Feb. 20, 1934. P. WOLF 1,947,670

MACHINE FOR TYING PARCELS BY MEANS OF WIRE

Filed Feb. 10, 1932 2 Sheets-Sheet 1

Fig. 1

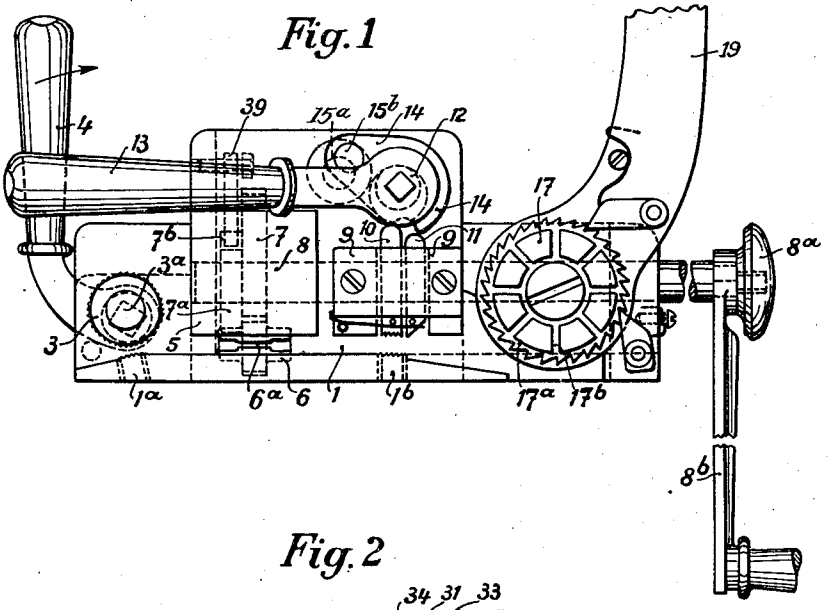


Fig. 2

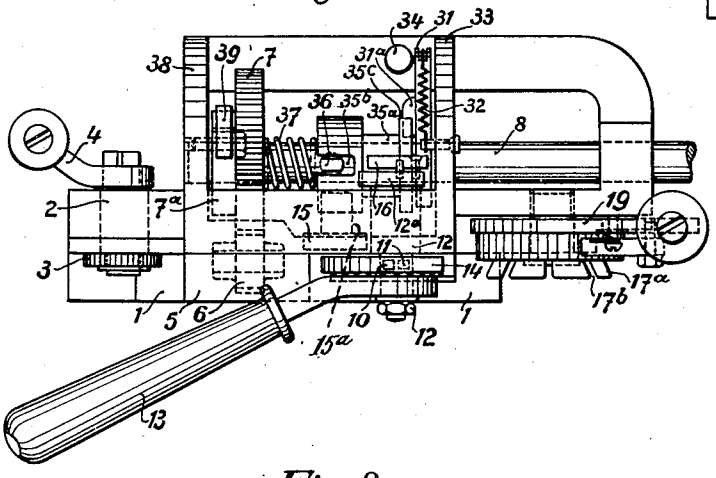


Fig. 8

Inventor:
Peter Wolf

Feb. 20, 1934. P. WOLF 1,947,670

MACHINE FOR TYING PARCELS BY MEANS OF WIRE

Filed Feb. 10, 1932 2 Sheets-Sheet 2

Fig. 3

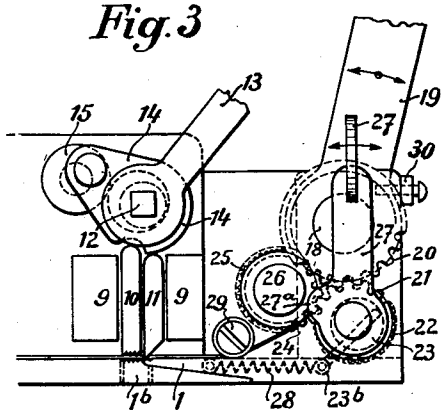
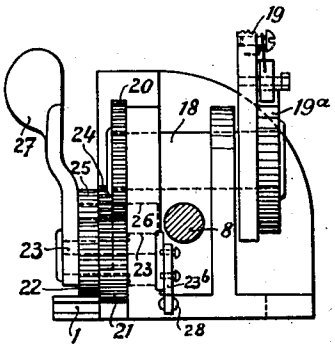


