March 13, 1928.

1,662,268

L. S. HOWE ET AL

BOX STRAP APPLYING MACHINE

Filed Aug. 28, 1924

2 Sheets-Sheet 1

Fig. 1.

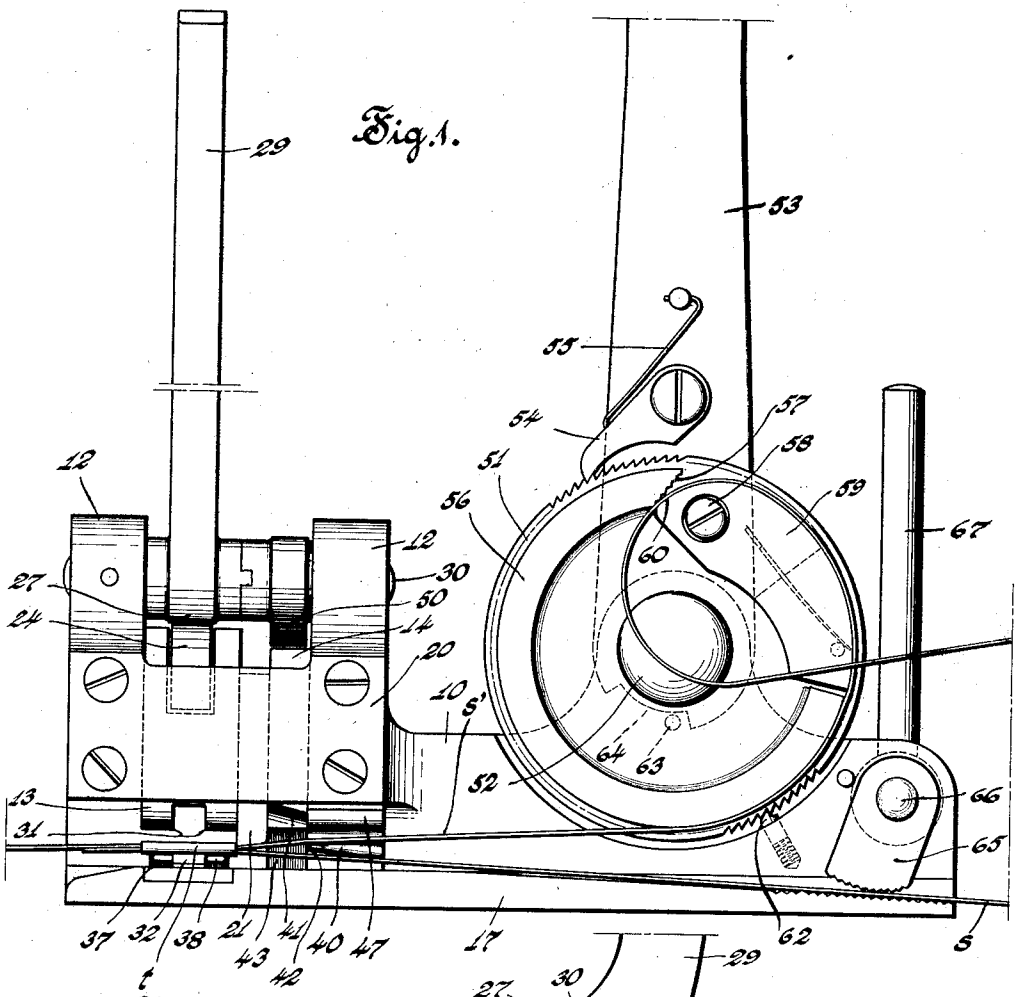
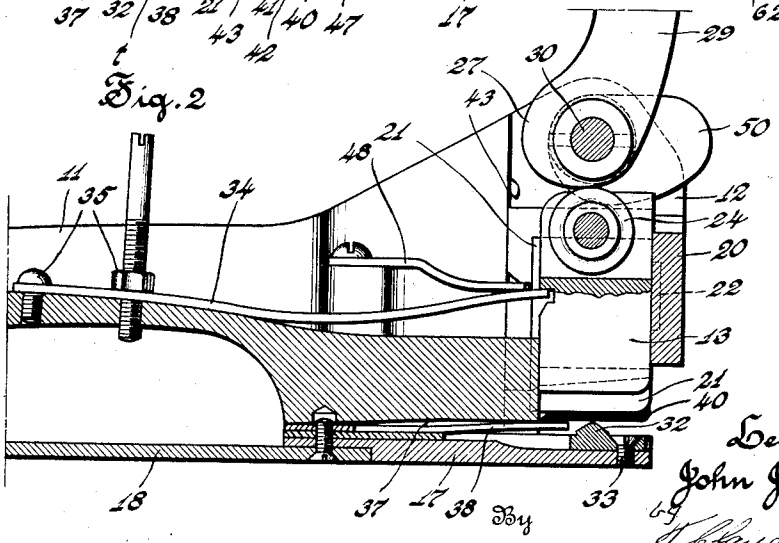


