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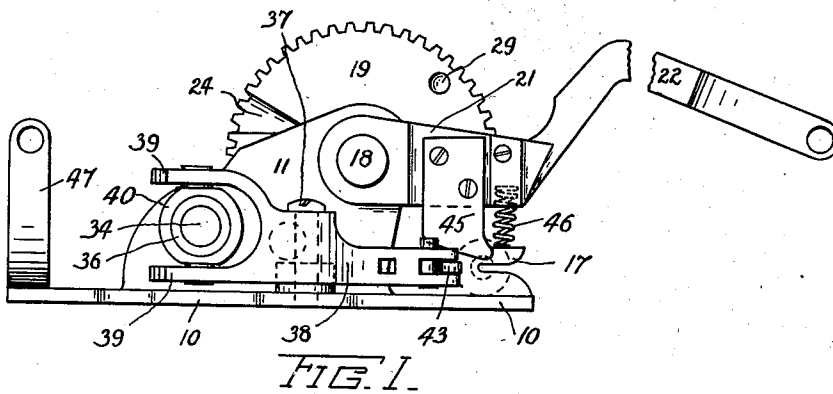
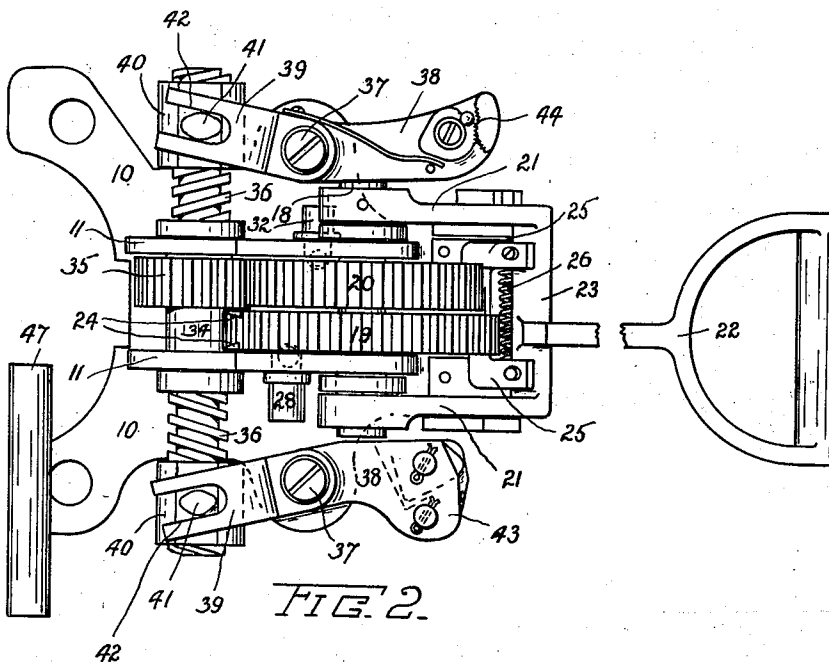
C. H. CHAMBERLAIN ET AL

2,062,698.

