

Jan. 13, 1953

L. L. SALFISBERG

2,624,992

PACKAGE SEALING DIE HAVING RESILIENT FACING STRIP

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3 Sheets-Sheet 1

Fig. 1

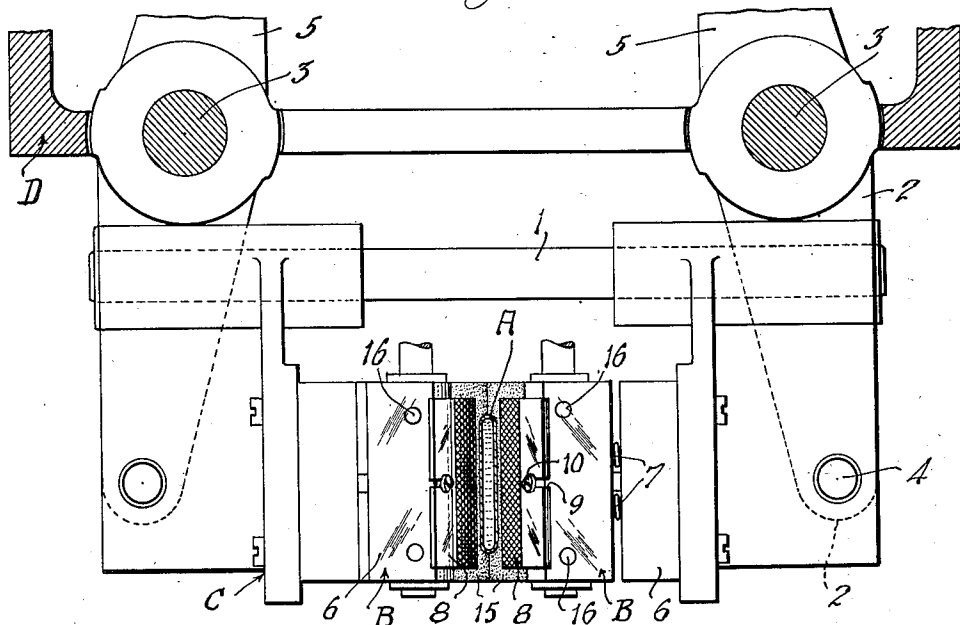
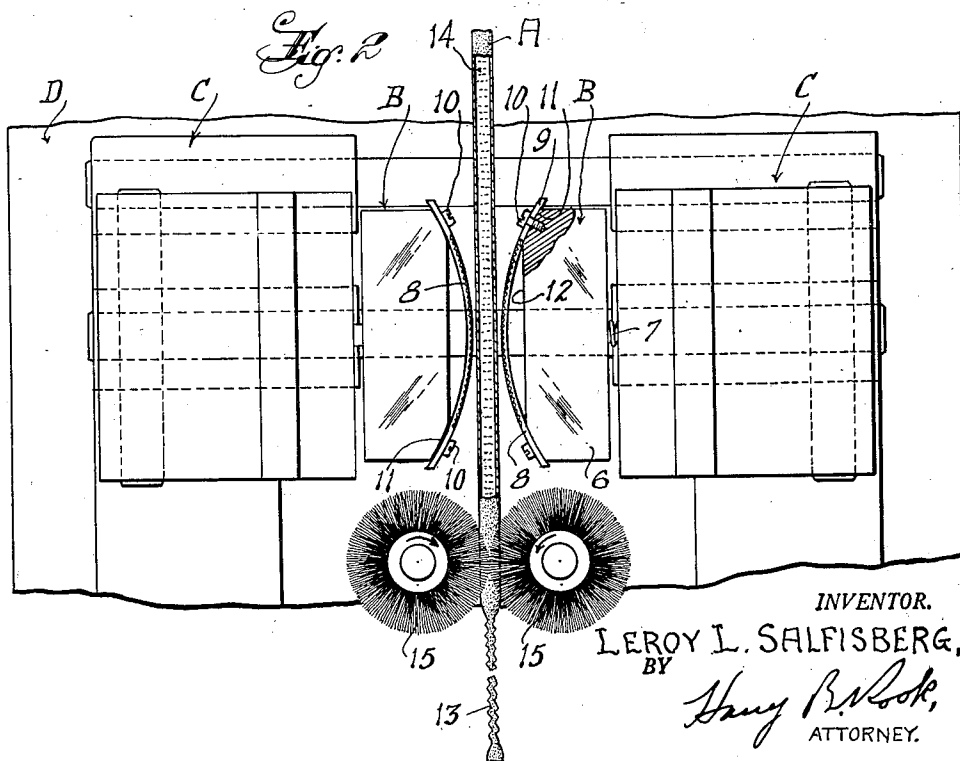