Fig. 2



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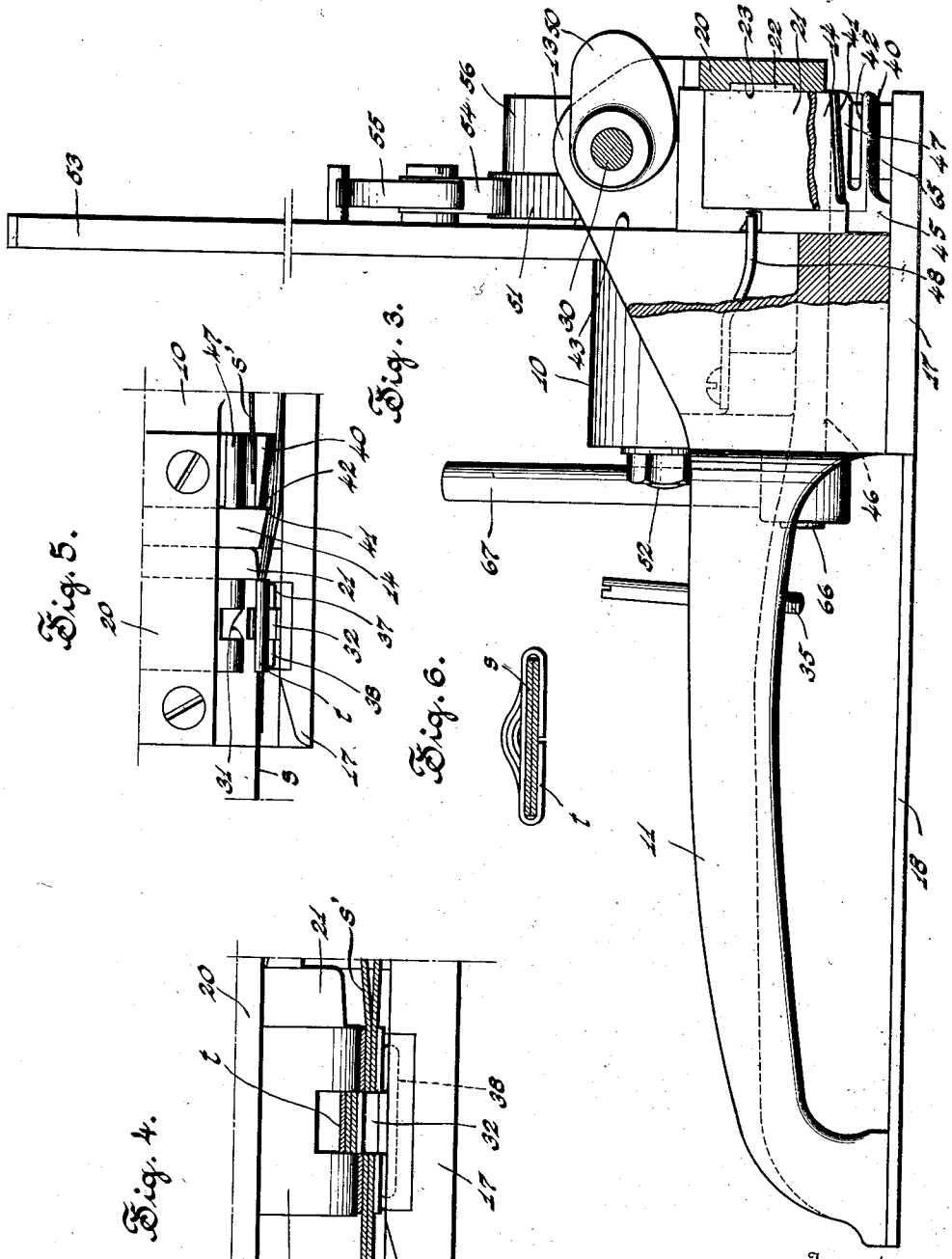


