April 7, 1936. C. B. FROST 2,036,866

MEANS FOR FORMING A BAND ABOUT A PACKAGE OR THE LIKE

Filed March 21, 1934 3 Sheets-Sheet 1

Fig. 1.

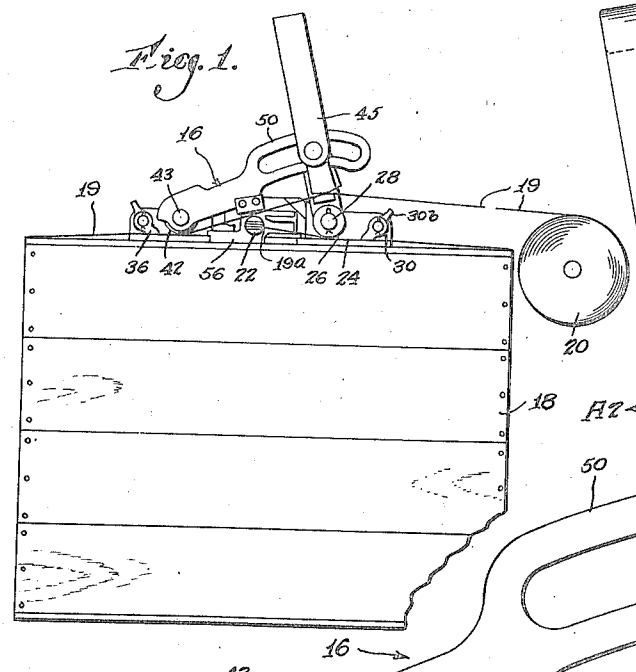


Fig. 2.

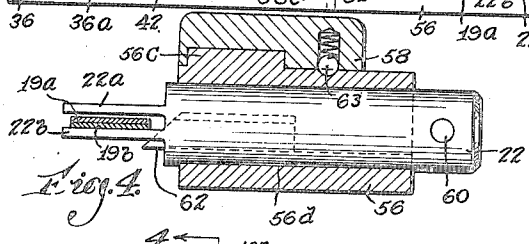


Fig. 4.

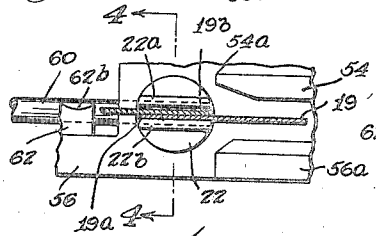


Fig. 3.

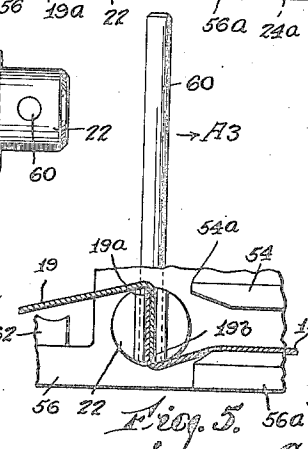


Fig. 5.

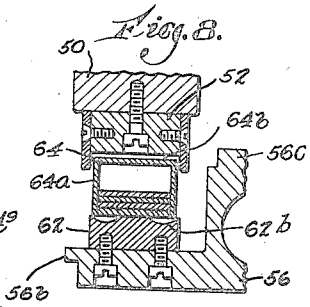


Fig. 8.

