This invention relates to supply packages of staple-making wire for stapling machines.

Such wire is usually wound in a continuous piece on a spool to be supported in some manner on a stapling machine so that it may be fed from the spool and guided through the machine to a position where a piece is cut off, formed into a staple, and clinched around workpieces, such as sheets of paper, or driven into a board as when the staples are used as tacks. The wire is usually rather stiff, so that there is always a tendency for it to unwind from the spool when left to itself.

To avoid this, and to provide a braking action on the spool to prevent overrunning when the wire is drawn from the spool, it has been the custom to provide on the supporting bracket for the spool a suitable brake shoe, usually in the form of a piece of felt mounted on a flat spring and engaging the portion of the wire remaining on the spool.

As heretofore made, the spool was provided with an axle extending through bearing holes in a bracket, which, in turn, was mounted in the desired place on the stapling machine.

An object of the present invention is to avoid the necessity of using this brake shoe on the wire, and to provide a package in which the spool rotates on the end flanges thereof rather than on an axle, for, when this is done, the friction between the flanges and the bearing surfaces on which they ride is such as to provide for controlled retarded rotation of the spool as the wire is being drawn off.

To prevent the wire from unwinding from the spool of itself during shipment and just before the wire is inserted in the stapling machine, the package of the present invention is so made as to completely enclose the space between the end flanges of the spool, except for a wire passage opening provided to permit egress of the wire in its use.

In one form of the invention, this is accomplished by forming a strap with downturned flanges so that it may be wrapped around the spool and its ends suitably clinched to hold it in encircling position with the flanges on the strap engaging the outer margin of the periphery of the end flanges of the spool. The strap may have formed integral therewith or as a separate piece, suitable lugs or other means engaging the frame of the stapling machine to hold the package in the desired position, and, if desired, one end of the strap may be extended downwardly to close the end of the machine and render inaccessible the leading end of the wire, so long as the package is in the machine.

In another embodiment of this invention, the package is so formed as to completely enclose the spool and render the same inaccessible to finger-engagement either before or during its use in the stapling machine.

In this form of the invention, the enclosing casing is preferably made of two formed halves telescoping with each other and provided with means for mounting the casing with the spool in the stapling machine. This mounting means may be formed integral with a strap partly surrounding the casing and having at its lower end an extension to reach down and close the rear end of the stapling machine.

One or both of the parts of the casing are provided with slots through which the leading end of the wire passes.

One of the important features of this invention is the provision of the tab on the lower end of the package in such a way that it fits into an existing slot in the machine and holds the package against swinging outwardly of the machine when the machine is turned over, and also stops movement of the package in wire-drawing direction.

Besides the friction tending to resist rotation of the spool and existing between the periphery of the end flanges thereof and the mounting means for the spool, the resiliency of the wire on the spool tends to expand it against the casing, and thus places an additional drag on the wire to the end that the spool will not rotate so freely as to cause an unwanted quantity of the wire to be paid off.

The mounting lugs for the package are so placed that the center of gravity of the spool is offset to the rear of the vertical plane in which the mounting lugs are located, so that there is a constant tendency for the spool to swing toward the machine, that is, in direction of wire withdrawal, thereby keeping the tab on the package against the end of the stapling machine even should its end portion not be located in the slot in the machine.

Other features and advantages will hereinafter appear.

In the accompanying drawings, which show several forms of my invention—

Figure 1 is a side view of a stapling machine, partly in section, showing a package made according to the present invention in place thereon.

Fig. 2 is a side view of the package shown in
Fig. 1, with portions of the casing and spool broken away to show the wire. Fig. 3 is an end view of the package shown in Fig. 2, partly in section, and looking at the side of the package facing the machine.

Fig. 4 is an end view of the machine shown in Fig. 1, with the package in place thereon.

Fig. 5 shows another form of the present invention and is an end view of the package, looking at the same from the side thereof which faces the machine.

Fig. 6 is a side view of the package shown in Fig. 5, with one side of the casing removed.

Fig. 7 is a vertical section through the package, taken on the line 7—7 of Fig. 6.

Fig. 8 is an exploded view, showing, in perspective, the spool, the two portions of the casing, and the supporting strap of the device shown in Fig. 5.