Fig. 3.

Fig. 5.

Fig. 6.

Fig. 4.

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UNITED STATES PATENT OFFICE.

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BOX-STRAP-APPLYING MACHINE.

Application filed August 28, 1924. Serial No. 734,701.

The present invention relates to a machine for applying bands or strips of metal to boxes and the like, and has as its aim to provide a machine of this sort having various features of novelty and advantage and which is particularly characterized by its simplicity in construction, its economy in manufacture, and by its effectiveness in operation.

A machine constructed in accordance with the present invention is relatively small and light in weight so that it may be readily handled and, at the same time, it is very durable so that it will stand up well under excessive strains and severe conditions of use. By the use of this machine, straps may be very quickly and securely fastened in place under considerable tension so that the full effectiveness of the strap is obtained.

Broadly speaking, the invention contemplates a machine having a device for stretching the strap tightly about the box and holding the strap in stretched condition during the sealing operation, mechanism for applying the seal so as to secure the ends of the strap together, and a severing device for cutting the strap after the seal has been applied, the various instrumentalities being in such relation to one another as to perform their functions with expedition.

In the accompanying drawings, wherein we have shown, for illustrative purposes, one embodiment which the present invention may take:

Fig. 1 is a front view of the machine;

Fig. 2 is a sectional view;

Fig. 3 is a side elevational view of the complete machine with portions broken away so as to more clearly illustrate the strap severing mechanism;

Fig. 4 is a detail view showing, in front elevation, the sealing dies in the act of completing the sealing operation;

Fig. 5 is a view similar to Fig. 4, but showing the female die raised, and the movable cutting blade as having severed the strap; and

Fig. 6 is a cross-sectional view through the applied strap adjacent one end of the seal.

Referring to the drawings in detail, the machine has a support including a frame 10 having a body portion on which the several instrumentalities are mounted, and a rearwardly extending handle or brace 11 with its under side transversely curved so as to form a good hand or finger hold. It will be seen that the frame, in top plan, is generally of L-shape, the body portion extending generally in the direction of the strap, and the handle 11 at right angles thereto. Extending forwardly from the body portion of the frame 10 is a pair of vertical webs 12 between which are positioned the sealing die or punch 13 and the knife 14 for cutting the strip. This frame may be constructed of one or more parts and, if desired, may be an aluminum casting. Secured to the bottom of the body portion of the frame is a base plate 17, the forward edge of which extends outwardly beyond the front face of body portion 10 and beneath the punch 13 and knife 14. A bar of metal 18 is secured at its opposite ends to the base plate 17 and the rear end of the brace 11. The brace 11 and bar 18 may be considered as constituting a hollow arm.

