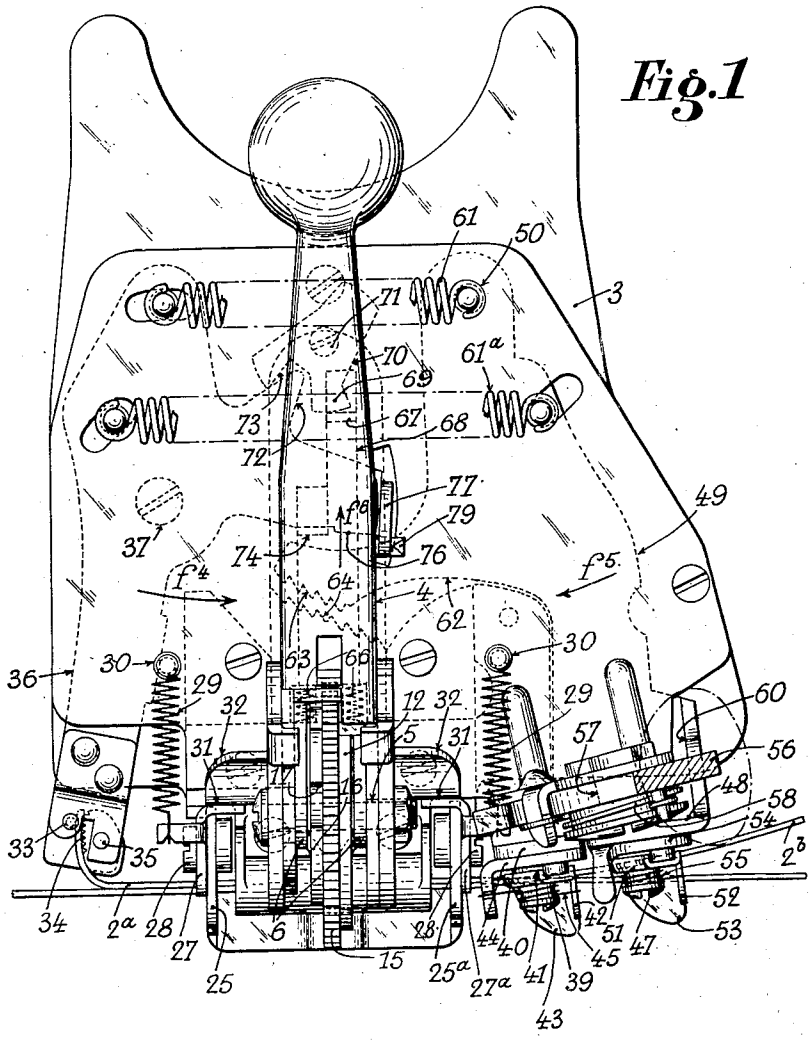
July 24, 1934. H. BRENNEISEN 1,967,739

MACHINE FOR HOOPING OR STRAPPING BOXES AND OTHER PACKAGES OR OBJECTS

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Fig.1



H. Brenneisen
INVENTOR

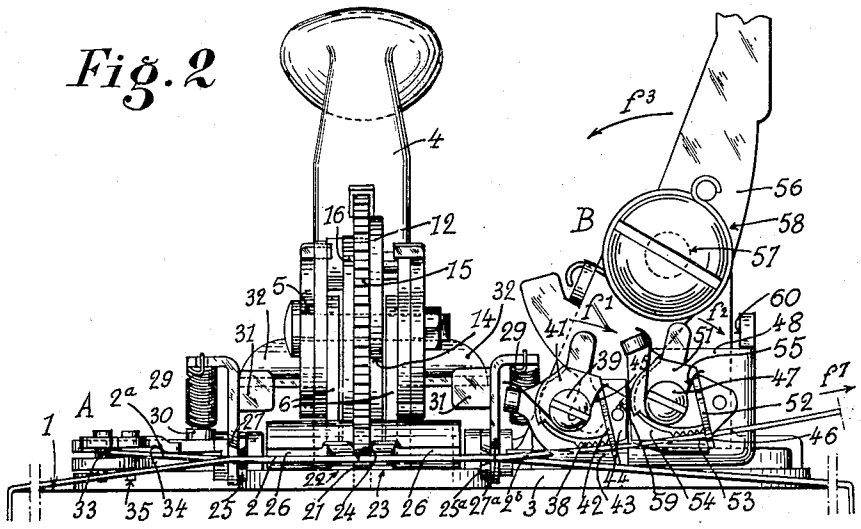
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MACHINE FOR HOOPING OR STRAPPING BOXES AND OTHER PACKAGES OR OBJECTS

