Oct. 3, 1933. H. BEAUVISAGE 1,928,875

WIRE TYING MACHINE

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Fig. 1.

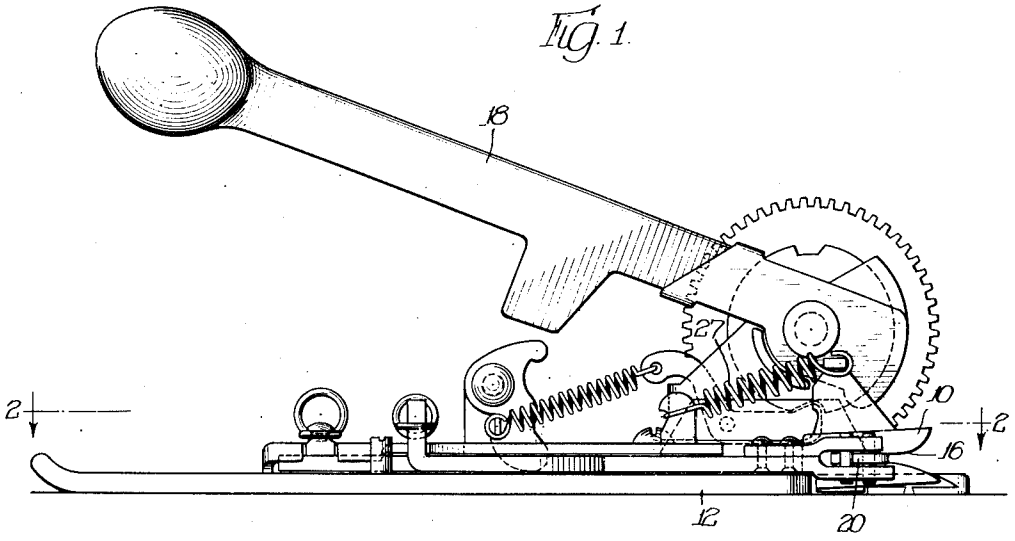
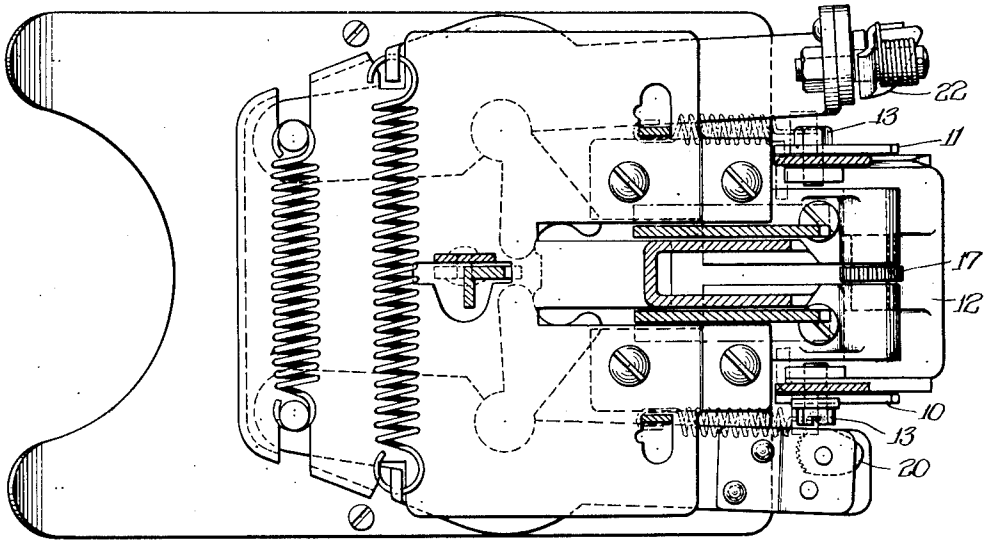


Fig. 2



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Fig. 3.

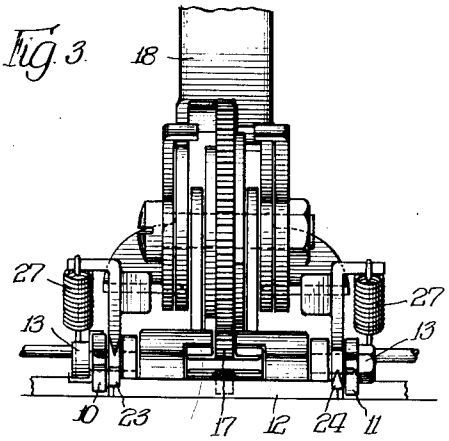


Fig. 4.

