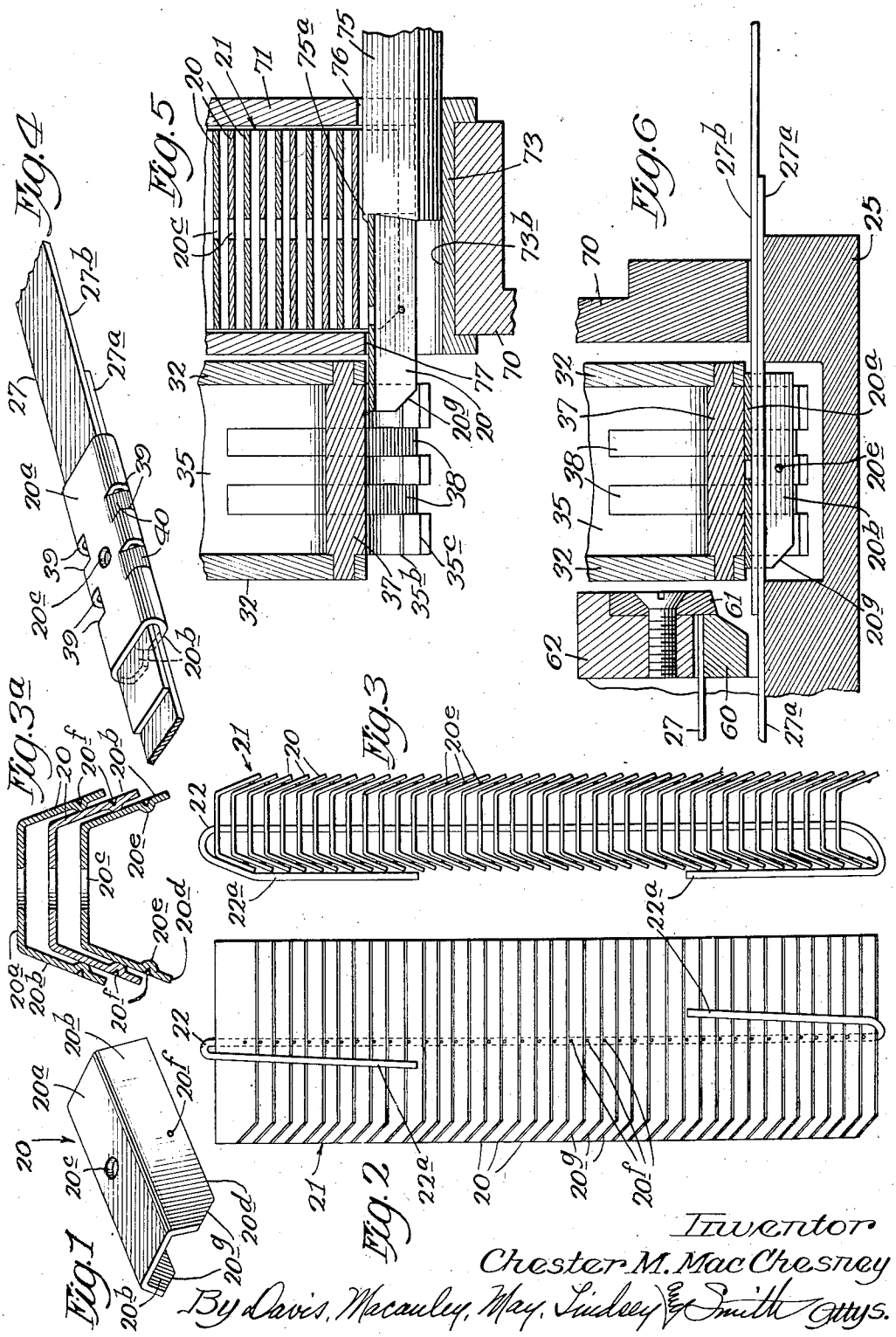
Nov. 24, 1936. C. M. MacCHESNEY 2,062,099