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Fig. 2



H. Brenneisen
INVENTOR

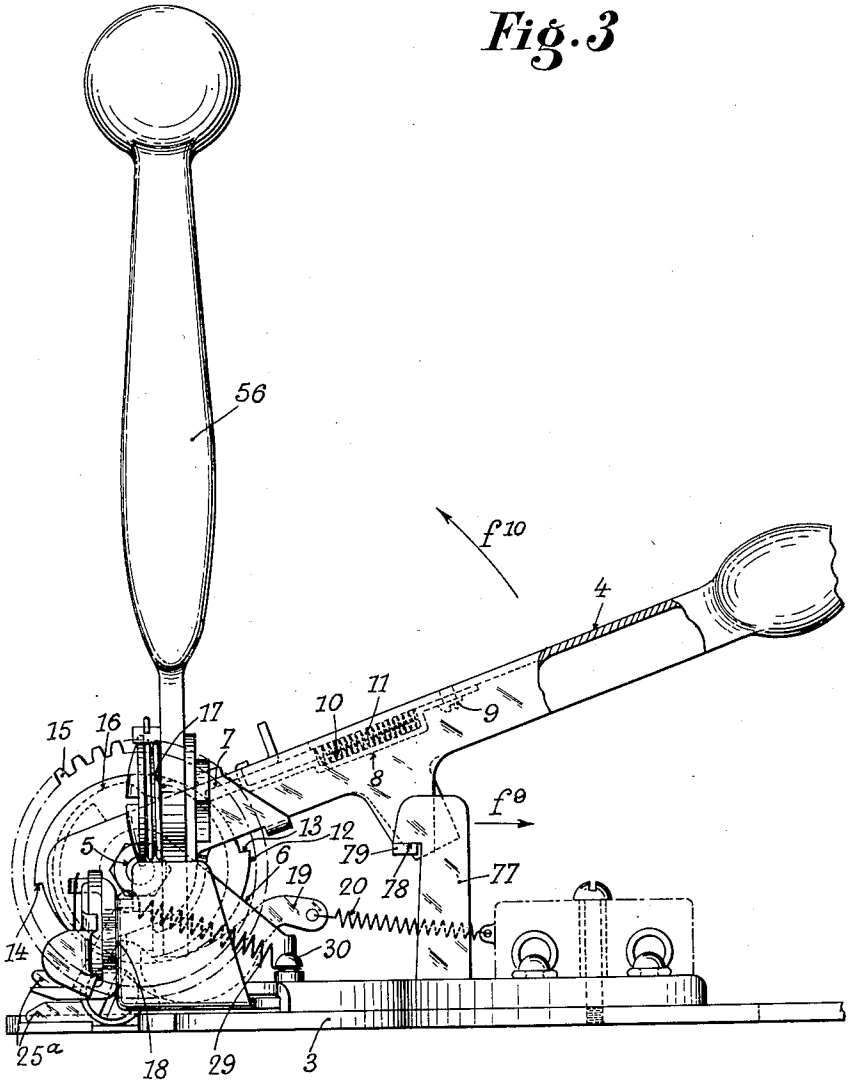
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MACHINE FOR HOOPING OR STRAPPING BOXES AND OTHER PACKAGES OR OBJECTS