Fig: 2



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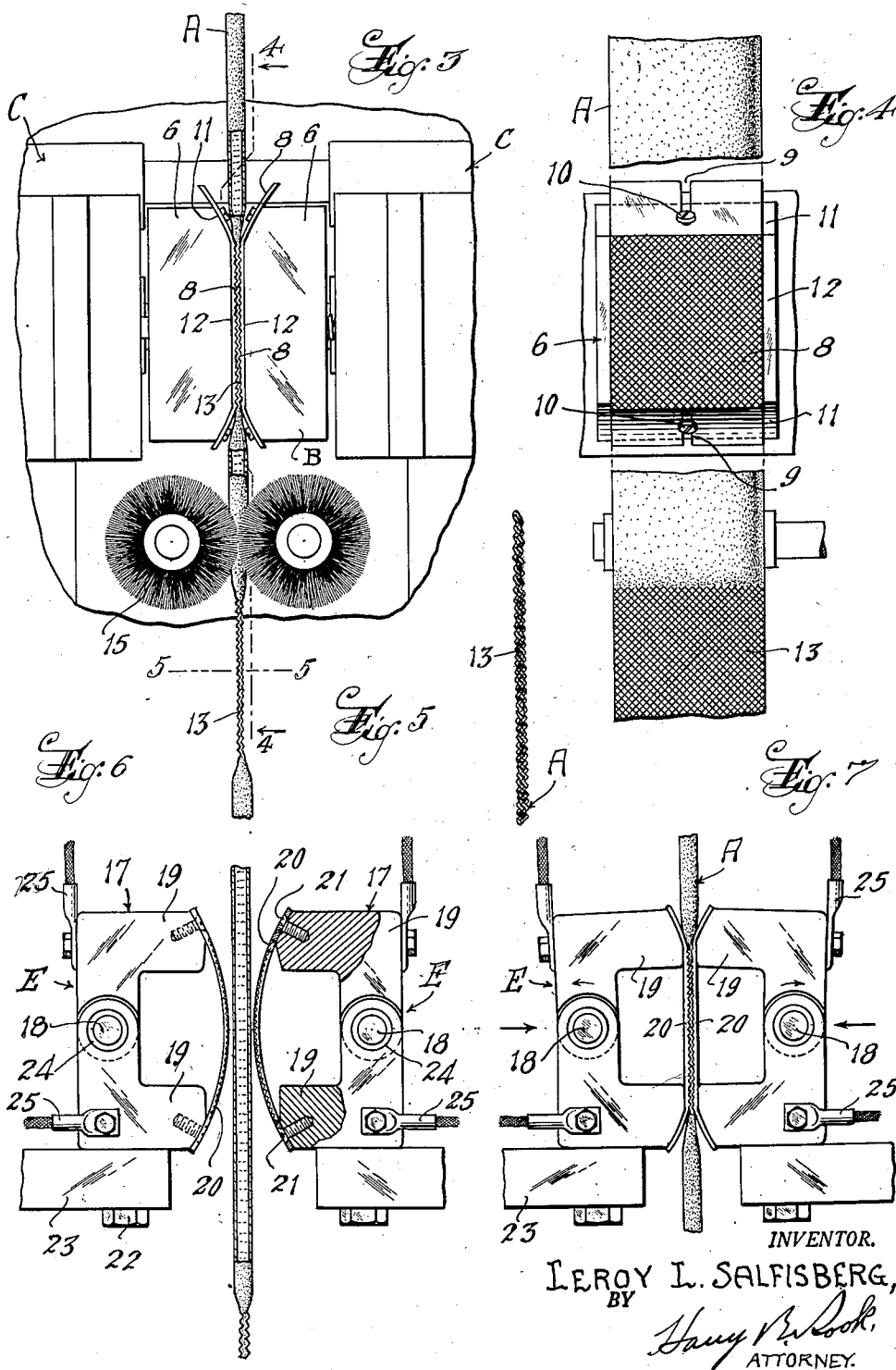
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3 Sheets-Sheet 2