STRAP SEAL

Original Filed May 25, 1934 2 Sheets-Sheet 1



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STRAP SEAL

Original Filed May 25, 1934 2 Sheets-Sheet 2

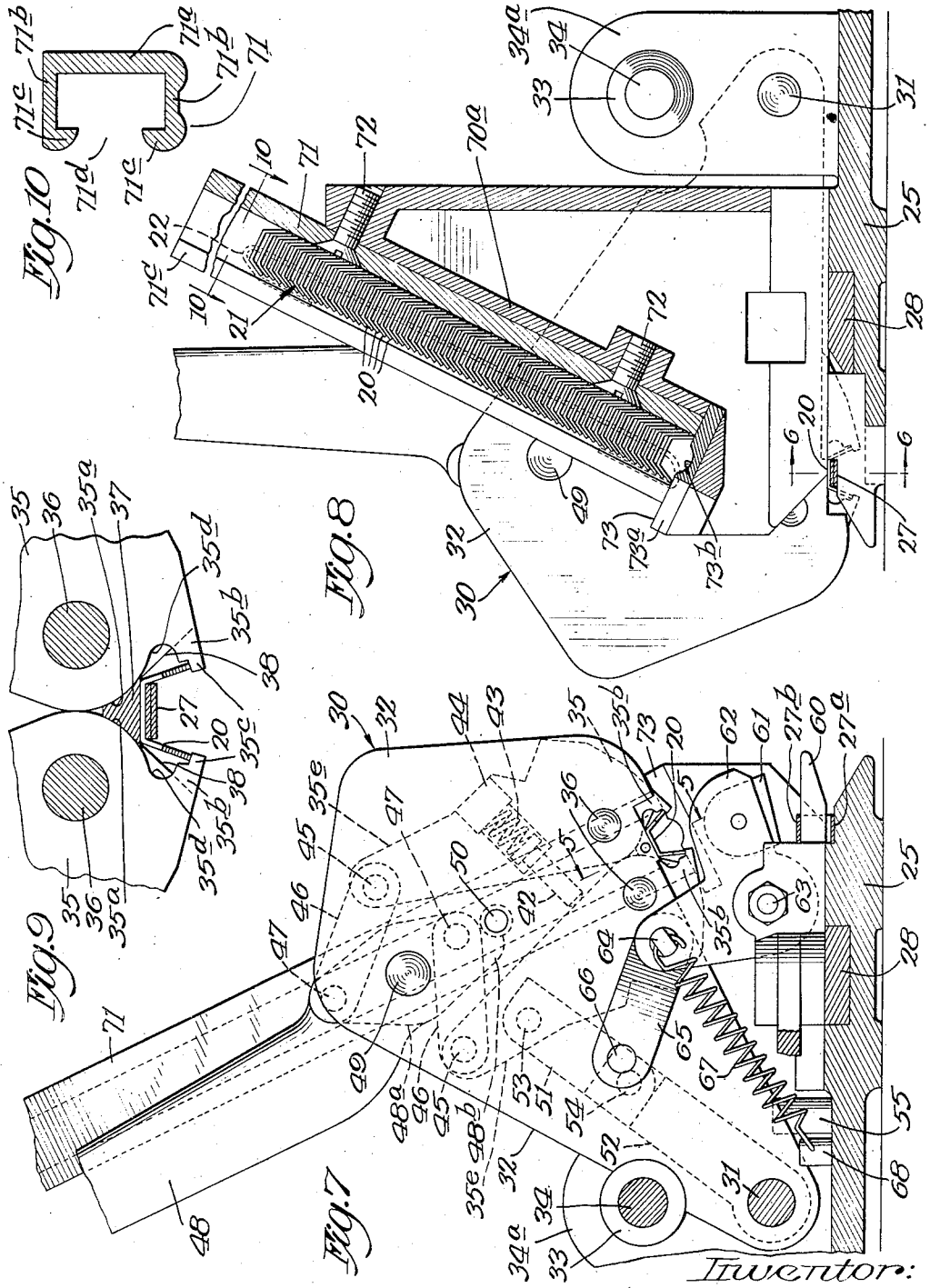


Fig. 10

Fig. 8

Fig. 9

Fig. 7

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STRAP SEAL

Chester M. MacChesney, Chicago, Ill., assignor to Acme Steel Company, Chicago, Ill., a corporation of Illinois

Original application May 25, 1934, Serial No. 727,410. Divided and this application April 20, 1935, Serial No. 17,418