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Fig. 3



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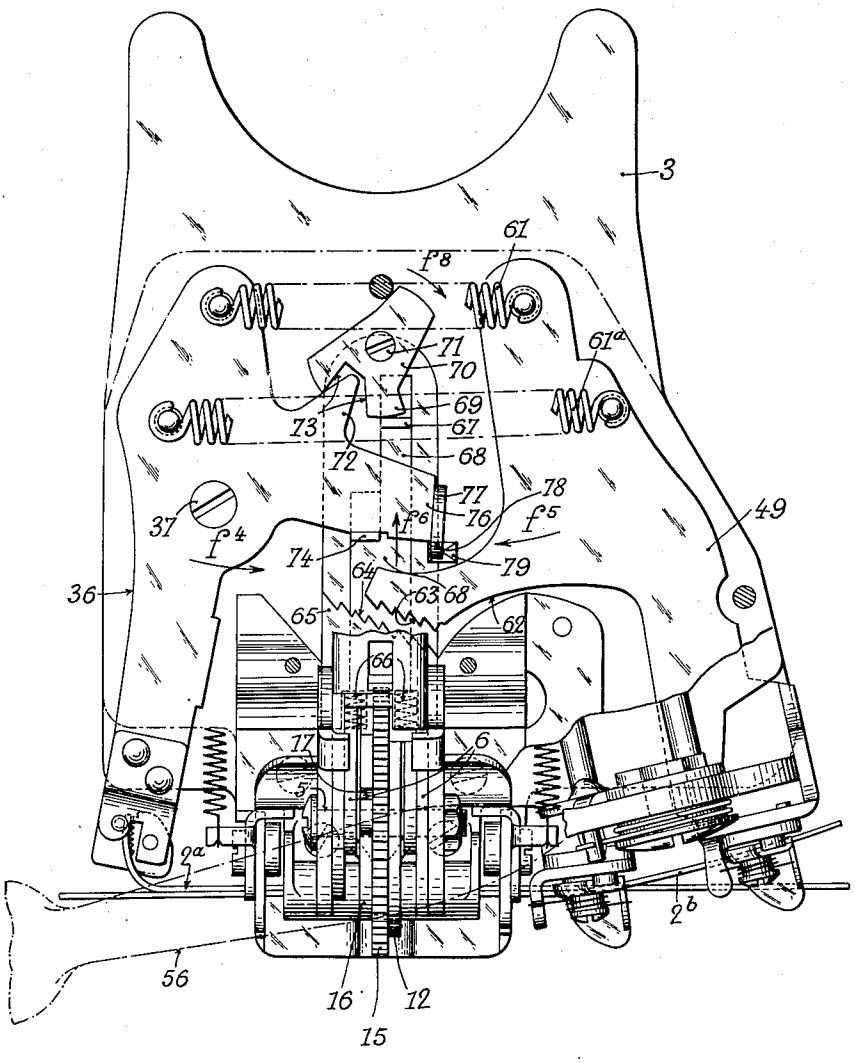
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MACHINE FOR HOOPING OR STRAPPING BOXES AND OTHER PACKAGES OR OBJECTS