Fig. 4



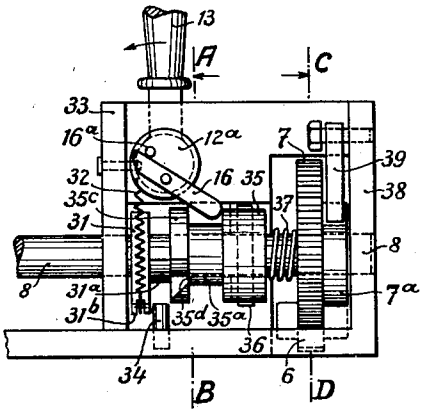


Fig. 5

Fig. 6

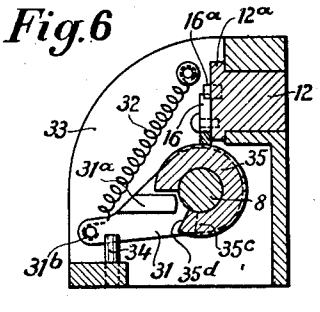
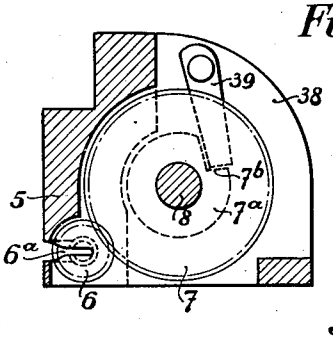


Fig. 7



Inventor:
Peter Wolf

Patented Feb. 20, 1934 1,947,670

UNITED STATES PATENT OFFICE

1,947,670

MACHINE FOR TYING PARCELS BY MEANS OF WIRE

Peter Wolf, Cologne-Kalk, Germany

Application February 10, 1932, Serial No. 592,064, and in Germany December 28, 1931

9 Claims. (Cl. 140—93)

My invention relates to machines for tying parcels by means of wire, and the principal object of my invention consists in a machine through which the wire tied around the parcel is after the tightening operation at first cut to the proper length and then twisted. Other objects of my invention will be apparent from the following specification of preferred embodiments of my invention which are illustrated in the accompanying drawings in which

Fig. 1 is a front view and

Fig. 2 a top view of the improved wire-tying machine.

Fig. 3 is a partial view of a modification, such partial view showing especially the cutting and clamping means in the state existing after the wire has been cut.

Fig. 4 is a side view showing especially the tightening means.

Fig. 5 is a partial view showing especially locking and releasing means of the machine.

Fig. 6 is a section according to the line A—B of Fig. 5, whereas

Fig. 7 is a section according to the line C—D of Fig. 5.

Fig. 8 shows the twisted joint of the wire.

1 is the supporting ledge for the wire, such supporting ledge forming a portion of the bottom wall of the frame of the machine. The supporting ledge 1 extends in the longitudinal direction of the machine, and the breadth of said supporting ledge is of a suitable dimension. The supporting ledge is provided with two threaded and hardened insertions which take up the counter-pressure exerted on the supporting ledge by the clamping devices 3 and 10. From the bottom wall of the frame a main vertical wall projects in which the pivot 2 is rotatably mounted at the left end portion of the supporting ledge 1. On the eccentric front end of the said pivot the rotatable and toothed clamping disc 3 is mounted. On the rear side of the vertical main wall of the frame a hand-lever 4 is fixed to the pivot 2 which lever serves for the actuating of the clamping disc 3. 5 is a front casing of the frame which takes up the twisting member 6 forming a slotted pinion which is in mesh with the toothed wheel 7. The said wheel is fixed to the crank-shaft 8 which is mounted within the frame in rear of the vertical main wall. Alongside of the casing 5 guiding ledges 9 are provided on the vertical main wall of the frame, such ledges forming a guide-block in which a clamping ram 10 and a cutting ram 11 are arranged side by side and are slidable in a vertical direction. The cutting ram 11 is provided with a recess into which the rear wire section may enter during the downward motion of the ram. The rams 10 and 11 are actuated by an eccentric bolt 12 through the intermediary of a curved pressure-plate 14 which is mounted on the eccentric bolts 12 and 15^b. The eccentric bolt 15^b forms a crank pin projecting from a crank disc 15 integral with a shaft portion consisting of a pivot 15^a which is mounted in the frame of the machine. The eccentric bolt 12 is rotated by means of a hand-lever 13. In rear of the vertical main wall of the frame the bolt 12 is provided with the disc 12^a on which a slide-lever 16 and further a driving pin 16^a is provided which pin actuates said slide-lever (Fig. 5).

