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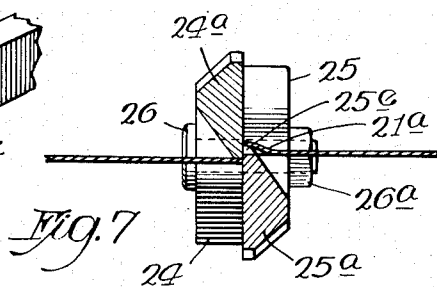
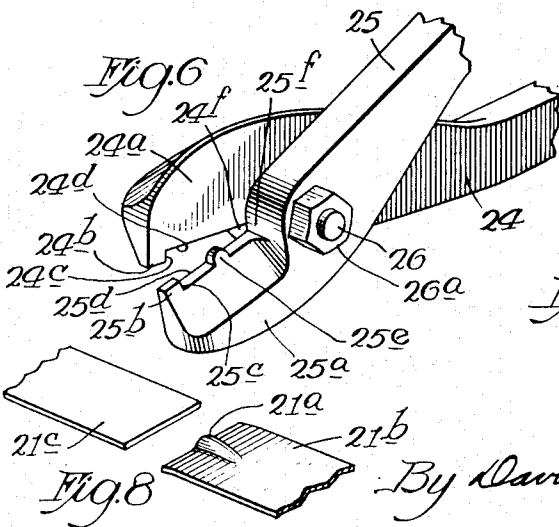
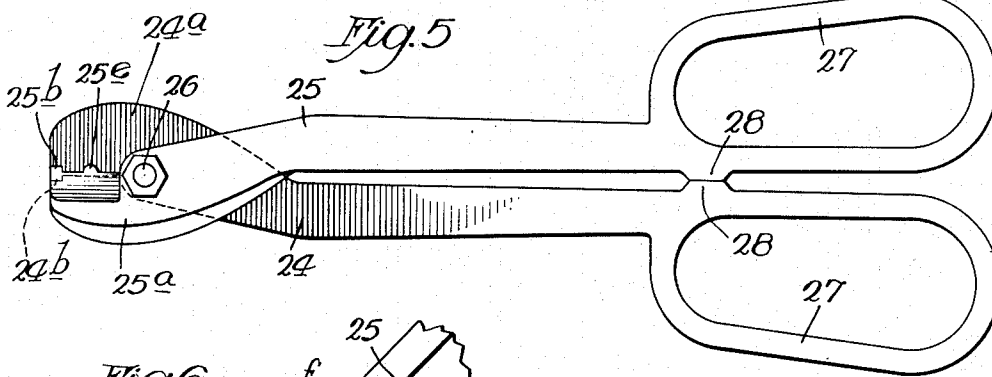
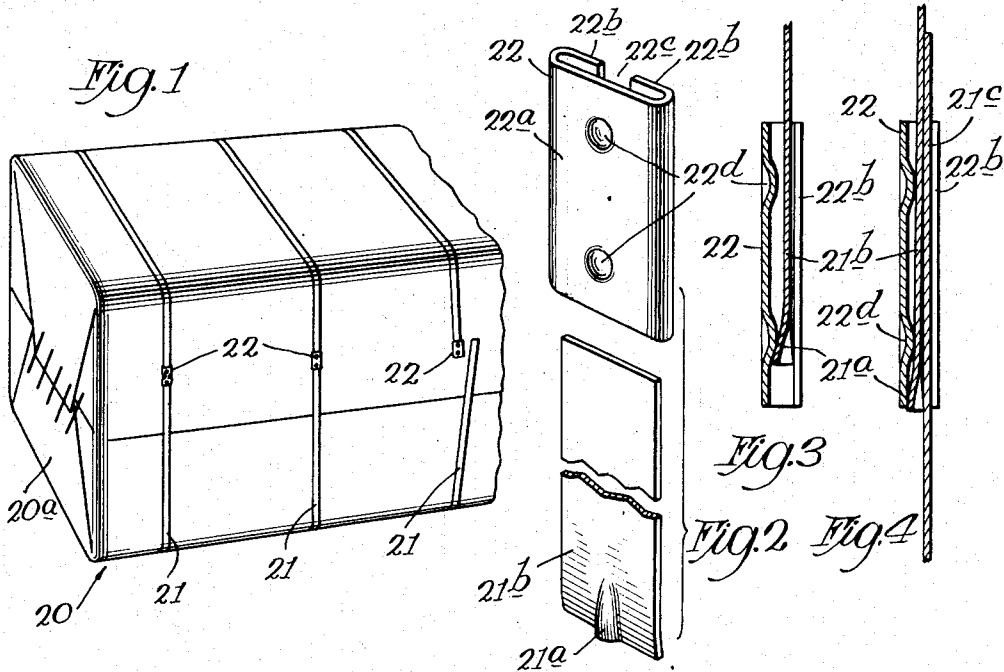
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2,214,110