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Fig. 4



H. Brenneisen
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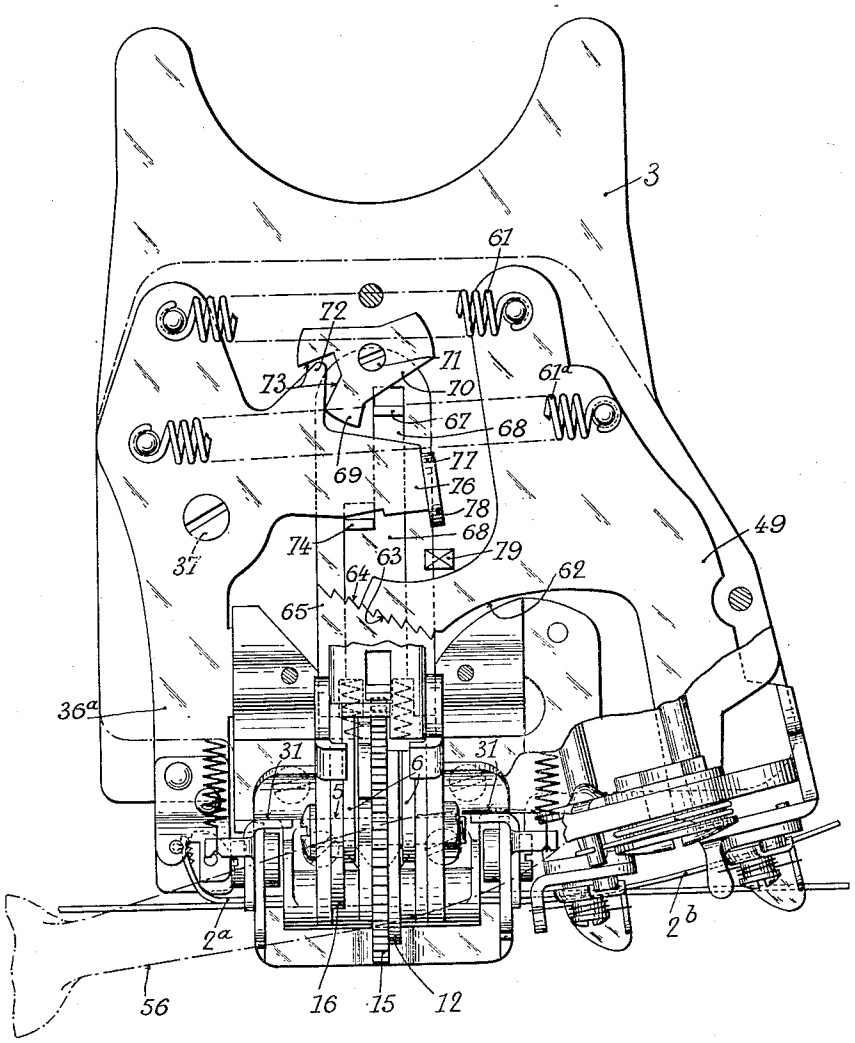
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MACHINE FOR HOOPING OR STRAPPING BOXES AND OTHER PACKAGES OR OBJECTS

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Fig. 5



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UNITED STATES PATENT OFFICE

1,967,739

MACHINE FOR HOOPING OR STRAPPING BOXES AND OTHER PACKAGES OR OBJECTS

Hermann Brenneisen, Paris, France

Application March 18, 1933, Serial No. 661,555
In France March 25, 1932

10 Claims. (Cl. 140—93)

The present invention relates to machines for the strapping, hooping or binding of boxes or like packages by the use of wire, band-iron or other binding material.

It is known that machines of this class essentially comprise two devices permitting, on the one hand, to secure the two ends of the wire, band-iron or the like to the machine, and on the other hand, to stretch said binding material, these devices being combined with a mechanism by which the two ends of the binding material, after said material has been placed around the package, may be assembled by twisting them together, by tying them, or otherwise.

The present invention has for its object to devise a machine of this class, and more particularly a machine of such construction that the exactly proper tension will be automatically given to the wire, band-iron or the like without any loss of such binding material.

According to one feature of the invention, the apparatus comprises a device adapted to lock the mechanism for stretching the wire or other binding material, after a desired tension has been given to said binding material, the value of said tension being predetermined by a calibrated arrangement.

According to another feature of the invention, said locking device of the tensioning mechanism of the binding material is combined with a device for locking the mechanism by which the two ends of the binding material are assembled or tied together, in such manner that when said tensioning mechanism is released, said tying mechanism will be locked, and inversely, the passage from one of these locking operations to the other taking place when the tension on the binding material has reached the desired value.

Further characteristics of the invention will be set forth in the following description.

In the accompanying drawings, which are given solely by way of example:

Fig. 1 is a plan view of a machine for strapping packages by the use of wire, comprising the several improvements according to the invention.

Fig. 2 is a corresponding front view.

Fig. 3 is a side view.

Figs. 4 and 5 are plan views corresponding respectively to the period of tensioning of the binding material and to the period of twisting the same.

In the form of construction herein represented, the apparatus is adapted for the strapping of a box 1 or the like (Fig. 2) by means of a wire 2.