8 Claims. (Cl. 24—23)

This invention relates to improvements in strap seals adapted for use in uniting the overlapping ends of metallic straps or binders which are commonly employed for reenforcing boxes or packages or for binding a plurality of boxes, packages, or other load elements into a group to form a relatively large load unit. The improved seal of the present invention is particularly adapted for forming an improved seal package which is described and claimed in my copending application, Serial No. 727,410, filed May 25, 1934, of which the present application is a division. The improved seal package made up of seals of the form covered by the present application is adapted to be inserted in the magazine or other storage space of sealing apparatus such as that described and claimed in the copending application of Squire Julius Johnson, Serial No. 698,835, filed November 20, 1933, and Ralph H. Norton, Serial No. 727,455, filed May 23, 1934, both owned by Acme Steel Company, the assignee of the present application, in which there is disclosed apparatus by which a metallic strap or binder is drawn taut around a box or package while at the same time a channel-shaped seal is fed from a magazine or other storage space into position between the jaws of the sealing device, which are then moved bodily to position the seal over the overlapping strap ends, after which the jaws of the sealing device are actuated to deform the overlapping strap ends and the seal to provide an interlocking joint. In the operation of such apparatus, in which seals are fed from a magazine or storage space to a position where they embrace the overlapping strap ends, or are located between the jaws of a sealing device which is capable of being moved to cause the seal to embrace the strap ends, it is desirable that a considerable number of seals be placed in the magazine or storage space at one time, so that it will not be necessary to renew the supply of seals at frequent intervals and, if the seals must be placed in the magazine or storage space one at a time, a great deal of the time of the operator is consumed in loading the machine with seals.

It is, therefore, the principal object of the present invention to provide an improved channel-shaped seal which will permit a series of seals to be stacked in nested relationship to each other and bound together to form a unitary package. A further object of the invention is to provide an improved channel-shaped seal having flaring walls and a back wall provided with a perforation so that a series of such seals may be stacked one upon another in nested relationship to permit a binder to be passed through the aligning perforations for the purpose of holding the seals together in a group. Another object of the invention is to provide an improved seal of such form that a plurality of seals will have a considerable degree of flexibility when arranged in a stack, thus permitting them to conform to a magazine when placed therein. A further object of the invention is to provide a seal of such form that when a series of such seals are arranged in a stack they will have a point to point contact with each other, thereby allowing them to conform to the shape of a magazine or the like, while at the same time decreasing the frictional resistance between adjacent seals when the lowermost seal is withdrawn from the stack for use. Other objects 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,—

Figure 1 is a perspective view of the improved seal of the present invention;

Fig. 2 shows a side elevation of the improved seal package of the present invention, which includes a plurality of these seals of the form shown in Fig. 1;

Fig. 3 shows an end elevation of the stack of seals shown in Fig. 2;

Fig. 3a shows an enlarged vertical section through a portion of the stack of seals shown in Fig. 2, illustrating the point to point contact of the seals with each other;

Fig. 4 shows a perspective view of a strap joint formed by applying one of the seals of the present invention to a pair of overlapping strap ends, then bending the side walls of the seal into engagement with the strap, and then shearing the edges of the strap and seal to form interlocking shoulders;

Fig. 5 shows an enlarged section taken on the line 5—5 of Fig. 7, illustrating the means by which the seals of the present invention are fed from the magazine of sealing apparatus into position between the jaws of a sealing device;

Fig. 6 shows an enlarged section on the line 6—6 of Fig. 8, illustrating the application of the channel-shaped seal to the overlapping strap ends before the side walls of the seal have been bent beneath the strap ends and before the interlocking joint has been formed;

Fig. 7 shows a side elevation of the movable

head and sealing jaws, and other associated parts of one form of sealing apparatus with which the improved seal and seal package of the present invention may be employed;

Fig. 8 shows an enlarged vertical section through the sealing apparatus illustrated in Fig. 7 with the movable head of the apparatus shown in side elevation after it has been lowered to bring a seal into engagement with the overlapping strap ends;

Fig. 9 shows an enlarged side elevation of the lower portions of the jaw members of the sealing apparatus with a seal positioned between them and embracing the overlapping ends of a strap, in readiness for the operation of effecting relative movement of the jaw members to bend these side walls beneath the strap ends and then shear the edges of the strap and seal to form an interlocking joint; and

Fig. 10 shows a section through the seal magazine on the line 10—10 of Fig. 8.