WIRE BINDING MACHINE

Filed March 13, 1936

3 Sheets-Sheet 1



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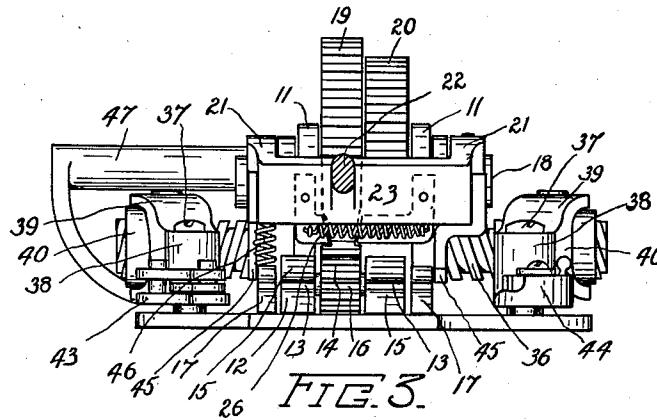
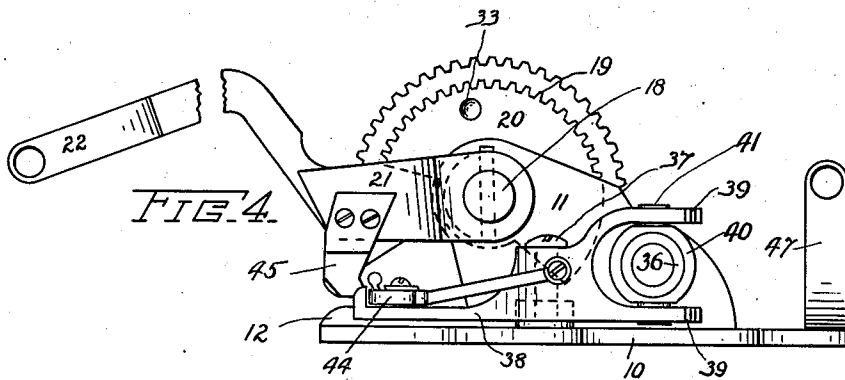
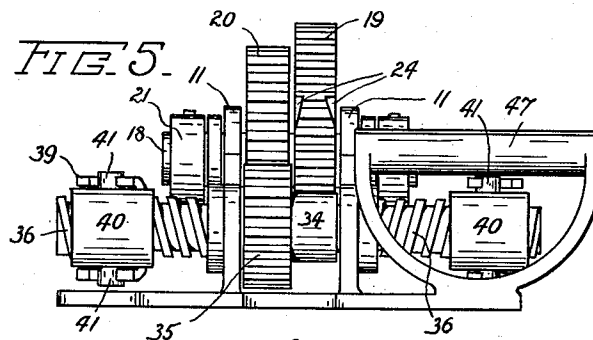
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WIRE BINDING MACHINE

Filed March 13, 1936

3 Sheets-Sheet 2



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WIRE BINDING MACHINE

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3 Sheets-Sheet 3

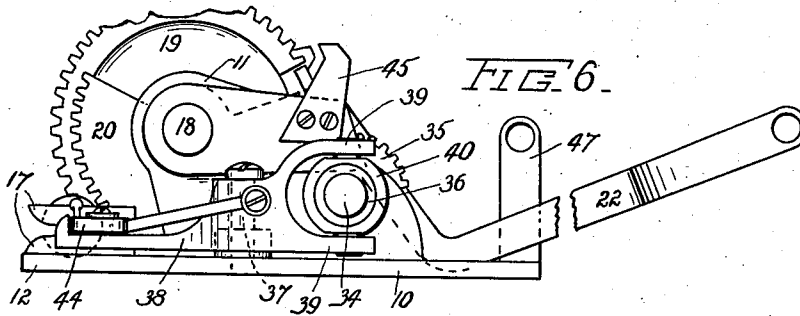
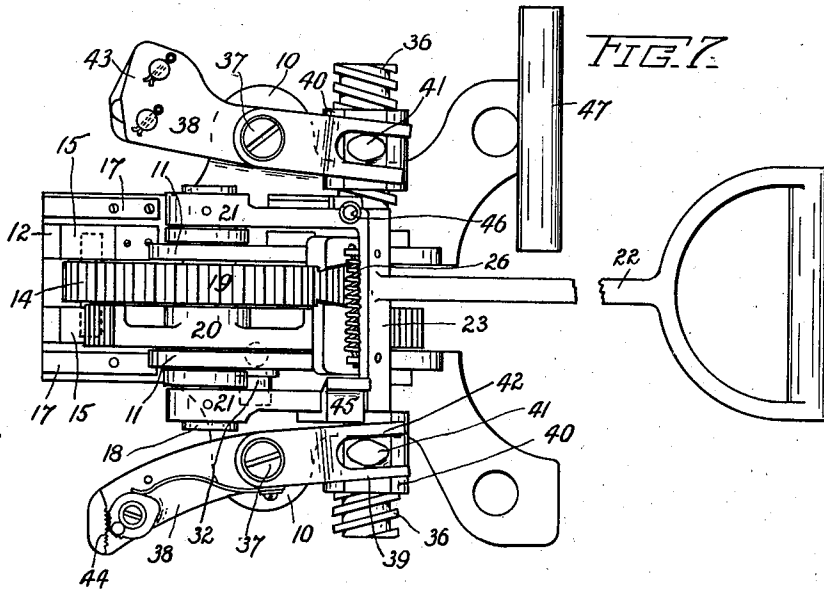


FIG. 8.

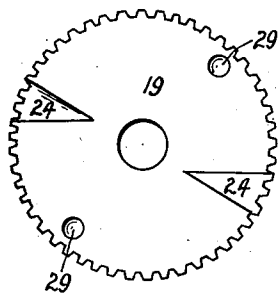


FIG. 9.