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MEANS FOR FORMING A BAND ABOUT A PACKAGE OR THE LIKE

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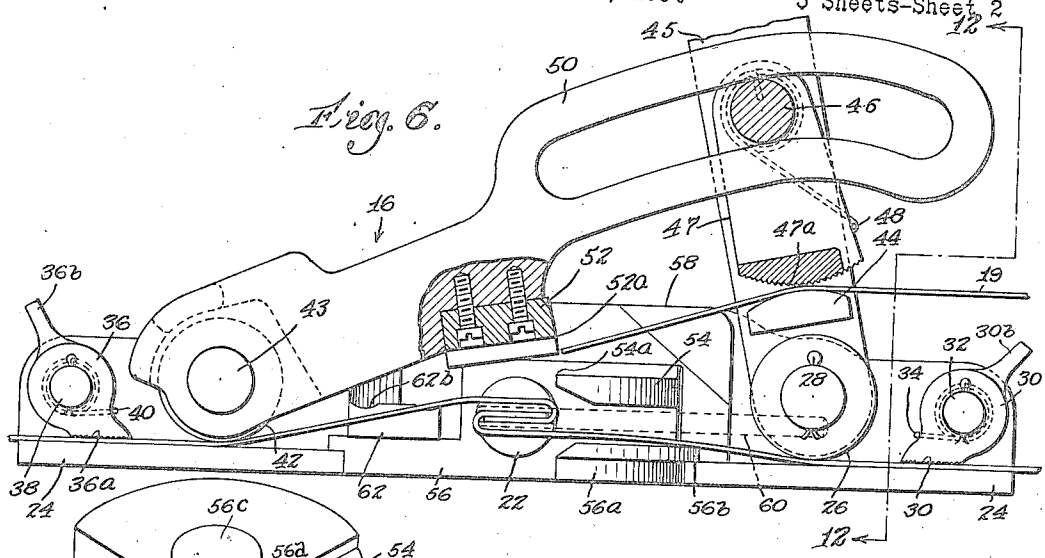


Fig. 6.

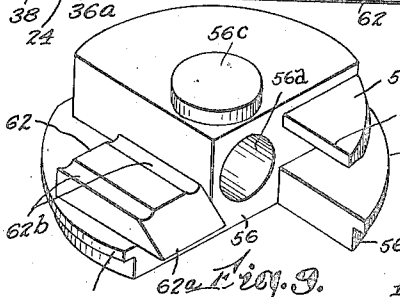


Fig. 9.

Fig. 7.

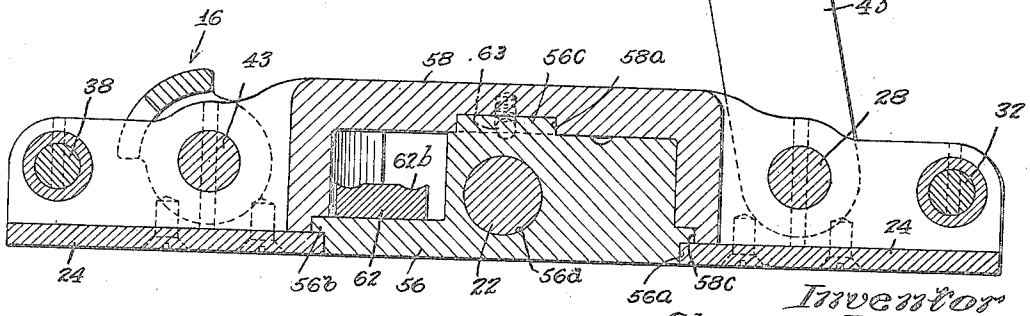


Fig. 10.

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MEANS FOR FORMING A BAND ABOUT A PACKAGE OR THE LIKE

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Fig. 11.

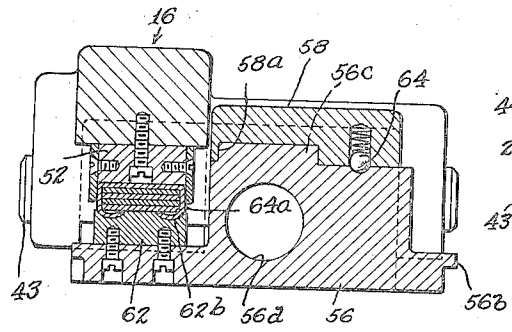
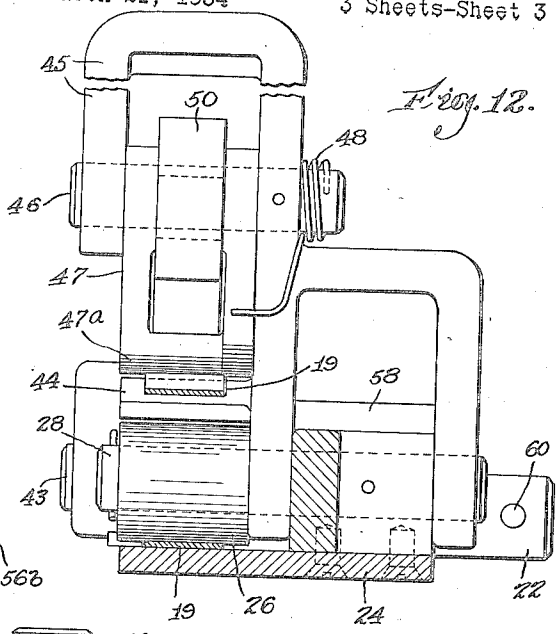


Fig. 12.