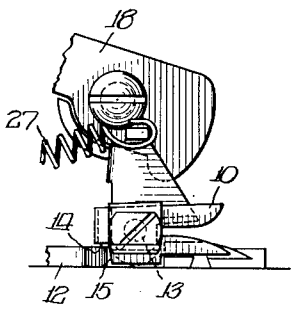


Fig. 5.

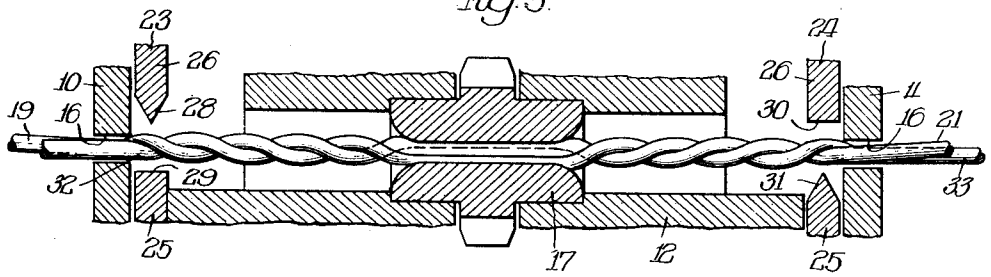


Fig. 6.

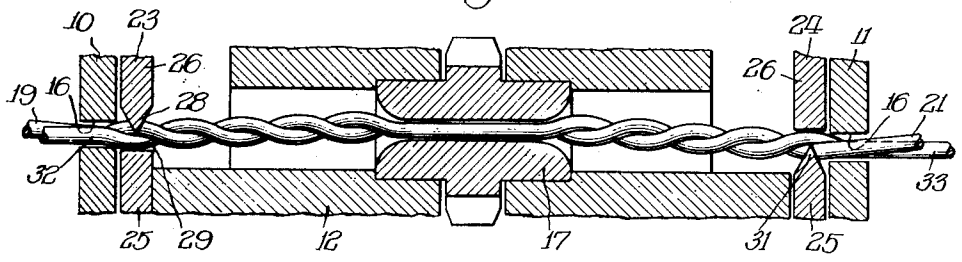


Fig. 7.



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UNITED STATES PATENT OFFICE

1,928,875

WIRE TYING MACHINE

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Application March 28, 1932, Serial No. 601,476, and in Germany March 30, 1931

5 Claims. (Cl. 140—93)

This invention relates to package binding machines of the type which tensions a wire in a loop about the package, twists together overlapped end portions of the wire and cuts away the surplus wire at the ends of the twisted section.

The principal object of the invention is to provide, in a wire tying machine, an improved wire cutting instrumentality which will leave the cut ends of the wire more or less imbedded in the contour of the finished tie where they will not snag into anything passing over the surface of the tie.

In the package tying machines of the prior art the wire loop which is placed about the package is tensioned and the tie is produced by intertwisting the juxtaposed free ends of the wire which forms the loop. The intertwisting is effected by several revolutions of a pinion which has a longitudinally extending and laterally opening slot in which both of the wire ends are received in lapped generally parallel relation. The twists are produced in a plurality of helical turns which extend outwardly from both ends of the pinion. In such machines the free ends of the wires are severed after the twisting operation has been completed, the ends to be severed being those ends which are beyond the extremities of the twisted section. The butts or tips which remain after this severing operation, and which are portions of the wire that have not been twisted, constitute projections which in some instances stand out more or less from the surface of the packing owing to the strains and stresses resulting from the twisting operation. These projecting ends frequently are the cause of injuries to the hands of the people who have to handle the packages.

In accordance with the present invention the devices for severing the free ends of the wire are disposed—not outside or beyond the twisting zone on the outside of the holding forks—but rather within the space confined on the one hand by the holding forks and on the other hand by the twisting pinion.

The arrangement and construction of the improved severing means is such that the free ends of the wires are cut at both terminal points of the twisted section just where the first quarter turn merges into the second quarter turn. Hence, assuming that the holding forks hold the wires at the ends of the twisted section in horizontally juxtaposed relation, the severing devices will be located at a point where the two intertwisted wire portions occupy a position one on top of the other close to the holding forks and between the latter and the twisting pinion.

