punches relative to each other.

2. In a tube sealing press, the combination comprising, a pair of indenting punches movable relative to each other, operating means for moving said punches relative to each other, electric heaters arranged so as to heat said punches and being located within and electrically insulated from said punches, heat responsive means located adjacent one of said punches so as to be responsive to the heat of said punch, heat control means connected to said one of said heaters to control the heat of said heater and connected to said heat responsive means so as to be controlled by said heat responsive means, a shaft forming a part of said operating means, a central eccentric fastened to said shaft, and an outer cam adjustably secured to said eccentric so that the eccentricity of said outer cam relative to said shaft is adjustable.

3. In a tube sealing press, the combination comprising, a pair of indenting punches movable relative to each other, operating means for moving said punches relative to each other, electric heaters arranged so as to heat said punches and being located within and electrically insulated from said punches, heat responsive means located adjacent one of said punches so as to be responsive to the heat of said punch, heat control means connected to said one of said heaters to control the heat of said heater and connected to said heat responsive means so as to be controlled by said heat responsive means, a shaft forming a part of said operating means, a central eccentric fastened to said shaft, an outer cam adjustably secured to said eccentric, and indicia oppositely disposed on said eccentric and on said outer cam so that the eccentricity of said cam relative to said shaft is adjustable by minute variations.

4. In a tube sealing press, the combination comprising, a pair of indenting punches movable relative to each other, operating means for mov-

ing said punches relative to each other, electric heaters arranged so as to heat said punches and being located within and electrically insulated from said punches, heat responsive means located adjacent one of said punches so as to be responsive to the heat of said punch, heat control means connected to said one of said heaters to control the heat of said heater and connected to said heat responsive means so as to be controlled by said heat responsive means, electrically operated indicating means connected in the circuit of said heaters so as to indicate when heat is applied to said heaters, and an adjustable cam operatively interposed between said punches and said means so as to limit the movement of said punches relative to each other.

5. In a tube sealing press, the combination comprising, a pair of indenting punches movable relative to each other, operating means for moving said punches relative to each other, electric heaters arranged so as to heat said punches and being located within and electrically insulated from said punches, heat responsive means located adjacent one of said punches so as to be responsive to the heat of said punch, heat control means connected to said one of said heaters to control the heat of said heater and connected to said heat responsive means so as to be controlled by said heat responsive means, electrically operated indicating means connected in the circuit of said heaters so as to indicate when heat is applied to said heaters, a shaft forming a part of said operating means, a central eccentric fastened to said shaft, and an outer cam adjustably secured to said eccentric so that the eccentricity of said outer cam relative to said shaft is adjustable.

6. In a tube sealing press, the combination comprising, a pair of indenting punches movable relative to each other, operative means for moving said punches relative to each other, electric heaters arranged so as to heat said punches and being located within and electrically insulated from said punches, heat responsive means located adjacent one of said punches so as to be responsive to the heat of said punch, heat control means connected to said one of said heaters to control the heat of said heater and connected to said heat responsive means so as to be controlled by said heat responsive means, electrically operated indicating means connected in the circuit of said heaters so as to indicate when heat is applied to said heaters, a shaft forming a part of said operating means, a central eccentric fastened to said shaft, an outer cam adjustably secured to said eccentric, and indicia oppositely disposed on said eccentric and on said outer cam so that the eccentricity of said cam relative to said shaft is adjustable by minute variations.

7. A press suitable for use in sealing collapsible tubes having a coating of thermo-plastic cement which require an accurate adjustment of pressure and heat, said press comprising, a pair of indenting punches mounted for movement relative to each other, operating means for moving said punches relative to each other, mechanical means interposed between said operating means and said punches for accurately adjusting the relative movement of said punches caused by said operating means, heating means located in each of said jaws and arranged to apply heat to said jaws and to the portion of the tube between said jaws and electrically insulated from said jaws, and heat-responsive means located in at least one of said jaws so as to be responsive to the heat of said jaw and connected to control the supply of heat to said heating means.

8. A press suitable for use in sealing collapsible tubes having a coating of thermo-plastic cement which require an accurate adjustment of pressure and heat, said press comprising, a pair of indenting punches mounted for movement relative to each other, a lever pivotally mounted for rotation about a fixed point and supporting one of said punches, operating means for moving said punches relative to each other, an adjustable cam interposed between said operating means and said lever for accurately controlling the relative movement of said punches caused by said operating means, a spring stressing said lever against said cam and consequently stressing said punches away from each other, heating means located in each of said jaws and arranged to apply heat to said jaws and to a portion of the tube between said jaws and electrically insulated from said jaws, heat-responsive means located in at least one of said jaws so as to be responsive to the heat of said jaw, and an electric switch connected between the heating means in said jaw or jaws in which said heat-responsive means is located and controlled by said heat-responsive means to control the supply of electricity to said heating means.

CHARLES J. WESTIN.