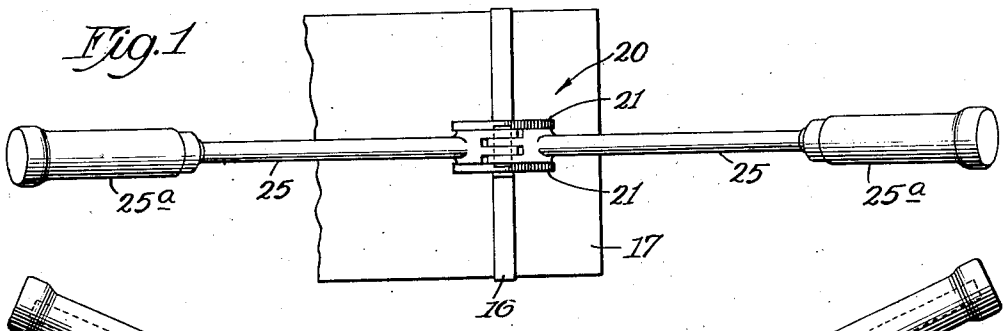
Sept. 25, 1934. W. C. CHILDRESS 1,974,913

SEALING DEVICE

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Fig. 1



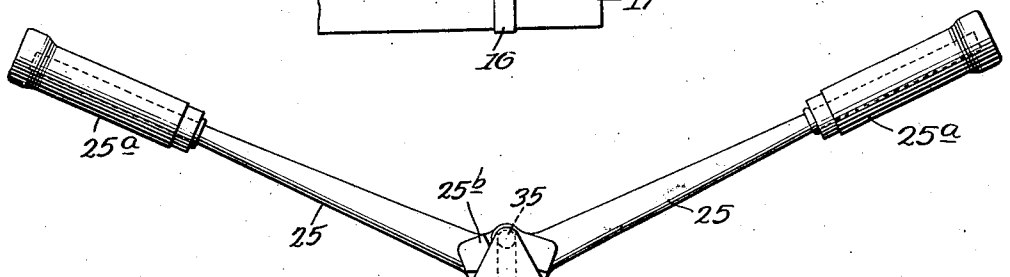


Fig. 2

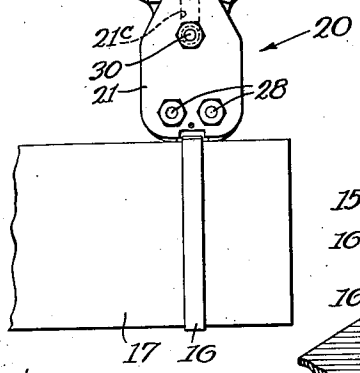


Fig. 3

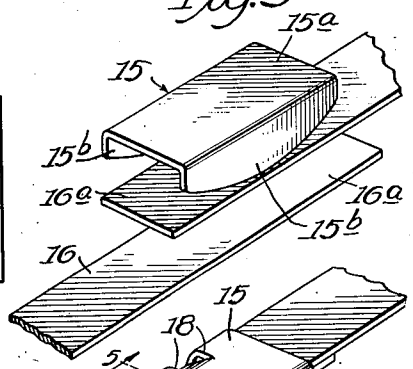


Fig. 4

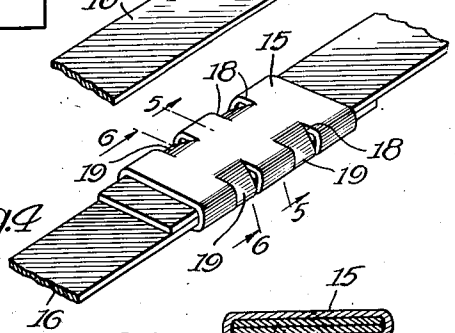


Fig. 5

Fig. 6

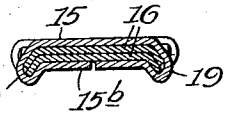
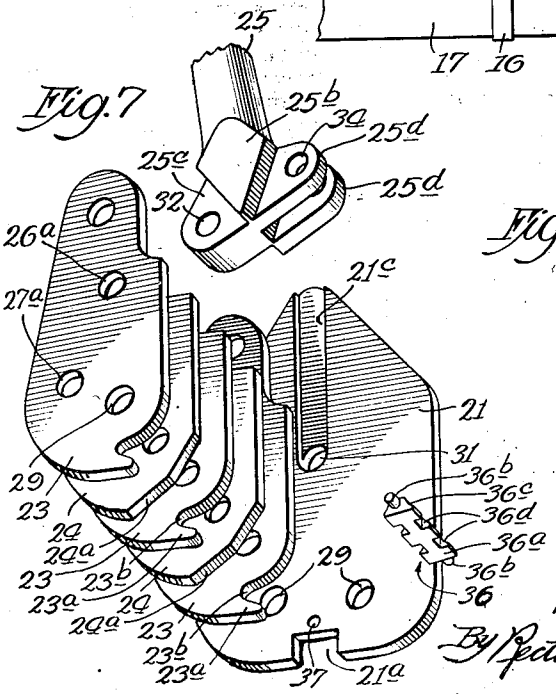


Fig. 7



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SEALING DEVICE

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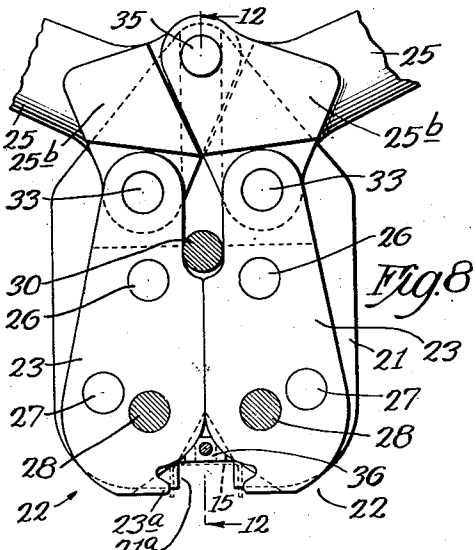