The members which do the actual cutting are preferably provided with wedge shaped edges, and the operative movement of these members is controlled in such manner that the cutting edges will penetrate only to the circumference of that wire which is to remain as a part of the loop and will not penetrate far enough to injure the other through wire. When the cut is produced at this point in the manner described the wire butt remaining after the cut will not rise or stand up because the same is located in a depression between two adjacent twists of the other wire portion and injury to the hands upon manipulating the package is thereby avoided.

Another important feature of the invention resides in the mounting of the holding forks. These forks are preferably fastened to the frame of the machine in such a way as to permit a slight floating movement with respect thereto, which movement, while insufficient to interfere with the primary holding function of the forks, will nevertheless permit the forks to float somewhat with the overlapped wire portions contained therein whereby to prevent the possibility of the cutters transmitting any shearing action to the wire portions which are not intended to be cut.

While the foregoing statements are indicative in a general way of the nature of the invention, other more specific objects and advantages will be apparent to those skilled in the art upon a full understanding of the construction, arrangement and operation of the improved cutting and holding instrumentalities.

A preferred embodiment of the invention is presented herein by way of exemplification, but it will, of course, be understood that the invention is susceptible of embodiment in other structurally modified forms coming equally within the scope of the appended claims.

In the accompanying drawings:

Fig. 1 is a side view of a wire tying machine equipped with the improved cutting means of the invention;

Fig. 2 is a plan view of the same machine, partially sectioned on the line 2—2 of Fig. 1;

Fig. 3 is a front view of the machine;

Fig. 4 shows in side elevation, viewed from the left, the detailed construction of the holding fork and wire cutting device on the left side of the machine;

Fig. 5 shows diagrammatically and in enlarged view a longitudinal section through the twisting pinion, holding forks and cutters, the parts being

shown in the position which they occupy just prior to the beginning of the severing operation;

Fig. 6 is a view similar to Fig. 5, showing the holding forks and the cutters in the positions which they occupy just prior to the end of the severing operation; and

Fig. 7 illustrates the completed tie after the excess wire portions have been cut away, showing the tie in a plane at right angles to the plane in which it is shown in Figs. 5 and 6.

The wire tying machine which is shown in the drawings to illustrate one particular application of the invention is for the most part substantially the same in construction, arrangement and operation as the machine disclosed in Harvey Patent No. 1,743,855, wherefore a detailed description of the machine will not be necessary here.

The holding forks 10 and 11 of the machine, instead of being rigidly attached to the base frame 12, are pivotally fastened adjacent their rear ends to the same on the shanks of headed machine screws 13 (see Fig. 4) which extend into the frame. The forks are provided with edge portions 14 and 15 which abut with opposed portions of the frame to limit the angular movement of the forks to not more than 5° or 10°. The holding forks 10 and 11 function during the twisting operation to prevent the wire portions which are disposed in the slots 16 in the forks from turning about each other. The intertwisting of the intervening wire portions is accomplished in the usual way by means of a radially slotted pinion 17 which is journaled in the frame between the forks in spaced relation to the latter. The pinion 17 is rotated by the movement of a hand lever 18 in one direction. Movement of the lever in the opposite direction, which is intended to take place before the twisting operation, serves to tension the wire in a loop about the package.

In using the particular machine shown to fasten a wire about a package, one end of the wire 19 is engaged frictionally behind a gripping dog 20 at the left side of the machine. Then the adjoining portion of the wire is pushed back into the slots in the holding forks and the twisting pinion, after which the main body of the wire is looped about the package and brought back again into the slots in the holding forks and the twisting pinion. The other end 21 of the wire, which usually leads off to a coil from which the wire has been drawn, is then frictionally engaged in a gripping device 22 at the right side of the machine.

With the wire thus placed, the machine is ready for operation. A swinging movement of the hand lever 18 toward the front of the machine in a large arc causes the grippers 20 and 22 to move away from the holding forks and results in the wire which is looped about the package being placed under tension, with the end portions of the wire disposed in lapped parallel relation in the slots in the holding forks and the twisting pinion. A return movement of the lever 18 then causes the twisting pinion to intertwist the wire portions between the holding forks, to the extent shown in Fig. 5. After the lever 18 has reached, in its return movement, the position shown in Fig. 1, further rearward and downward movement of the lever causes the operation of two cutting devices 23 and 24.