Fig. 9 is a side view of the package of the present invention, showing a modification of the package shown in Figs. 5 to 8, inclusive.

Fig. 10 is a side view of the package of the present invention, showing an auxiliary brake.

The staple wire supply package of this invention may be constructed to fit into any stamping device taking wire from a spool and forming it into staples.

Referring to the accompanying drawings, a conventional stapling machine is illustrated in Figs. 1 and 4. Such machines usually comprise a base 10 having a staple-clinching anvil 11, an upper portion 12 pivoted at 13 and held raised by a spring 14 so that a group of things, such as paper sheets, may be placed over the anvil to receive a staple.

The upper portion 12 of the machine contains mechanism collectively indicated by the reference numeral 16 for guiding and feeding a staple-making wire, and for forming the staple, cutting it off and driving the staple through the work and against the anvil 11. This mechanism includes a lever 16 pivoted at 17 to operate between side plates 18 of the upper portion 12 against the tension of a spring 16s which causes the upper portion to be brought together until the inner diameter of the casing is just slightly greater than the diameter of the end flanges 25 of the spool thereby providing an annullar bearing within which the spool may rotate and have very slight, if any, bodily movement. The ends 29 and 30 of the spool 24 are then secured together in any suitable way. In the form shown, the end 29 is provided with a pair of ears 31 extending through slots 32 in the end 30 and bent backward to form hooks preventing the separation or spreading of the ends 29 and 30 of the spool.

The casing 26 is provided with an opening 33 in its lower portion through which the leading end of the wire 24 extends and passes to the mechanism 15 of the machine.

The casing 26 is provided with suitable mounting lugs 34 at opposite sides for engagement with the mounting slots 22 and 21 of the extensions 19 of the frame of the machine. The lugs 34 may be provided on the casing in any suitable way, but, preferably, are formed on a piece 35 separate from but secured to the casing as by spot welding so that the annular interwound flanges 28 may be continuous and have no breaks through which a loop of the wire might escape. For the same reason, the ends of the flanges at the ends 29 and 30 of the spool-encircling part of the casing, are caused to abut when the casing is in finished shape.

With the spool of wire so encircled by the casing 26, the spool may rotate smoothly on the annular track formed by the inner surfaces of the strip 27 adjacent the flanges 28, yet the friction produced by the periphery of the end flanges 25 on the lay of the rotation of the spool to such an extent as to prevent overrunning as the momentum when the spool is rapidly rotated by the feed mechanism of the machine pulling off a staple-length of wire. As the wire on the spool is consumed and the danger of overrunning de-
creases, the pressure of the end flanges 28 on the strip 27 also decreases, thereby reducing the retarding friction in proportion to the decreased tendency to overrun.

As will be seen from Fig. 4, the package of this invention fills substantially the space between the extensions 18 and the casing proper conceals the wire on the spool and most of the operating mechanism 15.

To further conceal the wire and the operating mechanism and to control the position of the package in the machine, the casing 28 is preferably provided with a depending tab 35. This tab 35 may be formed over the casing 28 in any suitable way, but, preferably, for economy and convenience, it is formed as an extension in the end 30 of the casing. The tab 36, as shown in Fig. 4, reaches down to and overlies inwardly bent portions of the side plates 16 of the machine and, being rigid, positively limits the movement of the package toward the machine under the force of gravity which acts to swing the package because the mounting lugs are offset forwardly of the center of gravity of the package.

The package so adjusted, even with the leading end of the wire held by the mechanism 15, a forceful body swinging movement of the entire machine, which is not necessary or contemplated, might cause the package to pivot on the lugs 34 and swing away from the rear end of the machine and undesirably unwind a quantity of wire from the spool. To avoid this, the tab 36 is extended downwardly until it lies in a narrow space 37 between a portion 30 of the base and a portion 39 on the side plates 16. With the tab 36 so located, no substantial swinging movement of the package relative to the extensions 18 of the frame is permitted until the package is bodily lifted straight up, as allowed by the slots 29, and the tab removed from the space 37.