Fig.8

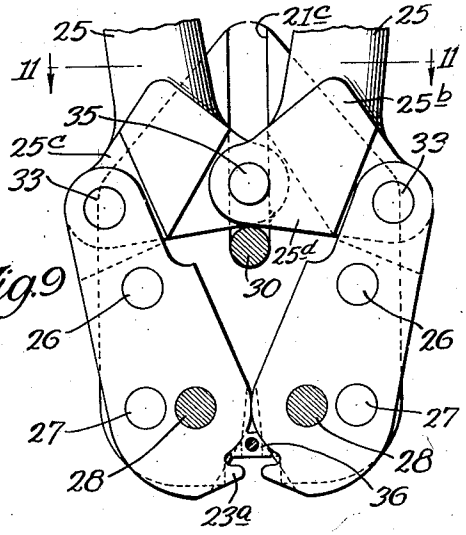


Fig.9

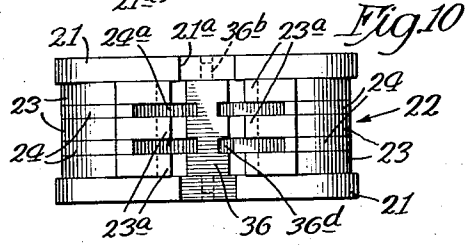


Fig.10

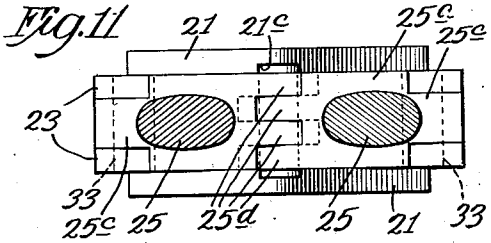


Fig.11

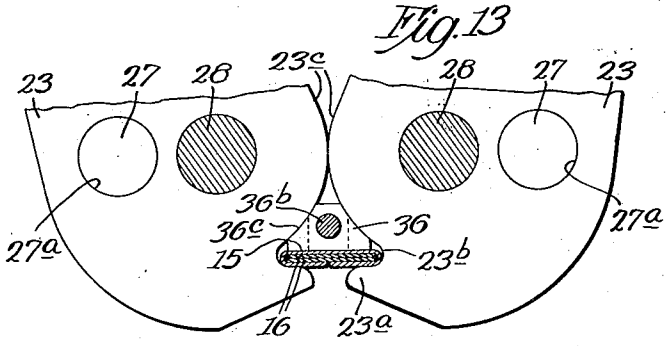


Fig.13

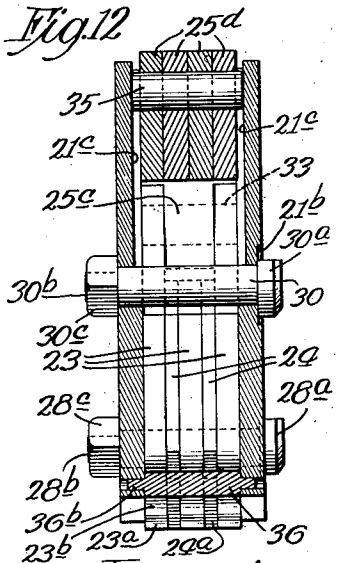


Fig.12

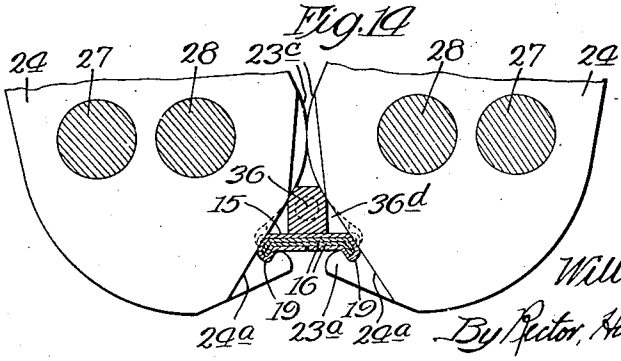


Fig.14

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UNITED STATES PATENT OFFICE

1,974,913

SEALING DEVICE

William C. Childress, Oak Park, Ill., assignor to Acme Steel Company, Chicago, Ill., a corporation of Illinois

Application March 15, 1933, Serial No. 660,795

4 Claims. (Cl. 81—9.1)

This invention relates to sealing devices for use in uniting the ends of a metallic strap or binder by means of a metal seal and the present invention is an improvement upon the device described and claimed in the United States patent to Chester M. MacChesney and John Ekern Ott No. 1,730,669, dated October 8, 1929. The principal object of the invention is to provide a sealing device of simplified construction which may be employed for applying an open metal seal, preferably of channel form, to the overlapping ends of a metallic strap or binder and then bending the walls of the seal about the strap and deforming the edges of the strap and seal to provide an interlocking joint. A further object of the invention is to provide a simple form of sealing device made up of parts which may be constructed at small cost and readily assembled and disassembled for convenience in replacement and repair. Still another object of the invention is to provide an improved form of sealing device of the tong type comprising relatively movable jaws adapted to bend and deform the metallic seal and having relatively movable pivoted operating handles which may be readily manipulated by the operator to apply sufficient power to the jaws. Other objects of the invention relate to various features of construction and arrangement which will appear more fully hereinafter.

The nature of the invention will be understood from the following specification taken with the accompanying drawings, in which one embodiment is illustrated.

In the drawings,

Fig. 1 shows a top plan view of a box or package with the improved sealing device of the present invention in position to apply a seal to the ends of a metal strap which are overlapped on the top surface of the box;

Fig. 2 shows a side elevation of the sealing device and box illustrated in Fig. 1;

Fig. 3 is a perspective view of the overlapping strap ends and the open channel-shaped seal in the forms which they have before being operated upon by the sealing device of the present invention;

Fig. 4 is a perspective view of the overlapping strap ends and the metallic seal illustrated in Fig. 3 after the sealing device of the present invention has operated upon them to bend the walls of the seal about the strap ends and to shear the edges of the strap and seal to provide an interlocking joint;

Fig. 5 is a transverse section taken on the line 5—5 of Fig. 4;

Fig. 6 is a transverse section taken on the line 6—6 of Fig. 4;