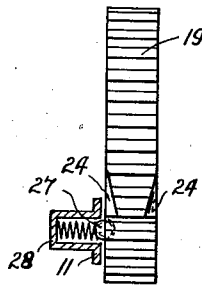
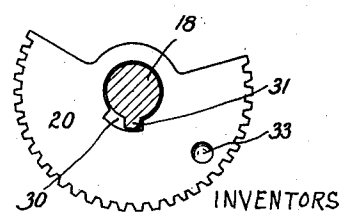


FIG. 10.



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2,062,698

WIRE BINDING MACHINE

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Stannard, Nelson, New Zealand

Application March 13, 1936, Serial No. 68,764
In New Zealand April 5, 1935

5 Claims. (Cl. 140—93)

This invention has reference to an improved machine for effecting wire binding operations in the binding or strapping of packing cases and other packages by the well known method in which the wire band is placed round the case or package, its two ends crossed and then tensioned by drawing them apart and are twisted together to form a tie and finally have the surplus ends cut off.

10 The invention provides a construction of machine which may be used either with wire bands previously cut into the required lengths, or with a coil of wire the free end of which is bound and tied on the case or package and then severed from the coil in the cutting operation.

15 The said construction is so designed as to provide for the operation of straining the band being effected by the rearward movement of an operating handle and the operations of twisting the overlapping portions and the cutting of the ends being effected by the forward movement of such operating handle.

20 The principal novel features of the machine are concerned with the means for gripping the band ends and for tensioning it around the case or package and the means for effecting the twisting and cutting actions beforementioned, through the operations of this hand lever.

25 An object of the invention is to construct a machine of this character which is portable, light in weight and readily handled in the carrying out of its operations.

30 Another object is to construct a machine with simple parts not of an intricate nature and in which repairs or replacements may be carried out without the employment of skilled labour and which is economical in the cost of its production.

35 The said machine is illustrated in the accompanying drawings and will be hereinafter fully described in relation to such drawings, in which:—

40 Figure 1 is a left hand side elevation of the machine showing the position assumed by the parts when the operating handle is swung across to the front in the commencement of the operations.

Figure 2 is a plan thereof.

45 Figure 3 is a front elevation thereof, the handle stem being shown in section.

50 Figure 4 is a right hand side elevation with the parts still in the commencement position.

Figure 5 is a back elevation thereof.

55 Figure 6 is a right hand side elevation but with the parts in the position assumed when the handle is swung back to the rear position.

Figure 7 is a plan thereof.

Figures 8 to 10 are detail views which will be hereinafter more fully referred to.

In its general features of construction and operation the machine designed resembles machines already known and used in like circumstances to strain a wire band round a case or package by overlapping its ends and drawing the overlapped ends in opposite directions and then to secure the two ends together by helically twisting them one upon the other. It also resembles known machines in that it provides for such straining and twisting being effected by causing the two ends of the band, as they cross, to pass through a radial slot in a rotatable pinion wheel and then to be respectively gripped at their extremities by grips upon pivoted lever arms which are caused to move apart and to approach each other in the operations of the machine. Still further, the machine resembles known machines of this type in that by the movement of a single operating handle in one direction, the straining levers are caused to be moved apart while the said pinion remains stationary, and the movement of such handle in a reverse direction causes the pinion to be rotated on its own axis while the straining levers move together.

The novel features of construction in this machine are hereinafter described and set forth in the claiming clauses.

In giving effect to the invention a base plate of suitable design is provided, such plate having combined therewith parallel disposed bearing cheeks 11 extending in a front to rear direction, and also having a ledge 12 along its front edge which is designed to have the wire ends brought across it for straining and securing and then to slip out from beneath the joined ends, in the well known manner. This ledge is provided with two horizontal slotted guides 13 arranged upon and disposed a distance apart across the front, and the slot in each of these is made of just sufficient height to allow of a single thickness of wire lying within it although its depth in from the front is sufficient to allow for two wires lying side by side within it. A pinion wheel 14 is arranged between the guides such being journaled on stub axles within the blocks 15 in which the guide slots are formed, and being formed with the radial slot 16 extending across its full width and into about the centre of the pinion in the well known manner. This slot also is made of such a depth as to allow of the two wires lying side by side within it, to ensure of the helical

twisting of one on the other when the pinion is rotated.

On the outside of each guide 13 a jaw 17 is disposed upon the ledge 12, and these jaws are adapted to have the respective wire ends passed through them as they also lie in the guides, in the manner and for the purpose hereinafter explained.