As illustrated in the accompanying drawings, the invention comprises an improved channel-shaped seal 20 having a back wall or top wall 20a and integral side walls 20b which diverge downwardly from the back wall at equal angles, thus forming a flaring channel. The side walls 20b are flared continuously from their inner margins to their outer edges and they are of equal depth so that a plurality of seals of similar formation may be stacked one upon the other to form a self-sustaining vertical pile. In order that a stack of these seals 20 may be maintained in superimposed relationship with each other, the back wall of each seal is provided with a centrally located aperture 20c and when a plurality of seals are stacked one upon each other to form a pile 21, as shown in Figs. 2 and 3, these apertures 20c align with each other and may be engaged by a binder or fastener 22 which may be a string or other flexible member but is preferably in the form of a wire of comparatively soft ductile metal which has its projecting ends reversely bent to form hook portions 22a extending along the sides of the stack of seals and holding them in assembled relationship. The stack of seals is thus bound in a compact unit and may be packed for shipment in this fashion after which it may be manipulated readily in the hands of the user, either for using the seals individually in any suitable sealing device, or for placing the stack of seals in the magazine or storage space of sealing apparatus in which the seals are fed to the sealing device or jaws by which they are applied to the overlapping strap ends.

If a series of seals 20 be made up with the surfaces of their side walls perfectly flat and these seals be then arranged in a stack as shown in Figs. 2 and 3, it will sometimes be found that, owing to inequality in the thicknesses of different portions of the side walls of different seals, the stack of seals will assume a curved form from end to end, thus making it inconvenient or impossible to place the stack of seals in a magazine or storage space having straight sides. This difficulty is overcome in the present invention by providing the side walls 20b of the seals with projections 20e which preferably extend inwardly and which are located some distance above the lower edges 20d of the side walls midway between the ends of the seal. These projections are preferably more or less pointed and may be formed by punching inwardly the metal of the side walls, thus forming indentations 20f in the outer surfaces of these side walls. When the seals are arranged in a stack, as shown particularly in Fig. 3a, the projections 20e in the side walls of one seal contact with the outer surfaces of the side walls of the next lower seal, so that the seals have a point to point contact with each other. This arrangement gives the stack of seals sufficient flexibility to permit it to retain an upright position, as shown in Figs. 2 and 3, regardless of inequalities in the thicknesses of the metal forming the walls of different seals and the stack of seals may therefore be inserted in a closely fitting magazine having parallel side walls. In addition, this point to point contact of adjacent seals reduces the frictional resistance between each seal and the next adjacent one so that the bottom seal of the stack may be readily removed endwise, as hereinafter described. The ends of the side walls 20b, at one or both ends of the seal, are preferably cut away along inclined lines 20g to facilitate the guiding of the seal from the magazine to the jaws of the sealing tool.

In Figs. 5 to 10, inclusive, of the drawings, there is illustrated one method of making use of the improved seal and seal package of the present invention in a form of sealing apparatus which is described and claimed in said copending applications of Messrs. Squire Julius Johnson and Ralph H. Norton and also in two pending applications of William C. Childress, Serial No. 592,050, filed February 10, 1932 and Serial No. 629,798, filed August 22, 1932. This apparatus comprises a base plate 25 which is adapted to rest upon the surface of the box or package about which the metal strap or binder is to be secured. The strap 27 is passed around the box or package with one end 27a thereof resting upon the base plate 25 and the other end portion 27b thereof, which leads from the source of supply, is carried over the end portion 27a so that the two end portions overlap and, after the supply portion has been cut off from the source of supply, these ends lie in close contact with each other as shown in Fig. 6. Before the supply portion is cut off, as shown in Fig. 6, the strap is drawn taut by means of gripping devices which engage the end portions thereof and which have relative movement due to the sliding motion of a bar 28 along the base plate 25, as more fully described in said copending applications. A movable head 30 is mounted above the base plate 25 and is adapted to pivot about a pin 31, the upward movement of the head being limited by the engagement of the side plates 32 of the head with bushings 33 mounted upon a pin or shaft 34 which is carried by the upstanding post 34a in which the pin 31 is mounted. The side plates 32 of the head 30 have mounted between them a pair of jaw members 35 which are adapted to pivot about pins 36 extending between these side plates. These jaw members are provided with curved surfaces 35a, concentric with the axes of the pins 36 and these surfaces are adapted to coact with the corresponding curved surfaces of a saddle 37 adapted to be engaged by the back wall of a seal when a seal is positioned between the hook-shaped jaw portion 35b of the jaw members. These jaw portions are provided with notches 35c adapted to be engaged by the edges 20d of the side walls of a seal 20 when this seal is placed between the jaws as shown particularly in Figs. 7 and 9. When placed between the jaw members, the seal 20 is adapted to be held in position while the head 30 is lowered for the purpose of causing the seal to embrace the overlapping ends of the strap. Cutting dies 38 are mounted in slots in the opposite jaw members and