STRAP CUTTING TOOL

Filed Aug. 13, 1937

2 Sheets-Sheet 1



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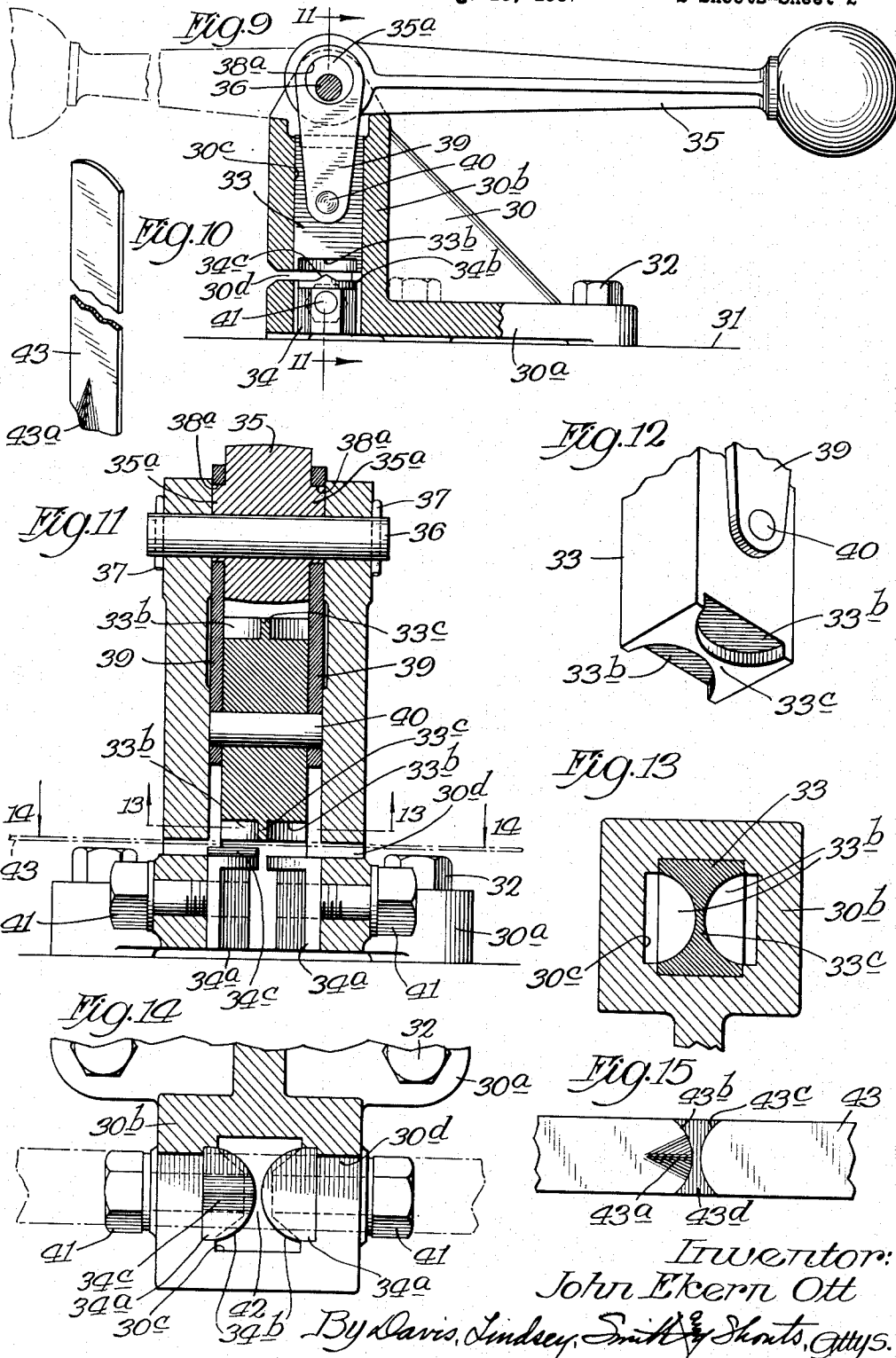
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,214,110