Fig. 7 is a perspective view of one of the side plates, the jaw plates and die plates, the bridge or saddle and one of the operating handles of the improved sealing device when separated from each other;

Fig. 8 is a vertical section taken adjacent the inner face of one of the side plates of the sealing device, showing a side elevation of the jaw plates and other parts of the construction when the jaws are separated in position to receive an open channel-shaped seal between them;

Fig. 9 is a sectional view similar to that of Fig. 8, showing the relative positions of the parts when the jaws have been moved inwardly toward each other by the actuation of the operating handles or levers;

Fig. 10 is a bottom plan view of the sealing device as viewed in Figs. 1, 2 and 8;

Fig. 11 is a horizontal section taken on the line 11—11 of Fig. 9;

Fig. 12 is a vertical section taken on the line 12—12 of Fig. 8;

Fig. 13 is an enlarged vertical section similar to the lower part of Fig. 8, illustrating the relative positions of the jaws after they have been moved inwardly toward each other to closed position, thereby bending the walls of the seal into parallel relationship with the overlapping strap ends; and

Fig. 14 is a sectional view similar to that of Fig. 13, but on a different plane through the jaws, showing the action of the jaws in effecting the transverse shearing of the edges of the seal and overlapping strap ends.

The invention is illustrated in the accompanying drawings in connection with a channel-shaped metal seal 15 which is applied to the overlapping ends 16^a of a flat steel strap 16 applied around a box or package 17. The seal 15 has a top or back wall 15^a and parallel side walls 15^b which are spaced apart sufficiently to permit them to embrace the overlapping strap ends 16^a. In ordinary practice, the strap is applied around the box or package and is drawn taut with the ends thereof overlapping by a suitable stretching device, not illustrated, and then the sealing device of the present invention is applied to the overlapping strap ends while the strap is held taut for the purpose of bending the walls of the seal about the strap ends and then shearing the edges thereof to form an interlocking joint of the type described and claimed in the United States patent to Ralph H. Norton No. 1,260,016, dated

March 19, 1918. In forming this joint, the walls 15^b of the seal are first bent inwardly beneath the overlapping strap ends into parallel relationship with the surfaces of the strap, as shown in Fig. 5, and then upon continued relative movement of the jaws of the sealing device, the edges of the strap and seal are sheared from the edges inwardly along transverse lines 18, as shown in Fig. 4, and portions of the metal of the strap ends and seal are deflected downwardly toward the package to form lugs 19, the edges of which abut against the adjacent edges of the strap and seal along the shear lines 18.

The improved sealing device 20 comprises a pair of side plates 21 having mounted between them a pair of oppositely disposed jaws 22, each made up of a plurality of jaw plates 23 and a plurality of alternately disposed die plates 24. In this instance, there are three jaw plates with two die plates interposed between adjacent jaw plates in each jaw 22 and all of these plates are secured together so that they move in unison when relative movement of the jaws 22 is effected by the actuation of a pair of operating levers 25 carrying handles 25^a. Lach jaw plate 23 is provided at its lower end with an inwardly directed jaw 23^a, with an under-cut recess 23^b located immediately above the jaw. These jaws 23^a are adapted to engage the walls 15^b of the seal 15 to bend these walls to the position shown in Figs. 5 and 13 and the intermediate die plates 24 are provided with shearing edges 24^a which partially overlap the recesses 23^b of the jaw plates and which are adapted to engage the edges of the strap and seal to shear them along the lines 18. The side plates 21 which are disposed on opposite sides of the series of jaw plates and die plates are each provided with channel-shaped notches 21^a which are located in registry with each other and with the spaces between the jaws 23^a of the opposite jaw members 22, to receive the overlapping strap ends 16^a when the seal 15 is applied to the strap.