Upon the frame of the apparatus, which consists of a base-plate 3, are mounted the following devices: a device for twisting together the two strands of the wire; the devices for securing the wire to the machine and for stretching said wire; the knives for cutting off the two ends of the wire after the twisting operation, and the devices for locking the torsion mechanism during the operation of the tensioning device, and for locking the tensioning device during the operation of the torsion mechanism.

The torsion device comprises a lever 4 which is pivotally mounted on a shaft 5 supported by two end-plates 6 secured to the frame 3. A pawl or latch 7 (Fig. 3) is mounted in lever 4 and is maintained by a plate 8 which is secured to said lever by a screw 9. Plate 8 has a rounded part 10 in which is mounted a spiral spring 11 adapted to press upon the said pawl or latch 7, this latter is in contact with a cam 12 which has two notches 13—14 (Figs. 2 and 3) in the diametrically opposite position, and which is rotatable on the shaft 5.

The cam 12 can be rotated together with a gear wheel 15 and with a second cam 16, said cam 12 being either integral with said wheel and cam 16, or secured together with the same upon the shaft 5. Cam 16 has two notches 17—18 in diametrically opposite position, in which may be engaged the suitably shaped end of a pivoting lever 19 (Fig. 3), urged by a spring 20.

The wheel 15 engages a small pinion 21 (Fig. 2) which is provided with journals rotatable in members 22—23 secured to the frame 3. The pinion 21 as well as its journals are radially slotted as far as the centre-line, the width of the slot 24 slightly exceeding the diameter of the binding wire 2. The gear ratio of the wheel 15 and pinion 21 being an even number. Two guides 25—25a are mounted on either side of the members 22—23 and are secured to the base-plate 3, said guides being provided with slots whose widths hardly exceed the diameter of the binding wire, and said slots being situated on the path of the wire 2. On the contrary, the free spaces 26 between the journals of the pinion 21 and the guides 25—25a have a height and widths which exceed double the diameter of the wire employed.

The binding wire is cut off by the following device:

Two knives 27—27a (Figs. 1 and 2), which are pivotally mounted on axles 28 secured to the base-plate 3, are in contact with the exterior of the guides 25—25a, and have cutting edges movable before the slots of said guides. Knife 27 is so arranged that it can only cut the strand 2a of the wire which is situated at the bottom of the

groove in guide 25, the knife 27*a* has a notch whose width is at least equal to the diameter of the wire, and it can only cut the strand 2*b* of the wire which is situated at the outer side, adjacent the strand 2*a* of the wire in the guide 25*a*.

Said knives 27—27*a*, which are provided with reaction springs 29 (Figs. 1 to 3) attached to studs 30 of the plate 3, are provided with lugs 31 adapted to make contact with two respective plates 32 secured to the lever 4. The said plates are preferably arranged in such manner that when the lever 4 is in the rear locking position (Fig. 3) reaction springs 29 are stretched.

On either side of the arrangement consisting of the twisting device and the said knives, are mounted (Fig. 2) the device A adapted to hold the free end of the strand 2*a* of the wire, and the device B for the tension of this wire on the portion 2*b* of said wire which is connected to the reel carrying the remainder of the wire.

The devices A and B are situated in the rear of the longitudinal axis of the torsion pinion 21.

The device A for holding the free end of the wire may have any suitable construction. It consists for example, as herein represented, of a stud 33 and a clamping member or cam 34 which is serrated on its edge adjacent the stud 33. Said cam is pivotally mounted on an eccentric axle 35. The stud 33 and axle 35 are mounted on an arm 36, pivoted at 37 to the base 3.

When the end of the part 2*a* of the wire has been engaged between the stud 33 and the serrated cam 34, any traction on the wire in the direction tending to release it will cause, by friction, a rotation of the said grip, and the eccentricity of the axle 35 is such that the serrated edge of the cam will clamp the part 2*a* of the wire still more tightly between the cam and the stud 33.