STRAP CUTTING TOOL

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Application August 13, 1937, Serial No. 158,850

4 Claims. (Cl. 153—2)

This invention relates to improvements in strap cutting tools and its purpose is to provide improved means for cutting a supply of flat, flexible steel strapping or the like into lengths suitable for application to boxes, bales, packages, and the like for reenforcing purposes. It is the common practice in this art to apply steel strapping and other flexible binders to boxes, packages, and the like, or to groups of such packages, for the purpose of reenforcing them or holding them together and the overlapping ends of the pieces of strap passing around such a package or group of packages are commonly secured together by means of metal seals which embrace the overlapping strap ends and which are adapted to be deformed, along with the portions of the strap enclosed therein, to provide interlocking joints. One form of such an interlocking joint is disclosed in the United States patent of Ralph H. Norton, No. 1,260,016, dated March 19, 1918.

During the application of flexible binders to some objects, such as compressible bales of cotton and the like, considerable inconvenience has heretofore been encountered by reason of the difficulty of holding the seals in proper positions with respect to the overlapping strap ends preliminary to and during the operations of forming the interlocking joints, and in my co-pending application, Serial No. 128,450, filed March 1, 1937, there is disclosed a new form of seal and a new method of using that seal by which this difficulty is overcome and each pair of overlapping strap ends is held in frictional engagement with respect to a surrounding seal until the operator is able to operate upon that seal to provide an interlocking joint. By this method, the ends of any number of binding straps surrounding a box, bale, or package, may be temporarily secured in overlapping relation with respect to surrounding metal seals and a sealing tool may subsequently be brought into use for operating upon all of these seals to deform them and provide interlocking joints. The invention disclosed in said co-pending application involves the deformation of one end of each link of strapping to provide an inclined wedging surface which is adapted to cooperate with a tubular seal threaded on to the strapping to force the overlapping strap ends into tight wedging engagement with each other and with the walls of the seal. One end of each length of strapping which is employed in the practice of this method is in its normal flat condition and after a length of strapping, having a tubular seal threaded thereon to a point adjacent the deformed end thereof, has been passed

around a bale or package, the flat end of this length of strapping may be inserted through the tubular seal, and the seal may then be passed into engagement with the inclined wedging surface on the deformed end of the strap to cause the seal and the overlapping strap ends to be held in proper assembled relationship to each other until a sealing tool can be brought into operation to shear and bend, or otherwise deform, the seal and the strap ends. This mode of operation is particularly advantageous in connection with the strapping of compressible bales and the like to which straps of predetermined length may be applied while the bales are under compression so that the straps may be brought to a reasonable degree of tautness by a manual operation preliminary to establishing a temporary frictional joint by forcing the seal into engagement with the inclined wedging surface on one strap end, after which the seal and strap ends are deformed to provide an interlocking joint preliminary to permitting the bale to expand to cause the straps to be drawn taut around the bale.