A transversely extending shaft 18 is journaled in the side cheeks 11 and on this, between the cheeks, are mounted side by side the two gear wheels 19-20. The gear wheel 19 is loosely mounted on the shaft 18 and is caused to gear with the slotted pinion 14, and bears a ratio thereto such as to impart to this pinion a definite number of exact revolutions on each half rotation of the wheel, such number of revolutions being that concerned with the number of fastening twists to be given to the overlapped wires.

The shaft 18 is designed to be moved reciprocally through a half rotation on each operation of the machine, and for this purpose has the two arms 21 of a bifurcated end of the handle lever 22 affixed to it in a manner to position the arms respectively upon the outsides of the bearing cheeks 11. These arms are connected by a bridging piece 23 which is positioned clear of the rim of the wheel 19.

The said handle is designed to lock with the wheel 19 only as the handle is moved from a rearwardly thrown back position to a forward position, and to move independently of the wheel as it is moved in the reverse manner. For this purpose each of the side faces of the wheel 19 is formed with two ratchet tooth depressions 24 disposed in positions diametrically opposite each other. Mounted on the bridge piece 23 of the handle are two pivoted pawls 25 which are drawn inwardly against the respective faces of the wheel 19 by means of a connecting spring 26 and which are designed to enter the depressions 24 and to lock with the wheel as the handle lever is moved in the forward direction, but to slide freely when the handle is moved rearwardly. To ensure of the wheel being on each forward movement of the handle, moved through the exact half rotation in order thus that the pinion 14 will at the commencement of the movement have its slot 16 opening to the machine front so that the wires may be inserted for twisting and removed after twisting, and also to ensure that the wheel shall be held firmly against movement when the handle is turned back, a ball 27 is fitted into a cup 28 affixed to one of the side cheeks 11, and this ball is acted upon by a spring within the cup so that it projects against the adjacent face of the wheel. The wheel is formed with two circular depressions 29 disposed on its face at points diametrically opposite, and as the full and exact half rotation of the wheel ends, the ball 27 springs into one of these depressions, to hold the wheel and the pinion 14 in the proper relative positions required. Figures 8 and 9 show the wheel 19 in side elevation and in front elevation and the aforesaid tooth depressions 24 and ball engaging depressions and also, in a fragmentary manner, the ball and its cup bearing.

The gear wheel 20 is keyed on to the shaft 18. This wheel for the purposes of its operation need not be a full wheel but may be formed of segmental character as shown more particularly in Figure 10. It is so mounted on the shaft that on each movement of the operating handle for-

wardly and rearwardly, the shaft turns a small portion of its movement before taking the wheel with it. This is effected as shown in Figure 10 by forming a key way 30 in the wheel which is wider than the key 31 attached to the shaft. Then to restrain the wheel while the idle part of the shaft's movement takes place, a similar spring ball fitting 32 to that employed in respect of the wheel 19 is provided to engage a depression 33 in the side face of this wheel 20.

A countershaft 34 is journaled in the cheeks 11 at the rear of the shaft 18 and such shaft 34 has a pinion 35 mounted on it which gears with the wheel 20 and is thus caused to have a reciprocal rotary motion imparted to it as the handle is moved rearwardly and forwardly in each operation of the machine. Each end of this counter-shaft 34 is extended beyond the machine frame side in the form of a screw worm 36 of quick pitch.

Pivoted at 37 on the base plate 10, outside each side cheek 11 is a lever arm 38 which extends forwardly at one end to be positioned in the machine front and rearwardly at the other end. This rear end is bifurcated at 39 and its forks pass one above and the other below a collar 40 mounted on the worm 36 on that side, being then connected with the collar by means of radial pins 41 on the collar which fit within slots 42 formed in the said lever arm forks. One of these worms is formed with a right hand thread and the other with a left hand thread and they are so arranged that with the rearward movement of the handle 22, and the rotation of the pinion 35 and countershaft 34 and worms caused thereby, the collars being loose on the worms, but being themselves suitably held from rotation by the engagement of their pins 41 in the slots 42, they will move inward towards the cheeks 11 on the respective sides thereby causing the forward ends of the levers to move outwards, or away from each other, while the movement of the lever arms will be reversed on the forward movement of the handle.

Each lever arm 38 at its forward end is fitted with a wire gripping device. This device on the left hand side of the machine is formed as a suitable clamp 43, while that on the right hand side is formed as a spring controlled ratchet grip 44.