The jaw plates 23 and the die plates 24 of each jaw member 22 are maintained in alignment with each other by means of a pair of cylindrical pins 26 which engage aligning apertures 26^a formed in the jaw plates and in the die plates, there being one series of these registering apertures for each pin. Each jaw member is also provided with a pin 27 engaging aligning apertures 27^a in the jaw plates and serving primarily to relieve the bending stresses on the pivot bolts 28 which hold all of the plates in assembled relation to each other and the side plates 21. These bolts 28 pass through aligning apertures 29 formed in the jaw plates, die plates and side plates, there being one series of these apertures 29 for each of the bolts 28. The heads 28^a of these bolts engage the outer faces of one side plate 21 and at their other ends they are provided with reduced threaded portions 28^b on which are mounted nuts 28^c. These nuts engage the shoulders at the inner ends of the reduced portions 28^b and the threads at the outer ends thereof may be deformed by punching or the like in order to prevent accidental removal of the nuts. By employing this shoulder construction on the bolts, the nuts 28^c are prevented from being tightened to such an extent as to prevent pivotal movement of the jaw members 22 on the bolts 28 between the side plates 21. In addition to the bolts 28 about which the jaw members pivot, the side plates 21 are maintained in spaced relation to each other by another bolt 30 which engages apertures 31 in the opposite side plates and extends between the upper portions of the jaw plates 23 and die plates 24, as shown particularly in Fig. 8. The bolt 30 is similar to the bolts 28 and has its head 30^a engaging a recess 21^b which is formed in the face of the adjacent side plate. The other end of this bolt 30 has a reduced threaded portion 30^b upon which is mounted the nut 30^c. When the side plates 21 are thus secured together and spaced apart by the bolts 28 and 30, the jaw members 22 are adapted to pivot between them on the bolts 28 and the ends of the pins 26 are adapted to slide over the faces of the side plates which maintain them in their positions in the apertures 27.

The operating levers 25 are provided at their lower or inner ends with enlargements 25^b, each of which has a single ear 25^c projecting from the outer side thereof and a pair of ears 25^d projecting in parallel relation from the inner side thereof. The ears 25^c of each lever 25 are adapted to extend between the outer ends of the jaw plates 23 of one of the jaw members 22, which is permitted by reason of the fact that the die plates 24 and center jaw plates are shorter than the outer jaw plates, and these overlapping parts of the ears 25^c and jaw plates 23 are provided with registering apertures 32, in each series of which is mounted a cylindrical pin 33. These pins are of sufficient length to bear at their ends against the side plates 21, by which they are retained in position during the relative movement of the jaw members, and they thus establish a pivotal connection between the jaw members 22 and the operating levers 25. The ears 25^d formed on the inner sides of the enlargements 25^b of the levers are so disposed that they overlap each other and these ears are provided with registering apertures 34 in which is mounted a cylindrical pivot pin 35. This pin is longer than the pins 33 and the ends thereof engage grooves 21^c which are formed in the inner faces of the side plates 21 and which extend vertically from the bolt 30 to the upper ends of the side plates. When the levers 25 are moved relatively to each other about this pivot 35, the ends of the pivot 35 slide in the grooves 21^c and thus permit the elongated enlargements 25^b at the lower end of the levers 25 to act as parts of bell crank levers for effecting relative movement of the jaw members 22 about the bolts 28.

The inner edges of the jaw plates 23 are provided with rounded surfaces 23^c concentric with the axes of the bolts 28 and these surfaces on opposite jaw plates are adapted to move in contact with, or in close proximity to, each other when the jaw members move about the bolts 28. For the purpose of supporting the seal 15 by engagement with the back or top wall 15^a thereof, when the seal is placed between the opposite jaws, there is provided a bridge or saddle 36 having a flat face 36^a adapted to coact with the wall 15^a of the seal, and having integrally formed cylindrical pins 36^b projecting from the ends thereof and pivotally engaging cylindrical apertures 37 which are formed in the side plates 21 just above the notches 21^a. The bridge or saddle 36 is provided on opposite sides with upwardly converging surfaces 36^c which are adapted to coact with oppositely disposed curved surfaces 23^c formed on the jaw plates 23. To accommodate the projecting portions of the die plates 24 when these plates are in their extreme positions during the pivotal movement of the jaw members 22, the opposite edges of the saddle 36 are provided with notches 36^d which are located in registry with the die

plates 24. The face 36[a] of the saddle is adapted to lie flush with the inner walls of the notches 21[a] in the side plates 21 and the curved surfaces 36[c] of the saddle are adapted to maintain contact with the surfaces 23[c] of the jaw plates in all relative positions of the jaw members.