The device B for stretching the wire on the portion 2*b* of said wire which is connected with the reel of wire, comprises two sets of parts, one of which serves to stretch the wire, and the other to retain the wire during the return stroke of the first set.

The device for holding the wire comprises a serrated cam 38 (Fig. 2) which is loose on an eccentric axle 39 mounted in a boss 40 of the frame. Cam 38 is pivoted about by a rocker 41 which is loose on the axle 39 and is provided with an inclined branch 42, cut on a bevel; said branch co-operates with the horizontal branch of an angle bracket 44 which is permanently secured to the boss 40. A spring 45 tends to turn the rocker 41 in the direction of the arrow f^1 (Fig. 2).

The tensioning device for the wire comprises, in the same manner as the aforesaid holding device, a serrated cam 46 which is loose on an eccentric axle 47, secured to the vertical boss 48 of an arm 49 pivotally mounted at 50 on the base 3. The cam 46 is rotated by a rocker 51 which is loose on an axle 47 and is provided with an inclined branch 52 cut on a bevel; said branch co-operates with the horizontal branch 53 of an angle bracket 54 which is secured to a boss 48. A spring 55 tends to rotate the rocker 51 in the direction of the arrow f^2 (Fig. 2).

The pivot axle 50 of arm 49 carrying the cam 46 is situated at a sufficient distance to the rear in order that the path of cam 46 and hence that of strand 2*b* of the wire will be practically straight. Arm 49 is controlled by a lever 56, pivotally mounted on an axle 57 and urged into the position shown in Fig. 2 by a spring 58. Lever 56 carries at its lower end, and on the other side of axle 57, a cam 59 adapted to make contact with the vertical part 60 of the arm 49 after lever 56 has made an inoperative stroke, while turning in the direction of the arrow f^3 (Fig. 2).

The arm 49 of the tensioning device B and the arm 36 carrying the device A for holding the strand 2*a* of the wire are connected together by two springs 61—61*a* (Fig. 1); the spring 61*a* tends to turn arms 36—49 respectively in the contrary direction of the arrow f^4 and in the direction of the arrow f^5 (Figs. 1 and 4), whilst the spring 61 tends to turn arm 36 in the contrary direction of the arrow f^4.

The apparatus is completed by devices for locking the twisting and the tensioning devices.

In the construction shown in Figs. 1, 4 and 5, pivoting arm 49 carries an appendage 62 provided with teeth 63 cooperating with teeth 64 of a member 65 which is slidable on the base 3 and is urged by one or more springs 66 which tend to move it in the direction of the arrow f^6 (Fig. 4).

Said sled or latch bolt 65 is held in a forward idle position (Fig. 4) by the contact between a shoulder 67 of an appendage 68 of said sled and the projection 69 of a member 70 which is pivotally mounted at 71 on the base 3. The movement of member 70 is controlled by a stud 72 of arm 36, said stud being constantly engaged in a notch 73 of member 7.

The branch 76 of arm 36 is ended by a vertical part 77 ending in a hook 78 (Figs. 1 and 3) and said hook, when the arm 36 is in the idle position, holds the lever in its rear position, due to a lateral projection 79 of said lever, which projection is engaged below the hook 78.

Thus, instantaneously after member 70 has oscillated, the projection 69 occupies the position shown in Fig. 5, and shoulder 67 of latch bolt 65 is suddenly moved in the axial direction (Fig. 5).

The operation is as follows. In the idle position, arms 36 and 49 are in the position shown in Fig. 1, as they are brought back by the springs 61—61*a*. The projection 69 of member 70 is engaged at the rear of the stop 67 of sled or latch bolt 65, which is in its forward position. Thus arm 49 and hence lever 56 are free, whilst torsion lever 4 is held by hook 78.