If the spool should overrun to the extent that the outer convolutions of the wire on the spool are loose, the pressure of the springy wire against the inside of the strip 27 of the casing will retard the advancing movement of the wire sufficient to maintain the surplus unwound portion of the wire within the casing.

With the package so arranged in the form of the invention shown in Figs. 1 to 4, inclusive, the spool is completely enclosed by the casing, rather than only partially enclosed as in Figs. 1 to 4, inclusive. For this purpose, the casing is made of two telescoping parts 40 and 41 having their ends 42 closed.

The casing is preferably made so that its interior is smooth and continuous, with no projections or crevices on which and within which the wire from the spool might be caught. For this purpose, the part 40 of the casing is provided with an enlarged annular portion 43 within which snugly fits the inner margin 44 of the part 41.

The two halves of the casing may be secured together in any suitable way either temporarily or permanently, but, for convenience in assembling the package, one half of the casing is provided with a series of holes 45 while the other half is provided with a series of catches 46 to engage the holes 45.

In the embodiment of the invention illustrated, the holes 45 are provided in the part 41 while the catches are provided in the part 40, and the catches are formed by lancing the material and pressing them inwardly, When the casing is assembled, the parts yield sufficiently for the catches 46 to ride over the material between the holes 45 and the inner edge of the part 41 until the catches snap into the holes.

Before the parts 41 and 42 are assembled, a spool of wire 47 is placed between the two halves of the casing with the leading end of the wire 48 extending through a wire passage 49 formed by aligned notches 50 in the two halves of the casing.

To support the package in the stapling machine, a separate piece having mounting lugs 34 may be secured to the casing in any suitable way, as by spot welding, and, with this construction of the device, it is preferable that the piece carrying the lugs 34 be spot welded to the part 40 of the casing so that the welding may be done before the spool of wire is inserted in the casing.

If it is desired to provide an extension on the package like the tab 35 in the form of the invention shown in Figs. 1 to 4 inclusive, then it is preferable to provide a strip 51 partially surrounding the casing members 40 and 41, and having formed integral therewith at one end the mounting lugs 34. The strap is formed with a central embossed portion 52 to fit over the enlarged portion 43 of the casing, and has at its lower end a tab 53 extending downwardly and covering the lower rear part of the stapling machine and concealing the leading end of the wire from view.

The central portion of the lower extremity of the tab 53 may be cut out, leaving ears 54 adapted to extend in the space 37, just as does the end of the tab 35 in the form of the invention shown in Figs. 1 to 4, to limit the movement of the package relative to the frame of the machine.

The casing made up of the parts 40 and 41 may receive any suitable form of spool, such, for instance, as the spool shown in Fig. 1. This spool may be of different construction, however, and, in the form of the invention shown in Figs. 5 to 8, inclusive, the spool comprises a sheet metal core 55 having ears 56 extending through slots 57 in the end flanges 58 of the spool and bent over the outside surfaces of the end flanges to lock the core and the end flanges together.

In order that the end walls 42 of the casing parts may be located close to the end flanges of the spool and yet have the ears 56 extend through and lie on the outside surface of the end flanges, the end walls 42 of the casing are provided with recesses 59 clearing the ears 56.

To avoid the ears 56 contacting with the end walls 42, the central portions of the end flanges are provided with bosses 60 to engage the recess portions 59 of the casing and present a smooth surface to these portions to limit lateral movement of the spool within the casing.

The bosses 60 are provided with central apertures 61 which may receive a supporting or driving shaft when the wire is wound upon the spool in the course of manufacture of the package.

In the form of the invention shown in Figs. 5 to 8, inclusive, the inside surface of the casing forms annular tracks for the end flanges of the spool, and it is on these tracks that the spool rotates with sufficient retarding action to prevent overrunning just as in the form of the invention illustrated in Figs. 1 to 4, inclusive.

In Fig. 9 there is shown the same form of device as shown in Figs. 5 to 8, inclusive, except that the end walls 42 of the casing are provided with openings 42a through which the spool may be grasped when it is desired to wind the spool without a quantity of wire, or to wind the wire back on the spool, as when preparing to initially thread the wire in the machine.
In Fig. 10 there is shown a modified form of the device in which an additional brake means is provided for retarding rotation of the spool and to prevent overrunning thereof as well as to prevent the wire from unwinding from the spool.