Secured to the front edges of the webs 12 is a face plate 20 for holding the punch 13 and knife 14 in place. Between this punch and knife is a partition 21 having on its forward edge a lug 22 which takes into a groove 23 on the inner face of the face plate, whereby this partition is held against vertical displacement. The punch 13 is in the form of a block, in the upper end of which is journaled an anti-friction roller 24 with which cooperates a cam 27 provided on the lower end of an operating handle 29 journaled on a pin 30 supported in the upper ends of the webs 12. The lower end of the punch or die 13 is provided with a groove so as to form cutting edges 31. Carried by the base plate 17, and immediately beneath the punch 13, is a male punch or die 32 corresponding in width to the spacing of the cutting edges 31. The punch 32 tapers upwardly from its front and rear edges towards its center, as will be most clearly seen from Fig. 2. Preferably, the die 32 is removable so that it may be easily re-sharpened or renewed after it has become worn. In the present instance, this die is removably secured by screws 33 in a recess in the base plate.

The upper die 13 is normally urged into raised position as, for instance, by means of a leaf-spring 32 secured at its rear end by screws 35 in the channel or groove in the upper face of the handle 11. One of the screws

35, as will be seen most clearly from Fig. 2, is adapted to constitute a stop for limiting the downwardly and backwardly swinging movement of the handle 29. Positioned in a groove 37 in the bottom of the frame 10, and immediately behind the punch 32 is a leaf-spring 38, the forward free end of which is adapted to engage beneath the seal when the latter is positioned between the dies. This spring 38 serves the purpose of forcing the seal off of the male die after the sealing operation has been completed.

Positioned alongside of the sealing mechanism, and between that mechanism and the stretching device, which will hereinafter be described more in detail, is a strap severing mechanism which includes the movable knife or blade 14 and a fixed knife 40. The knife 14 comprises a block of hardened metal having its lower surface beveled transversely and inclined downwardly from its forward to its rear end so as to form an inclined sharp cutting edge 41 adapted to cooperate with the sharp cutting edge 42 of the fixed blade 40. Owing to the inclination of the cutting edge 41, the knife will take a shearing cut. The knife 14 is positioned between the right hand web 12 and the partition 21 and between the face plate 20 and the bottom 43 of a vertical groove provided in the body portion of the frame 10. The fixed knife 40 is spaced from the upper surface of the base plate 17 in order to accommodate therebetween that portion *s* of the strap which surrounds the box. The right-hand end of the forwardly extending portion of the base plate is longitudinally tapered, as shown in Fig. 1. The knife 40 has a rectangular shank portion 45 positioned in a groove 46 in the frame. This shank portion carries a projection 47 which extends outwardly over the fixed knife 40. It will be noted, particularly from Figs. 1 and 5, that the lower end of the partition 21 extends downwardly beyond the die 13 and knife 14 when the latter are in raised position. The lower end of this partition is so placed relative to the punch 32 that it constitutes a stop or gage for properly positioning the seal relative to the dies. The knife 14 is normally urged into raised position by a leaf-spring 48. The movable blade 14 is forced downwardly, when it is desired to sever the strap, by means of a cam 50 journaled on the pin 30 and fixed to the handle 29. It will be seen, particularly from Fig. 2, that the cams 27 and 50 extend to opposite sides of the pin 30, this arrangement being provided so that the punch 13 and the knife may be operated in proper sequence by moving the handle 29 backwardly to perform the sealing operation, and then swinging it forwardly to cause the cam 50 to lower the knife 14 and thereby cut the strap.

Reference will now be had to the stretching mechanism which includes a ratchet wheel 51 journaled on a stud or bolt 52. 53 is a handle pivoted on the bolt 52 and carrying a pawl 54 urged into engagement with the teeth of the ratchet wheel 51 by a spring 55. Extending from the forward face of the ratchet wheel is a part-circular rim or flange 56, one end 57 of which constitutes a jaw. The surface of this jaw is roughened, as indicated. Positioned between the ends of the rim 56 and pivoted, as at 58, to the ratchet wheel is a dog 59, one end 60 of which constitutes a movable jaw adapted to cooperate with the jaw. 57. This dog is pivoted adjacent its jaw end 60, its other end being relatively long and being curved on its outer surface. Preferably, the long arm of the dog extends radially beyond the external periphery of the rim 56 so that when the ratchet wheel is turned, the strap which passes over the dog will force the long end of the dog inwardly and thereby cause the strap to be tightly gripped between the jaws 57 and 60. Normally, when the stretching device is not holding the strap under tension, the long end of the dog is urged outwardly so as to hold the jaw 60 slightly away from the jaw 57 in order to facilitate the insertion of the strap between the jaws. The ratchet wheel is held against clockwise movement by a spring-pressed plunger 62. The extent of movement of the handle 53 is limited by a stud 63 projecting from the frame 10 and into an arcuate recess 64 in the hub of the handle.