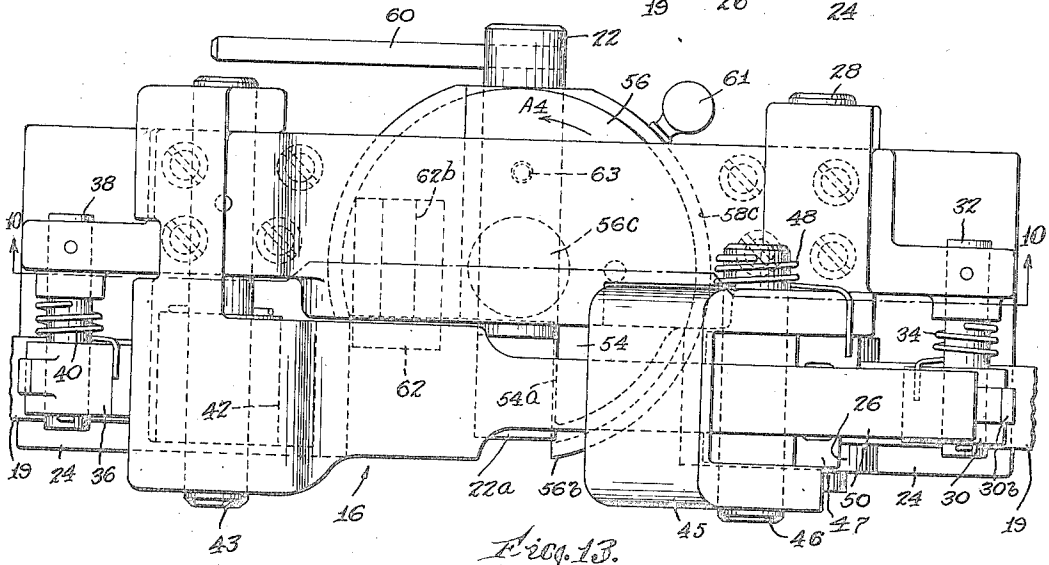


Fig. 13.

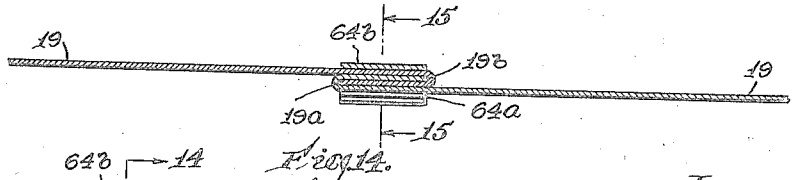


Fig. 14.

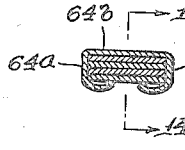


Fig. 15.

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UNITED STATES PATENT OFFICE

2,036,866

MEANS FOR FORMING A BAND ABOUT A PACKAGE OR THE LIKE

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Application March 21, 1934, Serial No. 716,726

11 Claims. (Cl. 81—9.1)

This invention relates to improvements in means and method for forming a band about a package or the like. More especially it has to do with the formation of a band having interengaged hooked ends which are held firmly together by a seal.

The principal object of the invention is to provide for attaching a band around a package so that its end portions will overlap, then forming said overlapping portions into hook-shape with one hook engaging the other, and finally applying a seal to the hooked-ends to bind them firmly together. Another object is to provide a tool by which the aforesaid application can be effected, said tool to be capable of tightening a band around a package, holding it there, cutting off the band to provide overlapping end portions, bending these end portions into hook-shape with one hook engaging the other, and attaching a seal to said hooked-ends to bind them together and thereby hold the band taut about the package.

The appended drawings show a tool embodying the present invention and by which the improved method may be practiced, but these drawings are to be taken as illustrative only for it is intended that the patent shall cover by suitable expression in the appended claims whatever features of patentable novelty exist in the invention disclosed.