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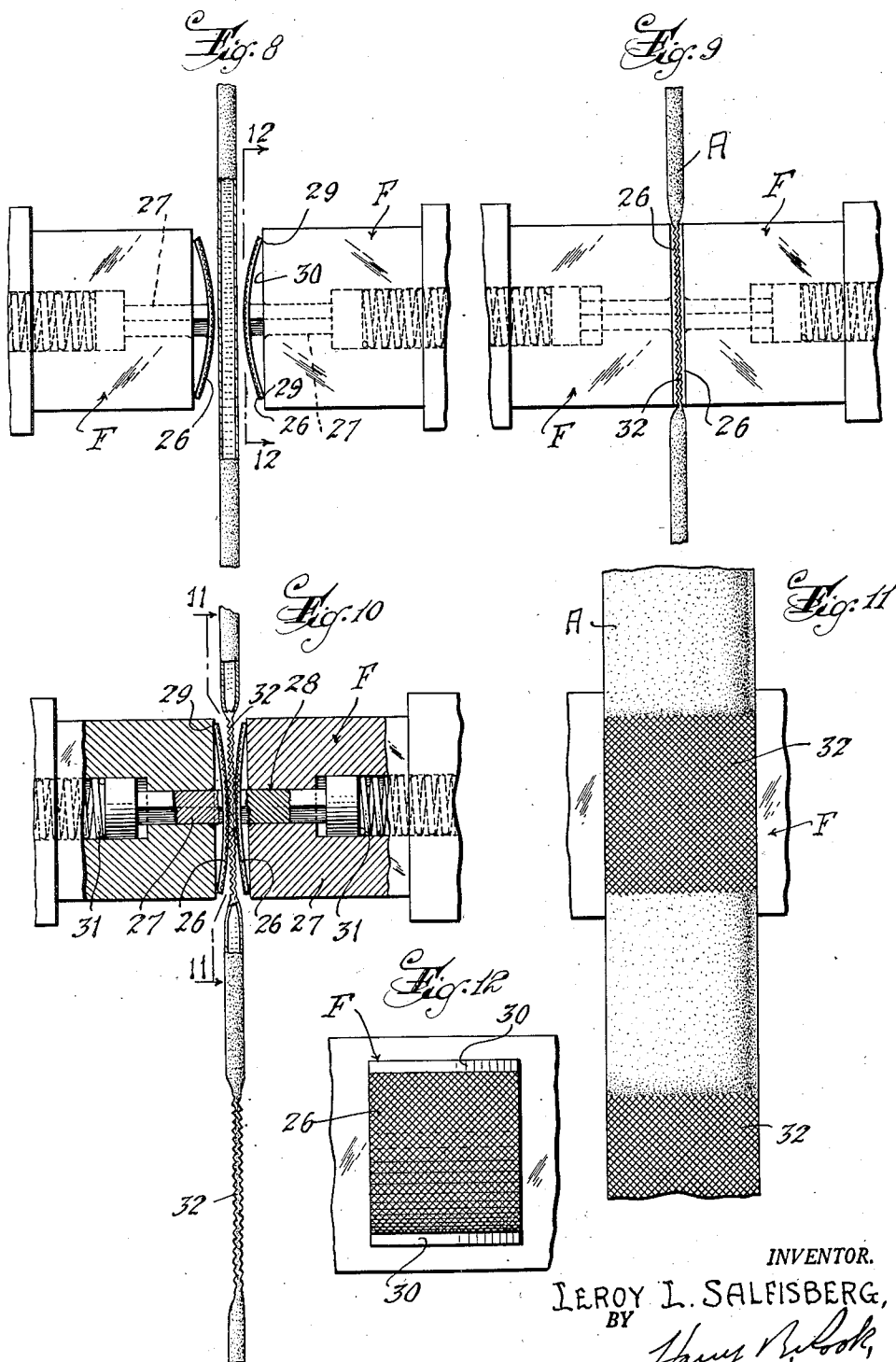
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PACKAGE SEALING DIE HAVING RESILIENT FACING STRIP