For the purpose of preventing the strap from moving about the box, when the stretching device is operated to draw the strap tightly in position, we provide means for clamping the other end of the strap. This means, in the present instance, includes a clamp or arm 65 between which and the base plate 17 the strap section *s* is adapted to be wedged. The outer end of the clamp 65 and the opposing surface of the base plate 17 are roughened or nurled and, preferably, the outer end of the clamp 65 is curved on an arc eccentric to the pivot of the clamp in order to make the clamping device equally effective on straps of various thicknesses. In the present instance, the arm or clamp 65 is fixed to the forward end of a pin 66 journaled in the right-hand end of the frame 10 and carrying on its rear end an operating handle 67.

The operation of the device is briefly as follows: When the strap is taken from a roll of strip metal, the sealing member, which is in the form of a flat tube or sleeve *t*, is threaded onto the free end of the strip and then moved along the strip for a distance substantially equal to the perimeter of the box. The strap is then placed about the box, and the free end of the strap is threaded into the sealing member. The sealing machine

is then positioned on the box with the forwardly extending portion of the base plate beneath the strap and with the clamp 65 and the fixed knife 40 above the strap *s*. That portion *s'* of the strip of metal between the sealing member and the source of supply (which latter may be in the form of a roll) is passed over the knife 40, is drawn around the lower portion of the flange 56, and over the dog 59, and is inserted between the jaws 57 and 60. The lever 67 is now forced to the left, referring to Fig. 1, so as to clamp the strap portion *s* between the clamp 65 and the base plate, and then the lever 53 of the stretching device is moved back and forth. As this latter lever is moved to the left, the ratchet wheel is moved counter-clockwise, causing the strap *s'* to be drawn taut and force the long end of the dog inwardly, with the result that the strap will be tightly gripped between the jaws 57 and 60. After the strap has been tightened up on the box to the desired extent, the lever 29 is thrown backwardly and downwardly, thereby causing the cam 27 to force the female die 13 downwardly onto the punch 32. In this operation, the sealing member *t* and the portions of the strap enclosed therein is slit along two parallel lines, and the portions between the slits are bowed or raised upwardly; also, the walls of the sealing member and the strap portions therebetween are pressed closely together. In order to exert, on the lever 29, a force sufficient to effect the sealing operation, the operator may place the palm of his hand upon the lever 29 and grip the arm 11 with his fingers. The lever 29 is then thrown upwardly and forwardly permitting the spring 34 to raise the die 13, whereupon the spring 38 will disengage the seal from the punch 32. Upon continued forward and downward movement of the handle, the cam 50 comes into play to force the knife 14 downwardly to sever the strip. After the strap is severed, the knife continues to move downwardly, thereby forcing the severed end of the strap down close against the strap portion *s*, as shown most clearly in Fig. 5. The sealing and severing operation, having now been completed, the machine, as a whole, may be moved backwardly to withdraw the forwardly extending portion of the base plate from under the strap.

We claim as our invention:

1. In a box-strap applying machine, a support, a sealing device thereon including a fixed die and a movable die between which the sealing member encircling the strap end is adapted to be interposed, severing mechaism on said support at the side of said dies and including a fixed knife and a movable knife between which one end of the strap is adapted to be interposed, a pair of cams journaled to rotate in unison and extending in opposite directions, one of said cams being above the movable die and adapted to engage the same, and the other of said cams being above said movable knife and adapted to engage the same, and a handle for rotating said cams.