The wire, carried by a reel containing any length, is inserted by its free end 2*a* between the stud 33 and the member 34. This strand 2*a* of the wire is then inserted into the torsion pinion 21. The wire is then placed around the packing box 1, and is again inserted by its strand 2*b* into the pinion 21, after which the next part of the wire 2*b* adjacent the unwound wire is placed between the branches 42 and 43 of the brackets 41 and 44 and then between the branches 52 and 53 of the brackets 51 and 54. The brackets 41 and 51 turn in the contrary direction to the arrows f^1 and f^2 against the springs 45 and 55, thus moving serrated cams 38 and 46. These pivoting devices now rise, due to the eccentricity of the axles 39 and 47, and the strand 2*b* of the wire can now take a position in contact with the interior of the fixed branches 43 and 53 of brackets 44 and 54 between said branches and cams 38 and 46 whose serrated edges grip the wire under the action of springs 45—55. Thenceforth, any motion of cams 38—46 with reference to the part 2*b* of the wire in the direction of the arrow f^7 (Fig. 2) will be impossible, as the grips will be further moved, thus clamping the wire more strongly in place.

Then, lever 56 is turned in the direction of the arrow f^3 (Fig. 2); cam 59 moves member 60 forward, and with it cam 46 and brackets 54, and in

general, the whole tensioning device, in the direction of the arrow f^7. Since any motion of the strand 2*b* of the wire with reference to the cam 46 is impossible during this stroke, the cam carries with it, (in the direction of the arrow f^7), said strand 2*b* of the wire which is held between said cam and branch 53 of the bracket 54. During this motion in the direction of the arrow f^7, the wire travels below the cam 38 which is raised against the action of spring 45.

When lever 56 is released, the whole tensioning device returns to the position here shown, under the action of spring 58 acting on lever 56 and spring 61*a* acting on arm 49.

During this return movement, the strand 2*b* is still held by cam 38; cam 46 rises, against the spring 55.

When the tensioning device has returned to the idle position, the operation is recommenced, and so on.

It is observed that, during this tensioning operation, a portion of the wire is restored to the reel situated next the strand 2*b*, without torsion or bending, and hence there will be no loss of wire, on the contrary to what usually takes place.

According as the tension of the wire increases, arm 36, drawn by strand 2*a*, pivots about its axle 37 in the direction of the arrow f^4 (Fig. 4). The stud 72 turns the cam 70 in the direction of the arrow f^8, whilst the hook 78 of arm 36 moves in the direction of the arrow f^9 (Figs. 3 and 4) with reference to the stop 79 of torsion lever 4.

When arm 36 has pivoted at 36*a* (Fig. 5) which corresponds to the desired tension of the wire, (this being adjustable by a proper choice of the springs 61—61*a* or by the use of any other suitable calibrated reaction device), the stop 79 is released from the hook 78, thus releasing the lever 4, which is abruptly brought back in the direction of the arrow f^{10} (Fig. 3) by the tension of the knife springs 29, and this shows to the operator the release of the twisting mechanism. At the same time, the projection 69 of the member 70 escapes from the stop 67 of the sled or latch bolt 68—65 which latter is brought to the rear by the spring or springs 66, and its teeth 64 engage the teeth 63 of the arm 49. This arm, which has been hitherto allowed to move normally and to its maximum degree under the action of lever 56, is now held fast in any position corresponding to the desired tension, whilst the torsion lever 4 is released.

The lever 4 is brought forward in the direction of the arrow f^{10}, and then, after the pawl 7 has engaged one of the notches of cam 12, lever 4 is moved to the rear, thereby turning wheel 15 and consequently pinion 21. The two strands 2*a* and 2*b* of the wire are thus twisted together.

Shortly before the end of the rear stroke of lever 4, the plates 32 make contact with lugs 31 of knives 27 and 27*a*, and each knife cuts the respective strand 2*a*—2*b*.

After the wire has been cut, the arm 36 is brought back by the spring or springs 61 into the position shown in Figs. 1 and 4. Branch 76 of arm 36 is thus rotated in the contrary direction of arrow f^4; it comes into contact with a stud 74 of sled 65 and causes said sled to move forward. Stud 72 brings back member 70 in the contrary direction of arrow f^8, and projection 69 engages behind the stud 67 of sled 65—68; thus teeth 63—64 are disengaged, arm 49 is again released, whilst lever 4 is held by hook 78. The machine is now ready for another operation.