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3 Sheets-Sheet 3



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PACKAGE SEALING DIE HAVING RESILIENT
FACING STRIPLeroy L. Salfisberg, South Orange, N. J., assignor
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1 Claim. (Cl. 53—86)

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This invention relates in general to the making and filling of packages which comprise a tube or two opposed layers of packaging material such as cellophane, Pliofilm, metal foil, moisture-proof paper, or the like; and more particularly, the invention contemplates the packaging of fluent material such as liquid, powder and the like. In general, the invention is directed to sealing dies for use in a machine wherein a tube of packaging material is fed step by step, the fluent material is deposited in the tube, and the walls of the tube are transversely sealed together at points spaced longitudinally of the tube so as to form packages, each containing the material to be packaged. The dies of the invention are intended particularly for use with machines of the general type wherein the tube of packaging material is moved through the machine between cooperative sealing dies with a step by step motion, and at the end of each step of movement, the dies press the walls of the tube together transversely to form a rectangular container.

A prime object of the invention is to provide sealing dies for machines of this character which shall embody novel and improved features of construction whereby the dies will draw or push the fluent material in the package tube away from the zone of contact of the walls of said tube incident to the engagement of the jaws with the packaging material as the jaws move toward each other, thereby to prevent such trapping or "pocketing" of portions of the fluent material in the sealed zone as would weaken the seal.

Another object is to provide such sealing dies the faces of which shall be normally convexly curved longitudinally of the packaging tube and shall be resiliently flexible so that they may progressively flatten under the pressure incident to the gripping of the packaging tube between them during the sealing operation.

Other objects of the invention are to provide sealing dies of the character described which shall be relatively simple and inexpensive in construction and reliable and durable in operation, and to obtain other advantages and results that will be brought out by the following description in conjunction with the accompanying drawings, in which

Figure 1 is a top plan view of cooperative sealing dies embodying the invention and mounted in a known type of machine which is schematically illustrated in horizontal section;

Figure 2 is a fragmentary front elevational

view of the dies and machine as illustrated in Figure 1, showing the dies in normal or open position;

Figure 3 is a view similar to Figure 2 but showing the dies in package-sealing position;

Figure 4 is a transverse vertical sectional view, approximately on the plane of the line 4—4 of Figure 3;

Figure 5 is an enlarged horizontal sectional view, on the plane of the line 5—5 of Figure 3;

Figure 6 is a schematic front elevational view of sealing dies embodying another form of the invention and showing the dies in normal open position;

Figure 7 is a similar view, showing the dies of Figure 6 in closed position;

Figure 8 is a view similar to Figure 6, showing a modification of the sealing dies;

Figure 9 is a view similar to Figure 7, illustrating the dies shown in Figure 8;

Figure 10 is a fragmentary partial front elevational and partial longitudinal vertical sectional view through the sealing dies shown in Figure 8, but illustrating them in a position intermediate between the full open and the full sealing positions during opening of the dies;

Figure 11 is a transverse vertical sectional view, approximately on the plane of the line 11—11 of Figure 10, and

Figure 12 is an end view of one of the sealing dies, approximately from the plane of the line 12—12 of Figure 8.