The distance between the side plates 21 is slightly greater than the length of the seal 15 and the width of the notches 21[a] may preferably be slightly less than the spaced relation of the side walls 15[b] of the channel-shaped seal, although sufficient to permit the passage therethrough of the strap 16, so that when the seal is placed between the jaws as shown in Fig. 8, the seal is prevented from moving endwise by the overlapping portions of the side plates 21. The bolts 28 and 30 are preferably of such length that the jaw members have sufficient frictional contact with the side plates 21 to permit the jaw members 22 to be held by friction in any of their relative positions after being so placed by the operation of the levers 25. This permits the jaw members to be moved to positions wherein the jaw portions 23[a] engage opposite side walls 15[b] of the seal, after the open seal has been inserted between them in the manner shown in Fig. 8, and then the entire sealing device 20 may be moved by the operator with the levers 25 spread apart, until the seal 15 is passed over the overlapping strap end, as shown in Figs. 1 and 2. However, it is usually desirable to place the open seal over the overlapping strap ends before putting the jaws into position to embrace the seal. After the application of the seal by either method, the relative movement of the levers 25 toward each other causes the upper ends of the jaw members 22 to separate and the lower portions thereof are moved inwardly toward each other with the result that the walls 15[b] of the channel-shaped seal are bent inwardly beneath the overlapping strap ends, as shown in Fig. 13. Upon continued movement of the levers 25 in the same direction, the cutting edges 24[a] of the die plates 24 cooperate with the adjacent cutting edges of the jaws 23[a] to shear the lateral edges of the strap and seal and to deflect portions of these edges, between pairs of cuts, into the spaces between the jaws 23[a], into which the die plates 24 do not project. This final relative position of the parts is illustrated in Fig. 14, where the deflected lugs 19[a] are shown projecting into the spaces between the jaws 23[a]. The levers 25 may then be moved in the opposite direction to release the sealing device from the joint which has thus been formed between the overlapping ends of the strap. The number of lugs 19 which are formed along each edge of the seal depends upon the number of die plates 24 and jaw plates 23 which make up each head 22 and the laminated construction of these heads or jaw members permits a ready adjustment of the number of such plates to suit the length of seal being operated upon. Of course, with a change in the length of the seal 15, bolts 28 and 30 of different length would have to be substituted for those previously used. After continued use, the die plates 24 may be readily removed and replaced since all parts of the sealing device may be readily disassembled by removing the bolts 28 and 30.

Although one form of the invention has been shown and described by way of illustration, it will be understood that it may be constructed in various other embodiments coming within the scope of the appended claims.

I claim:

1. The combination in a sealing device for overlapping strap ends, of a pair of side plates, a pair of jaw members made up of separate laminations mounted between said plates and having fixed pivotal connections therewith, some of said laminations forming bending dies and other laminations forming shearing dies, and a pair of operating levers pivotally connected to each other and to said jaw members for effecting relative movement of said jaw members.

2. The combination in a sealing device for overlapping strap ends, of a pair of side plates, a pair of jaw members mounted between said plates, each of said jaw members being formed of a plurality of plates, some of said plates having parts forming bending dies and others of said plates having parts forming shearing dies, means passing through said side plates and said last named plates for securing them together and permitting pivotal movement only of said jaw members between said side plates, and a pair of operating levers pivotally connected to said jaw members and to each other.

3. The combination in a sealing device for overlapping strap ends, of a pair of side plates, a plurality of parallel jaw plates mounted between said side plates, a plurality of die plates each interposed between two of said jaw plates, means for forming a pivotal connection with said jaw plates and die plates and securing said side plates together, and means for preventing relative pivotal movement of said jaw plates and said die plates.

4. The combination in a sealing device for overlapping strap ends, of a pair of side plates, a plurality of jaw plates and a plurality of die plates arranged alternately in parallel relation between said side plates, said jaw plates and said die plates having two series of aligning apertures therethrough, pins engaging said apertures and held against endwise movement by said side plates, and means for securing said side plates in fixed spaced relation.

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