An important advantage of the method of strapping described above is that it permits the binding straps to be cut to length from a source of supply in the field of operations and the principal object of the present invention is, therefore, to provide an improved cutting tool by which the lengths of strapping may be cut off from the source of supply with a simultaneous formation of one deformed end on each strap length, so that each length of strapping is then in readiness for the application thereto of a tubular seal. Another important object of the invention is to provide an improved cutting tool by which metal strapping or the like may be severed with the formation of an inclined wedging surface on the strap end at one side of the cut while leaving the strap at the other side of the cut in its initial flat condition. Still another object of the invention is to provide a tool for cutting lengths of strapping from a source of supply with an inclined wedging surface at one end of each length and a rounded flat end at the opposite extremity thereof. 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 two embodiments of the invention are illustrated. In the drawings,

Figure 1 shows a perspective view of a portion of a bale of cotton or other compressible mate-

rial having applied thereto flexible binders which have been cut from a source of supply by means of the tool of the present invention;

Fig. 2 is a perspective view of a deformed end of the strap length and of a tubular seal adapted to cooperate with that strap end in providing a temporary frictional joint when the other end of the strap is threaded through the seal and the seal is brought into engagement with the deformed ends of the strap;

Fig. 3 shows a longitudinal section through the deformed end of the strap with the seal applied thereto, before the other end of the strap has been threaded through the seal;

Fig. 4 shows a longitudinal section through a strap joint after the flat end of the strap has been threaded through the seal and after the seal has been brought into engagement with the inclined wedging surface on one end of the strap to form a frictional joint;

Fig. 5 shows a top plan view of one form of portable hand tool, embodying the features of the present invention, which may be employed to sever a length of strap from a source of supply and simultaneously to form an inclined wedging surface on one end of the strap;

Fig. 6 is a perspective view of the jaws of the tool illustrated in Fig. 5 when these jaws are in partially open position;

Fig. 7 shows a sectional view of the jaws of the tool illustrated in Figs. 5 and 6 after the jaws have been closed upon each other to sever the strap;

Fig. 8 is a perspective view of the adjacent ends of the strap on opposite sides of the cut formed by the tool shown in Figs. 5, 6, and 7, after the ends of the strap have been separated from each other;

Fig. 9 shows a vertical section through a modified form of tool embodying the features of the present invention which is adapted to be secured to a suitable support during use;

Fig. 10 is a perspective view of the opposite ends of a length of strap cut from a source of supply by the use of the tool illustrated in Fig. 9;

Fig. 11 shows an enlarged vertical section taken on the line 11-11 of Fig. 9;

Fig. 12 is a perspective view of the movable plunger or cutting or shearing die which is embodied in the tool shown in Figs. 9 and 11;

Fig. 13 shows a horizontal section taken on the line 13-13 of Fig. 11;

Fig. 14 shows a horizontal section taken on the line 14-14 of Fig. 11; and

Fig. 15 shows a top plan view of a section of metal strapping which has been operated upon by the tool shown in Figs. 9 and 11, illustrating the formation of a projecting rib on one end of the strap and the cutting out of a portion of the strapping between this rib and the other cut end which retains the original flat condition of the strapping.

As shown in Fig. 1, a bale 20, of cotton or other compressible material, having a cover 20^a applied thereto, is reenforced by a plurality of surrounding metal straps 21, formed preferably of steel or the like, which are adapted to have their overlapping ends secured together by means of metal seals. The strap 21 at the right of this figure has a seal 22 applied thereto at one end of the strap and the other end of the strap has not yet been threaded through the seal. The strap 21 in the middle position has both ends of the strap threaded through the seal and, in this condition, a frictional joint has been established which

holds the parts in assembled relationship preliminary to the deformation of the seal and the enclosed strap ends to provide an interlocking joint such as that shown on the strap at the left hand side of Fig. 1, where the marginal portions of the seal and the enclosed strap ends are deformed by means of a suitable tool or the like.