According to Fig. 1 the tightening device 17 at the right end of the vertical main wall is of approved construction. The said device is provided with a tightening disc 17^a having notches 17^b into one of which the wire is laid in. As the said wire also follows the periphery of the disc the said wire is bent in a broken line, so that the wire cannot be further used. Such loss of material is avoided by the tightening device shown in the Figs. 3 and 4. 18 is a rotatable shaft to which in rear of the vertical main wall a ratchet wheel 19^a and in front of said wall a toothed wheel 20 is fixed. The said wheel 20 meshes with a toothed wheel 21, whereas the said ratchet wheel is actuated by a lever 19. The toothed wheel 21 is rigidly connected with the toothed roller 22 and rotatably mounted on the rotatable eccentric pivot 23. The toothed wheel 21 further meshes with the toothed wheel 24 which is rigidly connected with the toothed roller 25 and rotatably mounted on the fixed bolt 26. In front of the roller 22 the lever 27 is fixed to the pivot 23. The said lever is provided with a projection 27^a. At the rear end of the pivot there is a projection 23^b which is under the influence of a spring 28. In front of the vertical main wall an adjustable abutment 30 and a roller 29 provided with an annular groove are provided.

In rear of the vertical main wall the controlling member 31 is mounted on the crank shaft 8. The said controlling member is provided with a locking cam 31^a the projection 31^b of which is suspended by the spring 32 which is fixed to the side wall 33 (Figs. 5 to 6). An axial movement of the controlling member 31 is prevented by a pin 34 extending upwardly from the bottom wall of the frame. By the side of the said controlling member the box 35 is mounted on the crank shaft 8. The box 35 is provided with an annular cavity 35^a and with diametrical slots 35^b. The collar

35c of said box has an incision at 35d, and the said incision serves for the engagement of the locking cam 31a of the controlling member 31 (Figs. 5 and 6). The slots 35b of the box are engaged by a pin 36 projecting with diametrically opposed ends from the crank shaft 8, said ends of the pin being flattened to correspond with the breadth of the slots. The pin 36 serves simultaneously as a guide for the box in the axial movement of the latter and also as a driver of the box in the rotary motion of the same. Between the box 35 and the toothed wheel 7 the helical pressure spring 37 is intercalated which is wound around the crank shaft. The said spring effects the axial return motion of the box 35. On the side wall 38 the pawl 39 is suspended (Fig. 7) which engages a dentate-serrate incision 7b of the hub 7a of the toothed wheel 7, thus locking the driving mechanism of the twisting member against rotary return motion. The crank-lever 8b is fixed to the crank shaft 8 by means of a screw cap 8a.

The operation of the machine is as following:

