PRESS JAWSYSTEM

Harald Georg Swede, Malmo, Sweden, assignor to AB Tetra Pak, Lund, Sweden, a Swedish company

Filed Apr. 8, 1966, Ser. No. 541,256

Claims priority, application Sweden, May 6, 1965, 5,916/65
4 Claims. (CL 100—264)

ABSTRACT OF THE DISCLOSURE

Apparatus to seal off a tube by pressing the tube closed between a set of jaws which are so mounted as to take advantage of the reaction forces in the system. A linkage system is used to simultaneously exert force on both jaws to bring them together by pushing on one jaw and pulling on the other jaw simultaneously.

The present invention refers to a press jaw system, including two press jaws which are adapted to press a pressing material between them, and preferably intended to be applied to machines having press jaws movable in pairs for working upon a movable web of material or similar pressing material, said system being characterized by the fact that the press jaws are associated with pulling means which are arranged to be connected together and to provide the necessary pressing force by drawing the press jaws toward each other, the pressing force exerted by the jaws being wholly or partially compensated internally of the system by a corresponding pulling force in said pulling means.

For example, the system according to the invention may be used for press jaws which are utilized for flat pressing and transverse sealing of a tube to form filled, sealed packages. More particularly in devices of this kind and similar devices which operate with jaws movable along or together with a web of material, problems often arise by large reaction forces having to be taken up, for example by the machine frame. In the system according to the present invention, on the other hand, it is made possible for these reaction forces to be wholly or partially compensated internally in direct connection with the press jaws.

The invention will be described more closely in the following with reference to the accompanying drawings, which by way of example show a preferred embodiment of the invention, FIGURE 1 showing a lateral view of one press jaw belonging to the system, together with a side view which is intended for providing the movement of the jaw, and a detail of the other press jaw, while FIGURE 2 shows the right hand side of the first-mentioned jaw, as seen from the line A—A in FIGURE 1.

The system shown as an example includes two press jaws 1 and 2, the jaw 1 being mounted on a turning arm 3 which is mounted rotateable around a pivot shaft 4. On the turning arm 3, with the shaft 4 as a centre, there is further provided a toothed segment 5, which in FIGURE 1 has been shown diagrammatically by drawing the pitch circle thereof as a dash and dot line. Also the jaw 2 is mounted on a corresponding turning arm (not shown) connected to jaw 2 and having a corresponding toothed segment 5A which is in engagement with the segment 5.

In FIGURE 1, however, these details have been omitted for simplicity.

In the upper part of the turning arm 3 an eccentric axle 6 is rotably mounted in a bearing 7. This eccentric axle 6 at each end carries an eccentric pin 8 and a second eccentrically disposed pin 9, the pin 9 being intended to serve as a mover pin for moving a locking detent 10 mounted on the pin 9 against the action of a spring not shown at the rotation of the eccentric shaft 6 by means of a link 11. At one end this link 11 is rotably mounted on the eccentric pin 8, while its other end is arranged to carry out a movement which is positively controlled by a link and sliding arm system.

The said link and sliding arm system includes a three point link 12 which at one point B is rotatably connected with said other end of the link 11. With a second point C as the centre a guiding disk 16 is arranged on a shaft 13. This guiding disk 16 is mounted stationary in relation to the pivot shaft 4 of the turning arm 3. At a third point D on the three point link 12 the force which is to be transmitted to the turning arms 3 and the jaws 1 and 2 is applied. For example, this force may be carried to the point D by means of a Bowden-cable or similar element which should be able to transmit large reaction forces. How this takes place is of minor importance to the invention. For this reason this power transmission element has been omitted in the drawings. It is essential, however, that the point D is caused to perform a positively controlled movement, which in the example shown takes place by means of a rectilinear guide from D to E. Here the point C moves along the groove 15 in the guiding disk 16 to a position designated by C'. Hence, also the point B moves positively controlled from B till B' along the curved line 17. At this movement the jaw 1 on the turning arm 3 is turned to the position designated by I', at the same time as the eccentric axle 6 is rotated. This causes the eccentric line E—F to be moved first to the position designated by F1—E1 and then rotated with the rotation centre E' of the eccentric axle 6 to the position F1—E1.

While the centre of the eccentric axle 6 is moved from E to E1 and the jaw 1 is moved to the position designated by I', the mover pin 9, against the action of a spring not shown, causes the detent 10 to be turned down to the position designated by 10' so as thereupon to be caused to engage a second detent 18 rigidly connected with the jaw 2. When finally the eccentric line F1—E1 is turned to the position F—E, a pulling force is obtained in the detents 10 and 18, which causes a corresponding pressing force between the jaws 1 and 2. It should be clear now that as link 12 moves upwardly to position C' the arm 3 with the sealing means 1 is swung in a clockwise direction and E—F will be moved to the position F—E. Then, when the link 12 moves to the next position C' the arm 3 will remain in an unchanged position but the detent 10 will continue to rotate and engage the detent 18 since the line E—F has now moved to the position F—E. When the detent 10 engages the detent 18 it will exert a force on the jaw 2 towards the jaw 1 bringing them tightly together thereby exerting both a pulling force and a pushing force on the jaw 2. It can be seen also that when jaw 2 is pulled towards the jaw 1 that jaw 1 will be moved towards jaw 2 through the co-action of the toothed gears 5 and 5A.

These forces then form a substantially closed system of forces, whereby reaction forces acting on the other parts of the machine are substantially reduced as compared with the corresponding prior systems.
In FIGURE 1 the positions of the points B, C and D corresponding to F' have been indicated, which have been designated by B'', C'' and D'', respectively.

As will be understood, the invention is not limited to the example described above alone, but may be varied within the scope of the following claims.

Thus, for example, the movement of the point B to B' may be provided in many ways. One possibility is to have the link 11 guided direct by a cam guide of the desired shape. The individual detailed constructions will moreover be very much dependent on the actual design of the machine to which the invention is to be applied. In certain cases it may then be suitable to guide each jaw separately, the system described above generally being duplicated.

That which is claimed is:

1. A press jaw system comprising: a set of press jaws, means to synchronize the movement of one jaw to bring it into pressing relation with the other of said jaws and means to pull said jaws towards one another by exerting a pulling force on one of said jaws.

2. The structure of claim 1 wherein the means to pull said jaws together includes detents on each of said jaws with the detent on one jaw engaging the detent on the other jaw to pull the jaws into engagement.

3. The structure of claim 2 wherein one of said jaws is mounted on a turning arm, a shaft rotably mounted in said turning arm, a pin eccentrically mounted on said shaft, said detent pulling said jaws together being operably associated with eccentrically mounted pin.

4. The structure of claim 3 wherein said shaft is eccentrically mounted with respect to said turning arm.

References Cited

UNITED STATES PATENTS

2,509,516 5/1950 Murphy ------------ 100—278 XR
2,637,268 5/1953 Culver ------------ 100—278 XR

BILLY J. WILHITE, Primary Examiner.