In Figs. 2 and 3 of the drawings, the seal 22 is shown as being a flat, tubular member having a body portion 22^a provided with flanges 22^b which are reversely bent upon the body portion, but spaced therefrom, with their edges separated from each other to provide a longitudinal open slot 22^c. The body portion 22^a of this seal is provided with a pair of inwardly punched circular projections 22^d which are spaced equal distances from the end of the seal and which are located midway between the lateral edges thereof. When this seal is threaded on to the strap shown in the lower part of Fig. 2, one of the projections 22^d is adapted to cooperate with a projection 21^a formed on the strap at one extremity thereof, which projection 21^a provides an inclined wedging surface adapted to cooperate with the projection 22^d to force the strap toward the opposite flanges 22^b of the seal. In Fig. 4 of the drawings, the end 21^b of the strap which carries the projection 21^a, and also the opposite flat end 21^c of the strap, are both threaded through the seal 22, and it will be apparent that when the seal is forced downwardly against the inclined projection on the end 21^b of the strap, both strap ends will be forced toward the flanges 22^b of the seal and a frictional joint will be formed by which the seal and the enclosed strap ends are held in fixed relation to each other. This temporary frictional joint is adapted to be subsequently operated upon by a sealing tool to form a permanent interlocking joint.

In Figs. 5, 6, and 7 of the drawings, there is illustrated one form of strap cutting tool embodying the features of the present invention by which a length of strap may be cut from a source of supply with the formation of the projection 21^a on the strap at one side of the cut, while leaving the adjacent cut end of the strap in its original flat state. This tool is of a scissor-like formation, covering a pair of levers 24 and 25 which are pivoted upon each other by means of a bolt 26 engaged at one end by a nut 26^a, and provided at the ends of their longer arms with open handles 27 into which the fingers of the operator are adapted to be inserted. These levers are provided on the side of the bolt 26 opposite the handles 27 with jaws 24^a and 25^a which are adapted to cooperate with each other, when the jaws are closed upon each other, to sever a strap. The extent to which the jaws may be closed is limited by a pair of lugs 28 formed on the levers adjacent the handles and adapted to engage each other. One jaw 24^a is provided at its extremity with a projection 24^b adapted to form a shoulder 24^c which holds the strap in its proper position between the jaws while it is being cut, and a similar projection 25^b, forming a similar shoulder 25^c, is formed on the other jaw. The jaw 24^a has a cutting or shearing edge 24^d which is adapted to cooperate with a similar cutting or shearing edge 25^d on the other jaw to cut the strap. The jaw 25^a is provided at an intermediate point with an upwardly extending projection 25^e, having a substantially semi-circular end surface, which, when the strap is severed by the action of the cutting edges, is adapted to project the material of the strap at one side of

the cut transversely to its own plane to form a projection 21^a on one end of the strap which has an inclined wedging surface thereon. The shoulders 24^c and 25^c are preferably spaced from the shoulders 24^d and 25^d respectively, at the inner ends of the cutting edges of the jaws, a distance substantially equal to or slightly greater than the width of the strap to be cut so that if the strap is properly inserted between the jaws against the shoulders 24^d and 25^d, the projection 25^c will form a deformation in the strap end at a point midway between its edges.

In the form of the invention shown in Figs. 9, 11, 12, 13, and 14, a frame 30 is provided with flanges 30^a adapted to rest upon a suitable support 31 to which the frame is secured by cap screws 32 or the like. This frame 30 is provided with a vertically extending tubular portion 30^b having formed therein a rectangular opening or passage 30^c in which there is mounted a movable shearing or cutting die 33 adapted to cooperate with a stationary shearing or cutting die 34 mounted in the lower end of the opening. The tubular portion 30^b is provided with a transverse slot 30^d adapted to receive the strap which is to be operated upon by the shearing dies 33 and 34. The movable die 33 is adapted to be moved into engagement with the strap seated on the lower die by means of an operating lever or handle 35 which is pivotally mounted upon a pin 36 extending through the opposite walls of the tubular portion 30^b and engaged at its ends by transverse cotter pins 37, as shown in Fig. 11. The hub of the operating lever 35 is provided with eccentric portions 35^a which pivotally engage apertures 38^a formed in links 39 which extend downwardly on opposite sides of the movable die 33 with their lower ends pivotally connected to this die by a transverse pin 40, having its ends arranged to form a sliding engagement with the walls of the passage 30^c.