these project into the recesses 35d of the jaws so that when the jaws are moved toward each other about the pivot pins 36, the jaws operate first to bend the side walls 20b of the seal beneath the overlapping strap ends and then to shear the lateral edges of the strap and seal to form an interlocking joint having the characteristics shown in Fig. 4, where the side walls 20b are shown as being projected into positions substantially parallel to the strap but preferably overlapping at their edges, while the lateral edges of the strap and seal are sheared by the cutting dies along the lines 39 and intervening portions of the metal are deflected to form tongues or projections 40 so that portions of the strap and seal interlock with each other along shoulders extending transversely of the strap. A pin 42 is slidably mounted in a bore formed in one of the jaw members and bears at its end against the other jaw member. A coil spring 43 is mounted in the bore to engage the head of this pin and the other end of the spring is engaged by a plug 44 which threadedly engages the bore in the jaw member for the purpose of retaining the spring in place and adjusting its compression. By this arrangement, the jaw members are caused to engage the side walls 20b of the seal with a resilient pressure which causes the seal to be firmly held while the head 30 is being lowered to move the seal into engagement with the strap ends.

The jaw members 35 are provided with upwardly extending arms 35e each of which is pivotally connected by a pin 45 with one of the links 46. These two links are in turn pivotally connected at their other ends by pins 47 with opposite ends of the elongated hub portion 48a of an operating lever 48. This lever is pivotally mounted upon a pin 49 extending between the side plates 32 of the head and when the lever 48 is in a position to cause its hub 48a to extend upright, as shown in Fig. 7, the arms 35e of the jaw members are drawn inwardly toward each other and the jaw portions 35b are correspondingly separated to permit the insertion of a seal 20. The extent to which the jaw members may be thus separated is limited by the engagement of the projection 48b of the hub of the lever with a pin 50 which extends between the side plates of the head. The jaw member 35 which is nearest to the pivot pin 31 about which the head moves is connected to that pin 31 by means of a pair of links 51 and 52. The link 51 is connected to the adjacent jaw member by a pin 53 and the two links are connected to each other by a pivot pin 54. The other end of the lower link 52 is pivotally mounted on the pin 31. When these links are in alignment with each other as shown in Fig. 7, they form a toggle which prevents relative movement of the jaw members 35 by manipulation of the lever 48. This allows the head 30 to be lowered by the lever 48 without any relative movement of the jaw members until the seal 20 is caused to embrace the overlapping strap ends as shown in Fig. 9. After that has been accomplished, the lower link 52 engages a stop pin 55 mounted in the base plate 25 with the result that this link is held against further movement and the toggle is broken so that relative movement of the jaw members 35e is then permitted as the lever 48 is moved about the pivot pin 49.

For the purpose of permitting the strap 27 to be cut off from the source of supply by the action of moving the head 30 downwardly, a stationary cutting die 60 is mounted upon the base plate 25. The cutting die is adapted to cooperate with a cutting blade 61 carried by a cutting lever 62 which is mounted on the bolt 63 by which the stationary cutting die is secured to a lug extending upwardly from the base. The cutting lever 62 is pivotally connected by a pin 64 with a link 65 which is in turn pivoted on a pin 66 carried by the adjacent side plate 32 of the head. With this construction, the initial downward movement of the head 30 causes the blade 61 to cooperate with the stationary cutting die 60 to sever the strap 27 from the source of supply and then the continuous downward motion of the head 30 causes the seal 20 to be positioned over the overlapping strap ends as shown in Fig. 9, the upper portion 27b of the strap which has just been cut off from the source of supply being forced downwardly into close contact with the underlying portion 27a which rests upon the base plate 25. A coil spring 67 connects the pivot pin 64 with a stationary pin 68 projecting upwardly from the base 25. When the head 30 is moved downwardly, this spring 67 is elongated by the relative pivotal movement of the cutting lever 62 and the link 65, and the spring therefore tends to elevate the head 30 and to maintain it in the position shown in Fig. 7.