2. In a box-strap applying machine, a base, a frame thereon having a pair of forwardly extending webs and a partition between and parallel to said webs, a sealing device including a fixed die on said base and a reciprocable die between said partition and one of said webs, a strap severing mechanism in said frame and including a movable blade between said partition and the other of said webs, said partition having its lower end spaced from said base and depending below the lower edges of said webs and constituting a gage and stop for positioning and holding the sealing member in proper relation to the dies, and means for operating said movable die and said movable blade.

3. In a box-strap applying machine, a frame, a base plate secured to the bottom of the frame and extending forwardly therefrom so as to be positioned beneath the strap about the box, a punch carried by said base plate, a movable die carried by said frame above said punch, severing mechanism including a movable blade supported for sliding movement by said frame and a fixed knife positioned above the forwardly extending portion of said base plate and normally beneath said movable blade, a partition in said frame between and guiding said movable die and movable blade, the lower end of said partition depending below said movable die when the latter is in raised position and constituting a gage for positioning and holding the seal in proper relation to the die and punch, and a pair of cams one for operating said movable die and the other for operating said movable blade.

4. In a box-strap applying machine, a frame having a pair of forwardly extending spaced webs, a face plate removably secured to the forward edges of said webs and having a groove on its inner face, a partition member between said webs and having a projection on its forward edge engaging in said groove of said face plate, a movable sealing die between one of said webs and said partition member, a movable blade between said partition and the other of said webs, a pin fixed in the upper ends of said webs, a pair of cams journaled on said pin and adapted to respectively cooperate with said movable die and movable blade, and a handle for rotating said cams.

5. In a box-strap applying machine, a support, sealing means thereon including a pair of opposed sealing dies one fixed and the other supported for movement; means on said support for stretching the strap tight

about the box and including a rotatable member having a part-circular portion, one end of which constitutes a jaw, a dog pivoted to said member and having one end constituting a cooperating jaw and the other end being adapted to be engaged by the strap, and a handle for rotating said member; a severing device on said support between said sealing means and stretching means and including a fixed knife and a cooperating movable knife; a pair of cams journaled on said support, one of said cams being adapted to move said movable die and the other cam to move said movable knife, and a single operating handle for rotating said cams.

6. In a box-strap applying machine, a support, a sealing device carried thereby including a fixed die and a movable die; means on said support for stretching the strap about the box, strap severing mechanism on said support between said sealing device and stretching means and including a movable blade; a partition between said movable die and blade with its lower end depending below said movable die when the latter is in raised position and constituting a gage and stop for positioning and holding the sealing member in proper relation to the dies, and means for operating said movable die and movable blade.

7. In a box-strap applying machine, a support having at its bottom a forwardly extending ledge, a punch carried by said ledge, a movable die carried by said support above said punch; means for stretching the strap about the box and including a member pivoted on said support and having a part-cylindrical flange above said ledge, a dog pivoted to said member and having one end adapted to cooperate with one end of said flange to grip the strap therebetween; severing mechanism including a fixed blade spaced above said ledge and a movable knife alongside of said movable die; a pair of cams one for said movable die and one for said movable knife, means for rotating said cams, a pivoted arm adapted to cooperate with the upper surface of said ledge to clamp one end of the strap to said machine, and a handle for withdrawing said arm from clamping position.

8. In a box-strap applying machine, a support having a body portion provided on its front forward face with a sealing device, a severing mechanism and strap stretching means, said support having, extending rearwardly from its body portion, an arm which is recessed, the bottom of the arm being adapted to rest upon the box and the upper portion of the arm constituting a brace or finger hold, said sealing device including a fixed die and a movable die, said severing mechanism including a fixed blade and a movable blade at the side of said movable die, and said stretching means including a pair of rotatable jaws adapted to grip the strap therebetween, and a handle for rotating said jaws; a pair of cams journaled in said support and adapted to respectively cooperate with said movable die and movable blade, and a pivoted handle for rotating said cams and adapted to be thrown backwardly and downwardly to a position over said arm.

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