In the drawings:

Figure 1 is an elevation showing a tool, embodying the invention, being used to apply a metal band to a box;

Figure 2 is an elevation of the tool showing the band tightened and ready to be cut off from the supply roll;

Figure 3 is a similar view of a portion of the tool showing the band cut off and ready to have its ends bent into hook form;

Figure 4 is an elevation in section as on line 4—4 of Figure 3, showing the bending arbor in full view;

Figure 5 is an elevation showing the bending operation partly completed;

Figure 6 is an elevation of the tool showing the bending operation completed with the hooked ends of the band interengaged;

Figure 7 is a similar view showing a seal being applied to the interengaged ends;

Figure 8 (Sheet 1) is an elevation in section as on line 8—8 of Figure 7 but showing the sealing dies in separated relation;

Figure 9 is a perspective of the rotatable anvil;

Figure 10 is an elevation in section as on line 10—10 of Figure 13;

Figure 11 is an elevation in section, as on line 8—8 of Figure 7 showing the completion of the sealing operation;

Figure 12 is an elevation in section as on line 12—12 of Figure 6;

Figure 13 is a plan view;

Figure 14 is a longitudinal section as on line 14—14 of Figure 15, showing the finished sealed band; and

Figure 15 is an elevation in cross section as on line 15—15 of Figure 14.

Referring to the drawings and more particularly to Figures 1 and 2, the tool 16 is shown resting on the upper side of a box 18 about which a binding band 19 is being applied. This band is conveniently supplied in the form of a roll 20 which may be supported on a suitable standard (not shown) if desired. The free end 19*a* of the band is placed in the tool with its very end opposite the left side (as seen in Figures 1 and 2) of a bending arbor 22 to be more particularly hereinafter described. The band is then placed between the base plate 24 of the tool and a roller 26 which is mounted on axle 28. The band is next slipped under a clamp 30 which is rotatable on an axle 32 and is acted upon by a coiled spring 34 which tends to swing the clamp counterclockwise and thus hold its serrated foot 30*a* against the band and thus clamp the band against the base plate 24. The clamp may be manually rotated against the force of spring 34 by the handle 30*b* to permit insertion of the band.

The latter is then passed around the box (which is to be understood as representative of a package, carton, bale or the like) and slipped under another clamp 36 which is at the opposite end of the base plate from clamp 30. Clamp 36 is similar to clamp 30 being similarly mounted on an axle 38 and similarly acted upon by a coiled spring 40 and similarly clamps the band to the base plate 24. Its shoe 36*a* is, however, reversely disposed as clearly seen in Figure 2. The band is then passed under a second roller 42, mounted on axle 43, and thence over an arm 44 provided on a hand lever 45 which is fulcrumed on the axle 28. This lever is also provided with an axle 46 on which is pivoted a dog 47 having a serrated eccentric face 47*a* adapted to coact with the face of arm 44. The dog is urged clockwise about the axle 46 by a coiled spring 48 so that when the lever is moved to the right in the direction of arrow A1 the dog and arm grip the band tightly between them and thus enable it

to be tightened about the box by the said movement of the lever. During this tightening the clamp **30** holds the free end of the band from slipping but clamp **36** releases by virtue of the movement of the band. When the tightening swing of the lever ends, the tendency of the band to slip back is resisted by the clamp **36** which locks the band between itself and the base plate **24**. This permits the lever **45** to be swung in the direction of arrow A2, the dog **47** releasing and permitting its face **47***a* to slide along the band. The described operation of lever **45** may be repeated as often as desired until the slack of band has been taken up about the box, but, as will later appear, the band need not be tightened to the fullest extent, indeed it is intended that it shall only be drawn reasonably taut.

The supply can now be cut off and this is readily accomplished by a further swing of the lever **45** in direction of arrow A2. This movement of the lever and consequently of the axle **46** causes a second lever **50** to swing downward about the axle **43**. This lever carries a pressure block **52** (see Figure 6) on its under side, the right edge **52***a* of which constitutes a cutter. As the lever **50** swings downward this cutting edge **52***a* engages the band substantially opposite the edge **54***a* of an arm **54** which is mounted on a rotatable anvil **56**. The band is thus severed and the end **19***b* drops down upon the other end **19***a*. It is to be noted that the cutting means is so located that the newly formed end **19***b* comes opposite the other side of the bending arbor **22** previously mentioned. After the cutting is completed, lever **45** is swung to the right in direction of arrow A1, thus raising lever **50** to its position seen in Figure 2.