The free end of the usual wire is laid upon the supporting ledge 1 underneath the toothed clamping disc 3. The lever 4 is then swung, so that a rotation of the eccentric pivot 2 takes place through which the wire is pressed towards the supporting ledge 1. Then the adjoining portion of the wire is inserted into the slot 6a of the twisting member, further the wire is brought underneath the rams 10, 11 and tied beyond the right end of the supporting ledge around the parcel. Then the adjoining portion of the wire is passed by the disc 3 and is also inserted into the slot 6a of the twisting member. The adjoining portion of the wire is also brought underneath the rams 10, 11 and between the toothed tightening rollers 22, 25. For the insertion of the wire between the said rollers the roller 22 is swung away from the roller 25 by a rotation of the eccentric pivot 23 through the intermediary of the lever 27 (Fig. 3). After the insertion of the wire between the said rollers the same are automatically moved towards one another by the tension of the spring 28. The projection 27a of the lever then covers the point in which the rollers 22 and 25 mesh with each other. Therewith the wire is prevented from sliding out of the rollers towards the front during the subsequent tightening operation. In rear of the rollers the wire is held in position by the toothed wheels 21, 24. The tightening is effected by the actuation of the ratchet mechanism 19, 19a. Through the gear wheels 20, 21, 24 rotary motions of equal direction are simultaneously exerted on both of the rollers the teeth of which seize the wire to tighten the same. For avoiding a slipping of the wire through the rollers at a higher tension of the wire, the rollers are moved towards one another by the eccentric pivot 23 in the direction of the tension which is exerted on the wire. In this way the rollers 22 and 25 are afterwards moved towards one another either by the action of a spring or by the tension of the wire. An extreme pressure on the wire is avoided by an adjustable abutment 30 which limits the corresponding rotary motion of the eccentric pivot 23 by limiting the motion of the lever 27. The roller 29 has the purpose to hold the wire during the tightening operation in the right cutting and twisting position. The wire engages with the annular groove of the roller 29 and is in this way kept in the right position at increasing distortion of the wire.

After sufficient tightening of the wire the clamping and cutting device are actuated and the release of the locking means of the twisting element is effected (Figs. 3 and 5). Through the actuation of the lever 13 the eccentric pivot 12 is rotated, whereby a continual pressure is exerted on the clamping ram 10 and the cutting ram 11 through the intermediary of the pressure-plate 14. The equal pressure-action on both of the said rams is terminated as soon as the clamping ram has clamped the front section of the wire which section has to be cut. The pressure which further arises from the rotation of the eccentric pivot 12 is now solely exerted on the cutting ram 11, and by this pressure-action the front section of the wire is cut. The eccentric motion arising from the rotation of the pivot 12 is transmitted to the bolt 15b through the intermediary of the pressure-plate 14. When following the motion this bolt 15b displaces the pressure-plate 14 laterally. In consequence of this lateral displacement the curved formation of the pressure-plate 14 allows an advanced termination of the pressure-action on the cutting ram 11. Hereby the rear section of the wire tied around the parcel is positioned in the incision of the cutting ram, so that only the front section is cut which section is near the cutting point held fast by the clamping ram, so that the wire remains in its tightened state. Simultaneously the slide-lever 16 which is rotatably mounted on the disc 12a at the rear end of the pivot 12 has released the means for locking the mechanism for driving the twisting member (Fig. 5). During the rotation of the bolt 12 the slide lever 16 is forced by the driving pin 16a into the annular cavity 35a of the box to move the same in axial direction. The axial movement is terminated, as soon as the slide-lever 16 leaves the annular cavity 35a at further rotation of the pivot 12. Meanwhile the locking cam 31a of the controlling member has been moved out of the incision 35d of the collar 35c and the controlling member 31 is subjected to a partial revolution about the crank-shaft 8 under the action of the spring 32. The locking device for locking the driving means of the twisting member is now released, and the twisting operation is executed by a single revolution of the crank-shaft. The parts are arranged in such a way that the lever 13 is moved by the left hand of the operator, so that after the clamping and cutting operation this lever serves in the respective end position as a handle to hold the machine fast during the twisting operation which is executed with the right hand of the operator. The pin 36 fixed to the crank-shaft 8 serves in consequence of its engagement with the slots 35b of the box as a driver for rotating the box itself and further as a guide for the axial displacement of the box 35 which is pressed with its collar 35c against the locking cam 31a of the controlling member 31 through the action of the spring 37. A short time before the end of the twisting operation the incision 35d reaches the locking cam 31a, and the box 35 is now pressed with its collar 35c against the controlling member 31 itself, so that this member is now taken along by the rotating crank-shaft in consequence of the engagement of the cam 31a with the incision 35d. As soon as the end portion 31b of the controlling member strikes against the bottom of the frame the rotation of the crank-shaft is terminated. In this moment also the twisting operation is terminated in such a way that the slot 6a of the twisting member is to some extent

excessively moved. Therefore the twisting member 6 must be subjected to a return movement for the purpose of withdrawing the twisting joint from the slot of the twisting member, whereby the twisting joint is untightened in fractions. This return motion automatically takes place after the crank 8^b had been left hold of, because the tension of the spring 32 is transmitted by the controlling member 31 to the crank-shaft 8 and the twisting member 6. This return motion is terminated by the engagement of the pawl 39 into the incision 7^b of the hub 7^a of the toothed wheel 7 (Fig. 7).