The lower cutting or shearing die 34 is formed as two separate complementary parts numbered 34^a which are secured in position within the lower end of the passage 30^c by means of studs 41 passing through apertures in the wall of the passage and threadedly engaging apertures in the die members. These die members 34^a are provided at their upper ends with arcuate flanges 34^b which are spaced apart as shown at 42 in Fig. 14, and which are of a width slightly greater than the width of the strap to be operated upon. One of these die members 34^a is provided on its upper side with an upwardly extending projection 34^c, of angular cross section, which is adapted to engage the under side of the strap to force it upwardly and thereby provide a projection 43^a in the strap 43 being operated upon by the tool, as shown in Fig. 10.

The movable cutting die 33, which is adapted to be reciprocated by the operation of the lever 35, is reversible in position, and is provided at each end with a pair of arcuate recesses 33^d of such shape that they are adapted to receive and be closely fitted by the arcuate projections 34^b formed on the lower die members. These arcuate recesses 33^d in the upper die member are separated by an intervening projection 33^c which is adapted to extend downwardly to the gap 42 between the cutting flanges 34^b of the lower die

members. It will be apparent that when the lever 35 is moved from the position shown by full lines in Fig. 9 to the position shown by dotted lines in that figure, the upper cutting die 33 will be moved downwardly to shear off the strap along two curved cutting lines 43^b and 43^c, shown in Fig. 15, and that an intervening portion of strap-ping 43^d will be severed from both adjacent strap portions, one of which will have formed thereon the projection 43^a which forms an inclined wedging surface having a depth gradually increasing toward the end of this strap end, while the strap end at the other side of the removed portion 43^d will be in its original flat condition.

Although certain forms of the improved strap cutting tool of the present invention have been shown and described by way of illustration, it will be understood that they may be constructed in various other embodiments coming within the scope of the appended claims.

I claim:

1. A strap cutting tool comprising a pair of pivoted levers having shearing dies adapted to cut a strap transversely throughout its width, one of said dies having a part adapted to form a projection extending longitudinally of the strap from one side of the cut, said shearing dies having shoulders adapted to engage an edge of the strap to position it with respect to said projection part.

2. A strap cutting tool comprising a frame, a pair of stationary die members removably mounted in said frame and having opposite curved cutting edges diverging away from each other, a movable die member mounted in said frame and having recesses adapted to receive portions of said first named die members and having a part adapted to extend between said first named die members, one of said stationary die members having a projection adapted to deform a portion of the strap inserted between said stationary die member and said movable die member to produce a projection in the strap extending transversely to the plane of the strap, and means for actuating said movable die member.

3. A strap cutting tool comprising a pair of pivoted levers having pivoted shearing blades adapted to cut a strap transversely throughout its width, one of said blades having shoulders at its ends adapted to position the strap on the blade during the cutting operation, one of said blades having a projection extending beyond the cutting edge thereof to form on one cut end of the strap during the cutting operation a projection having a wedging surface inclined longitudinally of the strap.

4. A strap cutting tool comprising a frame, a stationary die and a movable die mounted in the said frame, said dies having spaced rounded cutting edges adapted to shear the strap transversely throughout its width to form rounded extremities on two strap ends with the removal of an intervening part of the strap, one of said dies having a tapered projecting part of convex cross-section which is inclined away from one of said rounded cutting edges, whereby the operation of cutting the strap forms an inclined projection on one of said cut strap ends which is inclined longitudinally of the strap.

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