In the preferred form, as shown by Fig. 10, the brake comprises a tensioned spring arm 52 having an end thereof secured to the casing in any suitable way, as by spot welding. The arm is so positioned that the free end thereof resiliently engages the outer convolutions of the wire on the spool and offers frictional resistance to the rotation of the spool. To provide a more effective brake, and to prevent unwinding of the wire on the spool should the same be broken, a pad 53 of some suitable material, such as felt or the like, is secured to the end of the arm engaging the outer convolutions of the wire. The spring arm resiliently urges the pad against the outer convolutions of the wire regardless of the amount of wire on the spool so that a brake action is constantly exerted on the spool. The frictional resistance which is offered by the pad will decrease as the wire is unwound from the spool, but as the danger of overrunning also decreases as the wire on the spool is consumed the frictional resistance to rotation of the spool is effective notwithstanding.

The modified form of the brake, as shown by Fig. 14, although it has been illustrated in conjunction with the form of the invention disclosed in Figs. 1 to 4 inclusive, is not intended to be used with that form of the invention exclusively as it can be used with the form of the invention shown by Figs. 5 to 9 inclusive, equally as well. Variations and modifications may be made within the scope of this invention and portions of the improvements may be used without others.

I claim:

1. A supply package for stapling machines comprising a spool having a core and end flanges; a quantity of continuous staple-making wire wound on the spool; a mounting for said spool comprising means encircling the spool and having bearing surfaces engaged by the periphery of said spool flanges to support the spool for rotation; means adapted to withdrawal of the wire from the spool; and means adapted to engage portions of a stapling machine for supporting the package in operative position thereon, a wire-passage opening being provided between the sides of said spool-encircling means.

2. A supply package for a stapling machine comprising a spool having a core and lateral flanges; a quantity of continuous staple-making wire wound on the spool; a casing enclosing said spool, said flanges supporting said spool within the casing whereby the spool may be rotated incident to withdrawal of the wire from the spool; and means adapted to engage portions of the stapling machine for supporting a package in operative position thereon, said casing having a wire-passage opening therein.

3. A supply package for stapling machines comprising a spool having a core and end flanges; a quantity of continuous staple-making wire wound on the spool; a mounting for said spool comprising interconnected annular tracks engaged by the periphery of said spool flanges to support the spool for rotation incident to withdrawal of the wire from the spool; and means adapted to engage portions of a stapling machine to support the package in operative position thereon, a wire-passage opening being provided between said interconnected annular tracks.

4. A supply package for stapling machines comprising a spool having a core and end flanges; a quantity of continuous staple-making wire wound on the spool; a mounting for said spool comprising means encircling the spool and enclosing the space between the end flanges of the spool and the engaged periphery thereof to support the spool for rotation upon withdrawal of the wire therefrom, the frictional engagement between the periphery of the flanges and said encircling means incidently retarding the rotation of the spool as the wire is withdrawn therefrom; and means adapted to engage portions of a stapling machine for supporting the package in operative position thereon, a wire-passage opening being provided between the sides of said spool-encircling means.

5. A supply package for stapling machines comprising a spool having a core and end flanges; a quantity of continuous staple-making wire wound on the spool; means adapted to engage the upper rear portions of the stapling machine for supporting the package in pendant operative position between side plates of the machine; and rigid means carried by the spool-supporting means for covering at least the rear portion of the spool to render the spool and the wire carried thereby inaccessible to finger-engagement when the spool is in operative position on the machine, said means projecting downwardly and adapted to engage the machine to limit the movement of the spool and said supporting means relative to the machine.

6. A supply package for stapling machines comprising a spool having a core and end flanges; a quantity of continuous staple-making wire wound on the spool; means adapted to engage the upper rear portions of the stapling machine for supporting the package in pendant operative position between side plates of the machine; and rigid means carried by the spool-supporting means for projecting downwardly and terminating in a tab disposed substantially opposite said supporting means and adapted to engage the machine to prevent the movement of the spool and said spool-supporting means relative to the machine when the package is pendantsely mounted thereon.