Now by an equally directed manipulation of the left hand of the operator the levers 13 and 4 are returned to their initial positions, so that the ends of the twisting joint are freed from the clamping pressure. Subsequently the operator exerts with his right hand a slight pushing on the screw cap 8^a to release the supporting ledge 1 from the finished twisting joint. During the return motion of the lever 13 the slide-lever 16 being now released from the driving pin 16^a and being therefore freely movable is also returned into its initial position to come again into engagement with the annular cavity 35^a of the box. Now the machine is set for another phase of operation, and after the machine has been applied to another parcel to be tied the lever 27 is swung, and the cut end of the wire is removed from the tightening device and clamped within the left clamping device.

I claim:—

1. In a wire-tying machine a clamping device, a twisting device, a tensioning device, a second clamping device, a cutting device and a mechanism for simultaneously actuating the said second clamping device and the said cutting device.

2. In a wire-tying machine a clamping device, a twisting device, a tensioning device, a clamping ram, a cutting ram, two eccentric bolts, a curved pressure-plate mounted on said bolts, a hand-lever mounted to the front end of one of said eccentric bolts and being adapted simultaneously to actuate in a single turn said clamping ram and said cutting ram through the intermediary of said pressure-plate.

3. In a wire-tying machine a clamping device, a twisting device, a tensioning device, a second clamping device, a cutting device, a mechanism for simultaneously actuating said second clamping device and said cutting device and a mechanism for locking the twisting device.

4. In a wire-tying machine a frame, a twisting device, a crank shaft, a transverse pin on said crank shaft, an axially displaceable, spring-influenced box on said crank shaft, said box having slots for engagement with the said transverse pin and having further a collar provided with an incision, a controlling member slidably mounted on said crank shaft, said controlling member having a cam engaging with the incision of said collar and a stop on the bottom of said frame, said stop limiting the forward operative motion of the twisting device.

5. In a wire-tying machine a crank shaft, a twisting device including a toothed wheel on the crank shaft, said toothed wheel having a hub provided with an incision, a transverse pin on the crank shaft, an axially displaceable and spring-influenced box on said crank shaft, said box having slots for engagement with the said transverse pin, a spring-influenced controlling member slidably mounted on said crank shaft and in engagement with said box and a member limiting through engagement with the said incision of the wheel-hub the return motion of the twisting device, which return motion is effected by the spring influencing the controlling member.

6. In a wire tying machine a clamping device, a twisting device, a mechanism for locking said twisting device, a tensioning device, a second clamping device, a cutting device, a mechanism for simultaneously actuating said second clamping device and the cutting device and means for releasing the locking mechanism of the twisting device.

7. In a wire-tying machine a clamping device, a second clamping device, a cutting device, a twisting device, a mechanism for locking said twisting device, means for releasing said locking mechanism of the twisting device and a mechanism for simultaneously actuating the second clamping device, the cutting device and the means for releasing the locking mechanism of the twisting device.

8. In a wire-tying machine a clamping ram, a cutting ram, a twisting member, means for driving said twisting member, means for locking said driving means, two eccentric bolts, a pressure plate mounted on said eccentric bolts, a driving pin and a freely movable slide-lever on the rear of one of said eccentric bolts, a crank shaft, a spring-influenced controlling member slidably mounted on said crank shaft and a box rotatably taken along by the crank shaft but axially movable thereon and being provided with an annular cavity engaged by said slide-lever, a hand-lever mounted to the front of the eccentric bolt carrying said driving pin and said slide-lever, the said hand-lever being adapted to actuate in a single turn the said clamping ram and the said cutting ram through the intermediary of the said pressure-plate and simultaneously to release the previously locked driving means of the twisting member through the intermediary of said slide-lever and of said box.

9. In a machine for tying parcels by means of wire, a clamping device for holding fast the free end of the wire, a device for tensioning the wire passed around the parcel, a combined clamping and cutting device for simultaneously gripping and cutting the wire in and to the finished packeting length, and a device for twisting the wire.

PETER WOLF.