The next operation to be performed is the bending of the overlapping band ends. Mounted on the base plate **24** is the hereinbefore mentioned rotatable anvil **56**. Its base **56***a* fits in a circular opening **24***a* of the base plate and an annular flange **56***b* overlies the edge of this opening. A suitable holding member **58** is secured to the base plate to hold the anvil in rotatable position. This member has a socket **58***a* in its upper part which forms the upper bearing for a vertical trunnion **56***c* on the anvil and has suitable grooves **58***c* to receive the annular flange **56***b* of the anvil. A transverse hole **56***d* is provided in the anvil, through which can be slipped the bending arbor **22**, (see Figure 4). This arbor comprises a cylinder shaft portion provided at one end with a handle **60** and with bending jaws **22***a*, **22***b* at the opposite end. These jaws are relatively thin plates extending outward from the cylindrical portion of the arbor and are spaced apart so as to receive the overlapped ends **19***a* and **19***b* of the band between them.

After the band has been cut as aforesaid the arbor is pushed through the hole **56***d* in the anvil until the jaws **22***a*, **22***b* embrace the overlapped ends of the band as shown in Figures 3 and 4. The handle **60** is then turned to rotate the arbor clockwise, as seen in Figures 2 and 4. The latter figure shows the relative positions of the arbor and the band ends after the handle **60** has been turned through an angle of 90° in the direction of the arrow A3. When the handle has been turned through 180°, the jaws of the anvil and the ends of the band will appear as shown in Figure 6. A hook has been formed on each end of the band and these are interengaged. During this formation the band has been additionally tightened being drawn up slightly on both sides of the box, the clamps **30** and **36** releasing to permit the additional tightening but binding the band against the base plate to prevent any backsliding or undesired slipping of the band. When the bending is completed, the arbor is withdrawn from the hooked ends and also from the anvil **56**.

A knob **61** on the anvil is now grasped and the latter rotated a quarter turn in the direction of arrow A4 (Figure 13) to swing the arm **54** away from the band and to position a die **62** under the interengaged hooked ends. This die **62** is of course mounted on the rotatable anvil and when the rotative movement of the latter is stopped by the spring detent **63** (see Figure 4) provided in the holding member **58**, this die is directly under the hooked ends as seen in Figure 7. The inclined face **52***a* on the die enables it to slide easily under these interengaged ends. The lever **45** is now swung to the left in direction of arrow A2 thus causing lever **50** to swing downward and bring its block **52** against the hooked ends. Sufficient pressure is now applied to bring the four overlapping sections of the band tightly together, substantially as shown in Figure 8.

The lever **45** is once more swung to the right in the direction of arrow A1, thus lifting lever **50** so that a suitable generally U-shaped seal **64** can be placed over the overlapped ends and under the upper block **52**. Lever **45** is now given its final swing to the left to bring lever **50** and block **52** down toward the lower die **62**. The seal is forced downward on the hooked ends and its sides **64***a* are forced under the ends by virtue of the recessed faces **62***b* of the lower die. Sufficient pressure is then applied to bind the overlapped interengaged ends of the band tightly together with the seal.

The arbor **56** is rotated back to its former position, the clamps **30** and **36** released and tool slipped sidewise away from the band leaving it tightly sealed about the box. Thus the invention provides for applying a band to a box or the like, for holding it therearound while the supply is cut off to provide overlapping ends, for bending said overlapping ends into hook form in interengaged relation, and for applying a seal to the interengaged hooked ends to bind them together and thus secure the band tightly about the box.

I claim:

1. A tool for forming a band about a package comprising, in combination, a base plate having a portion underlying the band; holding means cooperating with the base plate for holding the band around the package with end portions overlapping; a rotatable arbor movable along its axis with respect to the base plate into position to engage said portions and capable when in said position of being rotated and thereby bend said portions into hook-shape with one hook engaging the other; and means for attaching a seal to bind said hooked ends together.

2. A tool for forming a band about a package from a supply of strip material comprising, in combination, a base plate having a portion underlying the band; holding means cooperating with the base plate at separated points for holding the band around the package; cutting means between said holding means for cutting off the supply and leaving the ends of the band between said holding means in overlapping relation; means movable with respect to said base plate in a

direction laterally toward said overlapping ends to engage and bend them into hook shape with one hook engaging the other; and means mounted on the base plate for attaching a seal to bind said hooked ends together.