The cutting devices 23 and 24 are located closely adjacent the holding forks between the latter and the twisting pinion and include lower stationary members 25 and upper movable members 26. The upper movable members 26 are preferably pivotally mounted on the shanks of the previously mentioned machine screws 13 and are caused to swing downwardly in an arc during the final movement of the lever 18. After the cutting operation, the upper portions 26 of the cutting devices are raised again into their inoperative positions by means of tensioned coil springs 27. In the cutting device 23 at the left side of the machine, the lower edge 28 of the downwardly movable member 26 is wedge-shaped while the upper opposed edge 29 of the lower stationary member 25 is flat. In the cutting device 24 at the right side of the machine, this arrangement is reversed, the lower edge 30 of the downwardly movable member 26 being flat and the upper opposed edge 31 of the lower stationary member 25 being wedge-shaped. In the operation of the cutters, the opposed edges 28 and 29 and 30 and 31 will not come entirely together but will stop when the distance therebetween equals the thickness of one of the wire portions, which distance may be varied for different sizes of wire by any suitable stop means, such as a set screw, associated with the hand lever.

At the points where the cutters 23 and 24 are located, the overlapped wire portions will have been twisted just a quarter of a turn at the commencement of the cutting operation, with the result that one of the wire portions at each side will be located directly above the associated wire portion with which it is twisted. Since at the left side of the machine the excess wire portion which it is desired to remove is located in vertical alignment with the cutter 23 directly above the through wire portion 32 which extends into the loop, the wedge-shaped edge 28 on the downwardly moving member of the cutter 23 will cut away the upper strand of the wire in a hollow or depression which is formed by the twisting operation in the lower strand, leaving a beveled extremity 32 disposed snugly within the general contour of the completed tie. During the cutting of the upper strand, the lower strand acts as a backing for the cutting member and is in turn supported during such operation by the flat anvil surface 29, the associated holding fork 10 meanwhile yielding downwardly far enough to preclude any shearing stresses being set up in the through wire portion 32 at the inner edge of the fork.

Substantially the same operation takes place concurrently at the right side of the machine, with the exception that lower strand 21 which leads off to the gripper 22 is the strand which is cut instead of the upper strand, the fork 11 floating downwardly far enough to prevent any shearing action on the through portion 33 of the wire.

Instead of producing each cut at the end of the first quarter turn of the first twist, it may be made farther away from the ends of the twist, as for instance at the end of the first half twist, at which point the two wires are located in a horizontal plane one to the rear of the other, and in which case that wire which is to be severed is acted upon by a vertical cutting edge which is movable horizontally. When locating the cut in that position, it would of course be possible to use, in place of the chisel-shaped cutting edge, a cutting tool of the well known shearing type.

By utilizing the present invention, a very satisfactory tie, free from all projecting and dangerous end portions, may be produced. This tie is particularly applicable for use in the fastening

of parcel post packages or other packages which are likely to receive considerable handling.

It will of course be appreciated that the foregoing description necessarily delineates the application of the features of the invention to but one particular type of wire tying machine and that its application to other types of machines, with such structural changes as may occur to one skilled in the art, is contemplated.

I claim:

1. In a wire tying machine, a pair of spaced members for holding lapped portions of a wire from turning at the locations of the members, means between the members for twisting together the intervening portions of the wire, and a cutter for removing the surplus wire at one end of the twisted section, said cutter being movable through one wire portion backed by another wire portion without entering the latter.

2. In a wire tying machine, a pair of spaced members for holding lapped portions of a wire from turning at the locations of the members, means between the members for twisting together the intervening portions of the wire, and a cutter for removing the surplus wire at one end of the twisted section, said cutter being positioned between one of the holding members and the twisting pinion and being movable through an upper wire portion resting on a lower wire portion without entering the latter.

3. In a wire tying machine, a pair of spaced forks for holding lapped portions of a wire from turning at the locations of the forks, means between the forks for twisting together the intervening portions of the wire, and chisel-shaped cutters positioned between the forks and the pinion for removing the surplus wire at the ends of the twisted section, each of said cutters being movable through one wire portion backed by another wire portion without entering the latter.

4. In a wire tying machine, a pair of spaced forks for holding lapped portions of a wire from turning at the locations of the forks, means between the forks for twisting together the intervening portions of the wire, and cutters for removing the surplus wire adjacent the ends of the twisted section, said forks being free to move a limited distance during the cutting operation.

5. In a wire tying machine, a pair of spaced forks for holding lapped portions of a wire from turning at the locations of the forks, means between the forks for twisting together the intervening portions of the wire, and cutters for removing the surplus wire adjacent the ends of the twisted section, said forks being pivotally mounted adjacent their rear ends for limited movement in vertical planes.

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