As will be observed (in Fig. 2) the lever 56 controlling the tension device should be out of the way, when in its idle position (for instance in the vertical position) so that it will not interfere with the rotation of the torsion lever 4. Hence at the beginning of the movement of the lever 56, for the tensioning of the wire, it is necessary to set laterally upon this lever, which is hardly practical when a great force is to be exerted. For this reason the shape of the cam 59 will preferably be such as to afford lost motion for the lever, so that it will only act upon the tensioning device when it has been sufficiently inclined in order that it may be readily given a downward pressure.

Obviously, the invention is not limited to the form of construction herein described and represented, which is given solely by way of example. For instance, arms 36 and 49, especially, may be made slidable instead of pivoting.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A machine of the type described comprising a tensioning mechanism provided with a member having stopping means, a latch bolt cooperating with said stopping means, reaction means acting upon said latch bolt and means adapted to release said latch bolt when the desired tension is reached.

2. A machine of the type described comprising a tensioning mechanism provided with a member having an uneven surface, a latch bolt cooperating with said surface, reaction means acting upon said bolt, and a device for securing the free end of the hooping material to the machine and adapted to release said latch bolt when the securing device has attained against said reaction means the position corresponding to the desired amount of tension.

3. A machine of the type described comprising a tensioning mechanism provided with a member having an uneven surface, a latch bolt cooperating with said surface, means for holding said latch bolt in the withdrawn position, reactions means acting upon said bolt, and a device for securing the free end of the hooping material to the machine and adapted to release said latch bolt when the securing device has attained against said reaction means the position corresponding to the desired amount of tension.

4. A machine of the type described comprising a tensioning mechanism provided with a member having an uneven surface, a latch bolt cooperating with said surface, means for holding said latch bolt in the withdrawn position, the displacements of said means being controlled by said securing device, reaction means acting upon said bolt, and a device for securing the free end of the hooping material to the machine and adapted to release said latch bolt when the securing device has attained against said reaction means the position corresponding to the desired amount of tension.

5. A machine as claimed in claim 8 further comprising elastic reaction means for the actuating member of said assembling mechanism, for automatically displacing this latter when unlocked.

6. A machine of the type described comprising a device for tensioning the hooping material, actuating means for said tensioning device, retaining means for said hooping material, reaction means of a predetermined force secured to and acting upon said retaining means and in-

stantaneous locking means for said tensioning device controlled by said retaining means.

7. A machine according to claim 6, wherein said actuating means consist of a reciprocating member adapted to move on full strokes.

8. A machine of the type described comprising a device for tensioning the hooping material, actuating means for said tensioning device, retaining means for said hooping material, reaction means of a predetermined force secured to and acting upon said retaining means, an assembling device for the strands of said hooping material and instantaneous locking means for both of said assembling and tensioning devices, controlled by said retaining means and adapted to lock one of said devices when releasing the other.

9. A machine of the type described comprising a main frame, an oscillating member mounted on said frame and adapted to be connected to the hooping material, a serrated surface on said member, another oscillating member connected to the free end of the hooping material, reaction means of a predetermined force acting upon said second oscillating member, a latch bolt slidably mounted on said frame and provided with a part intended for engaging said serrated surface, reaction means acting upon said latch bolt, and means for maintaining said latch bolt out of engagement with said serrated surface against said reaction means and controlled by the last mentioned oscillating member.

10. A machine of the type described comprising a main frame, an oscillating member mounted on said frame, provided with a tensioning device and adapted to be connected to the hooping material, a serrated surface on said member, another oscillating member connected to the free end of the hooping material, reaction means of a predetermined force acting upon said second member, a latch bolt slidably mounted on said frame and provided with a part intended for engaging said serrated surface, reaction means acting upon said latch bolt, and means for maintaining said latch bolt out of engagement with said serrated surface against said reaction means, and controlled by the last mentioned oscillating member, further comprising an assembling mechanism preferably situated between said two oscillating members.

HERMANN BRENNEISEN.