At the side of the head 30 opposite the cutting die, a bracket 70 is detachably mounted on the base plate 25 and extends upwardly therefrom. This bracket has an upwardly extending inclined flange 70a to which a channel-shaped seal magazine 71 is secured by screws 72. The lower end of the magazine 71 is closed by a flat guide plate 73 over which the seals 20 are adapted to be moved in passing to a position between the jaws 35b. The magazine 71 is in the form of a channel having a back wall 71a, side walls 71b, and front flanges 71c which project inwardly from the side walls to overlap the seals 20 which are mounted in the magazine, leaving a slot 71d through which the seals may be observed and through which access may be had to the wire 22 by which the stack of seals are held together when they are first placed in the magazine. The guide plate 73 is provided with a groove 73a extending outwardly between the flanges 71c of the magazine so that when the stack 21 of seals 20 is initially placed in the magazine, the lower end portion of the wire 22 will occupy this groove 73a and thus permit the lowermost seal to rest directly upon the plate 73. The hook portion 22a of the wire at the upper end of the stack will be exposed through the slot 71d between the flanges. The operator may then bend downwardly the lower hook portion 22a and, after bending upwardly the upper hook portion 22a of the wire, a pull exerted on the wire will cause it to be withdrawn from the seals so that they will then be free of each other within the magazine and may be fed therefrom over the guide plate 73 by the action of a plunger 75 which slides through an opening 76 in one side wall of the seal magazine to project the lowermost seal endwise through an opening 77 in the other side wall and into a position between the jaws of the jaw members 35. The plunger 75 is circular in cross-section and may be operated manually or by the actuation of the strap stretching mechanism as disclosed in said applications, to reciprocate in a groove 73b formed in the guide plate. The plunger is provided at its forward end with a projection 75a which is adapted to hook over the end of the top wall 20a of the lowermost seal of the stack so that this seal is definitely separated from those above it. The point to point contact be-

tween adjacent seals makes it possible to slide the lowermost seal readily from the magazine to a position between the jaws. This movement is facilitated by the inclined surfaces 20c at the end of the seal which cause the lower edges of the side walls 20b to be guided to the proper positions within the jaws. In this way, a stack of seals having a nested relationship with each other may be readily inserted in the magazine and then, after being put in condition for use by withdrawing the wire 22, they may be readily and accurately fed to a position between the jaws.

Although one form of the improved seal has been shown and described by way of illustration in connection with the disclosure of one method of using this seal, it will be understood that the invention may be embodied in various other forms coming within the scope of the appended claims.

I claim:

1. A strap seal of channel form comprising a back wall and side walls, said side walls having projections located entirely above the lower edge thereof to engage the side walls of an adjacent seal when two of said seals are superimposed upon each other.

2. A strap seal of channel form comprising a back wall and side walls, each of said side walls having a central projection located midway between the ends thereof and entirely above the lower edge thereof.

3. A strap seal of channel form comprising a back wall united with outwardly diverging side walls, said side walls each having a single projection located entirely above the lower edge thereof and adapted to contact with a flat surface on the side wall of an adjacent seal when two of said seals are superimposed upon each other.

4. A strap seal of channel form comprising a back wall united with outwardly diverging side walls, said side walls each having inwardly extending pointed projections located entirely above the lower edge thereof and adapted to make a point contact with the side wall of an adjacent seal when two of said seals are superimposed upon each other.

5. A strap seal of channel form comprising a back wall united with outwardly diverging side walls, each of said side walls having a single inwardly projecting projection located midway between the ends thereof and entirely above the lower edge thereof.

6. A strap seal of channel form comprising a back wall united with outwardly diverging side walls, each of said side walls having an inwardly extending projection adapted to engage the side wall of an adjacent seal when two seals of the same size and having their side walls diverging at the same angle are superimposed upon each other, the back wall of said seal having a centrally located aperture therethrough.

7. A strap seal of channel form comprising a back wall united with outwardly diverging side walls, each of said side walls having a pointed projection adapted to make a point contact with the side wall of an adjacent seal when two seals of the same size and having their side walls diverging at the same angle are superimposed upon each other, whereby the superimposed seals are capable of rocking endwise upon each other.

8. A strap seal of channel form comprising a back wall and outwardly diverging side walls, the walls of said seal being provided with a pair of oppositely disposed projections located midway between the ends thereof and entirely above the lower edges thereof for engaging the walls of another seal when two of said seals of the same size and form are superimposed upon each other, whereby the superimposed seals are capable of rocking upon each other.

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