Specifically describing the embodiment of the invention illustrated in Figures 1-5, inclusive, a tube A formed in any suitable manner and of the desired material is fed step-by-step downwardly in a vertical plane between two sealing dies B which are carried by jaws C. Preferably, the interior surfaces of the walls of the tube are coated with a thermoplastic composition, so that the walls of the tube can be sealed together transversely by application of heat and pressure on oppositely disposed portions of said walls by said sealing dies.

Any suitable mechanism may be utilized for mounting and reciprocating the sealing dies B, but as shown, the jaws C are mounted to reciprocate toward and from each other in a horizontal plane and are guided in accurate alignment with each other during their movements by guide rods 1 each of which is mounted in one of the jaws and is slidable in openings in the other jaw. Each jaw is carried by an arm 2 which is rotatably mounted on a vertical shaft 3 in the frame D of the machine, the arm being

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pivotally connected to the jaw at 4. These arms are simultaneously oscillated to move the jaws alternately toward and from each other by the respective crank arms 5 connected to actuating mechanism such as shown and described in my Patent No. 2,350,930, dated June 6, 1944.

The sealing dies B are substantially identical, each comprising a block 6, and one of which is preferably movable toward and from the body portion of the corresponding jaw C and has its movement toward said body portion yieldingly resisted by springs 7 under the pressure exerted during the sealing operation upon the packaging tube A.

The face of each sealing die is bowed longitudinally of the package tube A and is resiliently flexible, being shown in the present instance as comprising a thin sheet or plate 8 of metal of a width equal to or greater than the width of the portions of the tube walls to be sealed and having an inherent convex longitudinal curvature to form a convex face to engage said tube and being mounted on the corresponding die block 6 in any suitable manner, so that the plate may flatten upon application of pressure transversely thereof. As shown, the plate is substantially flat transversely of the tube, has a slot 9 at each end through which passes a screw 10 that is screwed into the die block 6, and the die block has beveled surfaces 11 approximately conforming to the normal curvature of the plate, and a main vertical flat surface 12 that is approximately parallel to the corresponding surface of the other die block.

Normally the base plates 8 are bowed outwardly from the flat surfaces 12 of the die blocks, as shown in Figure 2, and the jaws C are positioned to locate the face plates 8 in spaced relation to the package tube A, as shown in Figure 2.

In forming the packages, the sealing dies are first separated, as shown in Figure 2, and the tube is rulled downwardly between the sealing dies. Thereupon, the jaws C are moved toward each other so as to cause the face plates 8 of the sealing dies to press the opposed walls of the package tube A together to form a transverse sealing zone 13 and partially fabricate or form the bottom margin of a package or container, after which the sealing dies are opened. The fluent material 14 is then continuously fed into the package tube A by any suitable means, and the tube is again fed downwardly one step by any suitable feeding means, auxiliary feeding brushes 15 preferably being provided to exert a continuous downward pull on the package tube.

Then, at the end of the next step of feeding of the tube, the sealing dies are again moved together to form another transverse sealing zone 13 and complete a package containing a portion of the fluent material between the two adjacent sealing zones.

It will be observed that during the closing of the sealing dies, the two face plates 8 will first contact the respective sides of the tube with approximately a line contact at about the middle of their lengths or along the high points of their outer curved faces; and thereafter, the face plates gradually will be flattened against the flat surfaces 12 of the die blocks 6, whereupon further movement of the dies toward each other will firmly press the walls of the package tube together throughout the flattened areas of the face plates. During this operation, the fluent material 14 in the package tube will be gradually pushed away from the sealing zone progressively

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as the latter is formed. This is particularly important in that it reduces the possibility of any of the fluent material being trapped in tiny pockets between the contacting walls of the tube in such a manner as to weaken the seal.