3. A tool for forming a band about a package from a supply of strip material comprising, in combination, a base plate having a portion insertable under said band; means coacting with the base plate for holding the end of said strip supply; means for tightening said strip around the package; means coacting with the base plate for holding said strip about said package when tightened; means mounted on said base plate for cutting off the supply leaving the end portions of the strip about the package in overlapping relation; means mounted on said base plate and movable with respect thereto in a direction laterally toward said band to engage said overlapping end portions and rotatable while so engaged for forming the ends of said strip into hook-shape and for engaging one hooked end with the other; and means for attaching a seal to said hooked ends to bind them together.

4. A tool for forming a band about a package comprising holding means for holding the band around the package with end portions overlapping; a movable anvil; an arbor mounted movably in said anvil arranged to engage said overlapping portions and upon rotation to bend said portions into hook-shape with one hook engaging the other; a die block on said anvil arranged upon movement thereof to be positioned under said engaged hook ends; and a movable pressure block arranged to be moved toward said die block to co-operate therewith in attaching a seal to said hooked ends.

5. A tool for forming a band about a package comprising holding means for holding the band around the package with end portions overlapping; a movable anvil; a cutting edge on said anvil; a cutter arranged to cooperate with said cutting edge to cut said strip so that the end portions thereof are in overlapping relation; a movable arbor mounted in said anvil adapted to engage said overlapping portions and bend them in hook-shape with one hook engaging the other; a die block on said anvil arranged to be positioned by movement of the anvil under the engaged hooked ends; and a pressure block arranged to cooperate with the die block in attaching a seal to said hooked ends.

6. A tool for forming a band about a package comprising a base plate; holding means mounted on said plate for holding the band around the package with portions between said holding means in overlapping relation; a lever mounted on said plate having means thereon for engaging one portion of the band so that upon movement of the lever said band is tightened about the package; a second lever having operative connection with the first lever and adapted to be moved thereby; a cutter actuated by said second lever for cutting the band so that one end portion thereof will overlap the other end portion a predetermined amount; means for engaging said overlapping end portions and bending them into hook-shape with one hook engaging the other; and means, including said second lever, for attaching a seal to said hooked ends.

7. A tool for forming a band about a package comprising, in combination, a base plate having a portion underlying the band; holding means mounted on said base plate for holding the band around the package with its end portions overlapping; and bending means movable with respect to said base plate and laterally with respect to the band to engage the overlapped portions. and movable rotatably to bend said overlapped portions into hook-shape with one hook engaging the other.

8. A tool for forming a band about a package comprising, in combination, a base plate having a portion underlying the band; holding means mounted on said base plate for holding the band around the package with its end portions overlapping; and bending means comprising a rotatable arbor which is movable along its axis with respect to said base plate into and out of engagement with said overlapping portions, and capable when engaged with said portions of being rotated to bend said portions into hook-shape with one hook engaging the other.

9. A tool for forming a band about a package comprising, in combination, a frame having a base plate underlying a portion of the band; means cooperating with the base plate at separated points for holding the band against said base plate; cutting means movable with respect to the base plate to a position where one end of the band is severed to provide overlapping end portions between said holding means, and to another position beside the band; bending means movable with respect to the base plate to a position to engage the said overlapping end portions and capable of bending them into hook-shape with one hook engaged with the other, and movable to another position removed from said ends; and means mounted on said base plate for applying a seal to said hooked ends to bind them together.

10. A tool for forming a band about a package comprising, in combination, means for holding the band around the package; a lever having means for gripping the band so that upon movement of the lever the band is tightened; an anvil; force applying means operatively connected with said lever having a cutter associated therewith and arranged to coact with said anvil so that upon movement of said lever the band is severed with one end thereof overlapping the other; means for bending said overlapping ends into hook-shape with one end engaging the other; and a die block; the said force applying means and said lever being capable upon movement of said lever of coacting with said die block to apply a seal to said hooked ends to bind them together.

11. A tool for forming a band about a package comprising, in combination, means for holding the band around the package; a lever having means for gripping the band so that upon movement of the lever in one direction the band is tightened about the package; an anvil; cutting means connected to and actuated by said lever when moved in the opposite direction for cooperating with said anvil to sever the band so that its ends overlap a predetermined amount; means for bending said overlapping portions into hook-shape with one hook engaging the other; and means for attaching a seal to bind said hooked ends together.

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