7. A supply package for stapling machines comprising a spool having a core and end flanges; a quantity of continuous staple-making wire wound on the spool; a mounting for said spool comprising a two-part telescopic casing encircling the spool and having bearing surfaces engaged by said spool flanges to support the spool for rotation incident to withdrawal of the wire from the spool; and means carried by the casing adapted to engage portions of a stapling machine for supporting the package in operative position thereon, a wire-passage opening being provided in the casing between the sides of said spool-encircling means.

8. A supply package for stapling machines comprising a spool having a core and end flanges; a quantity of continuous staple-making wire wound on the spool; a mounting for the spool comprising a casing completely enclosing the end flanges of the spool and the space between them and having bearing surfaces engaged by said spool flanges to support the spool for rotation incident to withdrawal of the wire from the spool; and means carried by the casing to engage portions of a stapling machine for supporting the package in operative position thereon, a wire-passage opening being provided in the casing between the sides of the spool-encircling means.

9. A supply package for stapling machines comprising a spool having a core and end flanges; a quantity of continuous staple-making wire wound on the spool; a mounting for said spool comprising a casing completely enclosing the end flanges of the spool and the space between them and having bearing surfaces engaged by said spool flanges to support the spool for rotation incident to withdrawal of the wire from the spool; and means carried by the casing to engage portions of a stapling machine for supporting the package in operative position thereon, a wire-passage opening being provided in the casing between the sides of the spool-encircling means.
13. A supply package for stapling machines comprising a spool having a core and end flanges; a quantity of continuous staple-making wire wound on the spool; a two-part telescopic casing in which the spool is mounted, said casing having bearing surfaces engaged by the spool flanges to support the spool for rotation incident to withdrawal of the wire from the spool; means carried by said two-part casing for detachably securing the two parts thereof together; and a strip of metal secured to the casing, and having laterally extending lugs adapted to engage portions of the stapling machine frame for supporting the package in operative position therein, said casing having a wire passage for the leading end of the wire.

14. A supply package for stapling machines comprising a spool having a core and end flanges; a quantity of continuous staple-making wire wound on the spool; a two-part telescopic casing in which the spool is mounted, said casing having bearing surfaces engaged by the spool flanges to support the spool for rotation incident to withdrawal of the wire from the spool; means carried by said two-part casing for detachably securing the two parts thereof together; and a strip of metal secured to the casing, and having laterally extending lugs adapted to engage portions of the stapling machine frame for supporting the package in operative position therein, said casing having a wire passage for the leading end of the wire.

15. A supply package for stapling machines comprising a spool having a core and end flanges; a quantity of continuous staple-making wire wound on the spool; a two-part telescopic casing in which the spool is mounted, said casing having bearing surfaces engaged by the spool flanges to support the spool for rotation incident to withdrawal of the wire from the spool; means carried by said two-part casing for detachably securing the two parts thereof together; and a strip of metal secured to the casing, and having laterally extending lugs adapted to engage portions of the stapling machine frame for supporting the package in operative position therein, said casing having a wire passage for the leading end of the wire.

16. A supply package for stapling machines comprising a spool having a core and end flanges; a quantity of continuous staple-making wire wound on the spool; a two-part telescopic casing in which the spool is mounted, said casing having bearing surfaces engaged by the spool flanges to support the spool for rotation incident to withdrawal of the wire from the spool; means carried by said two-part casing for detachably securing the two parts thereof together; and a strip of metal secured to the casing, and having laterally extending lugs adapted to engage portions of the stapling machine frame for supporting the package in operative position therein, said casing having a wire passage for the leading end of the wire.
stapling machine to hold the casing and spool against substantial swinging movement.

17. A supply package for stapling machines comprising a spool having a core and lateral flanges; a quantity of continuous staple-making wire wound on the spool; a casing for said spool comprising means encircling a spool and having bearing surfaces engaged by said spool flanges to support the spool for rotation incident to withdrawal of the wire from the spool; means whereby said casing may be pendently mounted in a frame of a stapling machine; and rigid means for opposing movement of the casing parallel to the line of pull exerted on the wire in withdrawing the same from the spool.

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