As above pointed out, the inner surfaces of the tube walls have a thermoplastic coating, and the die blocks 6 may be heated in any suitable way, for example, by electric heating elements 16 that are located in recesses in the die blocks 6 in known manner for applying heat to the walls of the package tube for effecting the thermoplastic seal.

A modification of the invention is shown in Figures 6 and 7, wherein each sealing block E comprises two sections 17 each of which has two right-angularly disposed arms, one of which is pivotally connected to one arm of the other section at 18 while the other arm is disposed approximately parallel to the corresponding arm of the second-mentioned section. A face plate 20 is secured as by screws 21 to the arms 19 of each die block so as to span or bridge the space between said arms. Each of the blocks has one section rigidly secured as by cap screws 22 to a sealing jaw 23 corresponding to the jaw C and operated in the same manner.

With this construction, the face plates 20 are normally longitudinally bowed, as shown in Figure 6, but upon application of pressure thereto during the sealing operation, the movable sections 17 of each die block E (in the present instance the upper sections) may swing about their pivots 18 to permit the face plates to flatten, as shown in Figure 7.

For conveniently heating the die blocks, the two sections of each die block may be electrically insulated from each other as by insulating bushings 24 on the pivot pins 18; each section may have one terminal 25 of an electric circuit connected thereto, and the face plates will be formed of some resiliently flexible material having suitable electrical resistance characteristics to permit the heating thereof by current supplied through the circuit terminals 25.

Figures 8-12, inclusive, illustrate another form of the invention wherein the flexible and bowed face plates 26 have guide rods 27 connected thereto and slidable in recesses 28 in the corresponding jaws F, the face plates being normally longitudinally bowed and having their transverse end portions 29 in sliding contact with the flat faces 30 of the die blocks F; and compression springs 31 are provided to yieldingly resist the flexing of the face plates during the sealing operation. In this form of the invention, the inherent resiliency of the face plates is reinforced by the resiliency of the springs 31. Of course, the springs 31 might be omitted entirely and the rods 28 could serve merely as guide supports for the face plates in place of the screw and slot connection 9, 10 of Figures 1-4, inclusive.

The operation of this form of the invention is essentially the same as the form shown in Figures 1-4, the face plates being normally bowed and spaced from each other and from the package tube, as shown in Figure 8, and becoming flattened during the sealing operation so as to form the sealing zone 32, as shown in Figure 9. Figure 10 shows the position and partially flattened condition of the face plates during the separating movement of the die blocks.

While I have shown and described the invention as embodied in certain details of construction, it will be understood that this is pri-

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marily for the purpose of illustrating the principles of the invention and that many modifications and changes may be made in the details of construction of the sealing dies and the dies can be used with other types of machines, all within the spirit and scope of the invention. For example, the face of one die normally may be flat while the other may be bowed or convexly curved.

Having thus described the invention, what I claim is:

A packaging machine including feeding means for advancing longitudinally step-by-step a tube containing fluent material and having compressible walls, a pair of sealing dies between which portions of the wall of said tube may be pressed together to form a seal, means for actuating said sealing dies toward each other and apart in timed relation to the feed of said tube to form said seal and permit said feeding, respectively, characterized in that each of said dies includes a block and at least one die has a resilient face plate to engage the wall of said tube, said face plate being convexly curved in the direction of operation of said feeding means to form a smooth and continuous convex face to engage said tube, said face being substantially contin-

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uous and straight transversely of the direction of operation of said feeding means, said face plate being capable of flattening under pressure exerted thereon during the formation of the seal thereby to progressively displace said fluent material in said tube away from the zone of contact of said portions of the wall of the tube, and means mounting said face plate on said block so that at least one end of said face plate may move lengthwise of the tube when the face plates press the tube between them.

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