In the use of the machine, the wire band has its one end first engaged in the clamp grip 43 and the wire then carried along the front of the machine by being inserted in the cutting jaws 17, guides 13 and the slot 16 of the pinion 14, and then passed round the box or package to be bound and again through the jaws, guides and pinion slot, in front of the first wire end, and is engaged at its other end in the grip 44. This is, of course, with the handle brought over to the front and the grips at their inward position. Then on the rearward movement of the handle the arms 38 are moved apart and the band strained in the required manner. On the forward movement of the handle, the twisting of the overlapping wires takes place and the grips move inward loosening their grips on the wires to allow for the slackness necessary for twisting. Such inward movement of the grips, however, does not take place until after the twisting action has commenced and the wires are held together, by reason of the idle movement provision in respect of the gear wheel 20 hereinbefore described.

For the purpose of severing the wire ends, i. e. those held in the grips, from the twisted joint, there is attached to the outside of the handle arm

21 on each side of the machine a cutter 45 which is designed and so adjusted that in the downward movement of these arms as the handle completes its forward movement, it will pass across the
 5 outer face of the cutting jaw 17 on the corresponding side, overlapping with such jaw just a sufficient distance to engage the inner of the two wires lying therein, to thereby cut through it. These blades are however kept normally
 10 raised clear of the jaws, to permit of the insertion of the wire therein when placing the band in position and also the removal of the wires after the joint has been made, by means of a vertical compression spring 46 resting on one of
 15 the jaws in a position to engage the handle arm as it is brought down, the cutting action then being effected by lowering the handle a distance against this spring's resistance. The two cutters are so disposed relatively that one acts ahead of
 20 the other, in order thus to lessen the strain or power required to effect the cutting.

A handle loop 47 is attached to the rear of the base plate 10 and this may be used in the lifting and adjusting of the machine in carrying on its
 25 operations and in its withdrawal from beneath the joined band.

We claim:—

1. In wire binding machines of the class comprising a slotted pinion disposed between wire
 30 holding guides, and a gear wheel gearing with such pinion and adapted to be actuated by a hand lever when it is moved in one direction and to remain stationary when the hand lever is moved in a reverse direction, and also comprising tensioning arms pivoted one on each side of the said
 35 guides to move out and in, in relation thereto, and adapted also to be actuated by the said hand lever as it moves in both directions, means for so actuating the tensioning arms, consisting in the combination with a second gear wheel adapted
 40 to be rotated in reverse directions by the movements of the hand lever, a countershaft geared with such gear wheel, a screw worm for each tensioning arm fixed upon such counter-
 45 shaft, and connections between each screw worm and its tensioning arm designed on the rotation of the worm in reverse directions to move the tensioning arm out and in, such screw worms being so relatively arranged as to cause the tensioning arms to be moved out and in together.

2. In wire binding machines according to claim 1, means for connecting each of the said tensioning arms with its actuating screw worm, comprising the formation of the arm with a
 55 forked end and the combination therewith of a collar fitted within the fork members and held from rotation therein and which collar is screwed on to the worm and engages the fork members by means of radially projecting pins passing into
 60 slots formed in such members.

3. In wire binding machines of the class comprising a slotted pinion disposed between wire holding guides, and a gear wheel gearing with such pinion and adapted to be actuated by a
 65 hand lever when it is moved in one direction and to remain stationary when the hand lever

is moved in a reverse direction, and also comprising tensioning arms pivoted one on each side of the said guides to move out and in, in relation thereto, and adapted also to be actuated by the said hand lever as it moves in both direc-
 5 tions, means for so actuating the said gear wheel comprising the mounting of the gear wheel loosely upon a shaft carried in bearings upon the machine and the combination therewith of a hand lever having a forked end, the members
 10 of which are fixed on to such shaft on the respective sides of the gear wheel, a spring controlled pawl, on each, or either, side of the wheel, pivoted on the handle to engage the adjacent side face of the wheel, and a ratchet tooth depression
 15 formed in such side face designed to be engaged by and to lock with the spring pawl when the hand lever moves in one direction, and to be free thereof when the hand lever moves in the reverse direction.

4. In wire binding machines according to claim 3, means for restraining movement of the said gear wheel as the hand lever moves in one direction consisting in a spring pressure ball disposed
 25 in a fixture on the machine to engage against the side face of the wheel and the formation of such side face with a depression into either of which the said ball is adapted to enter.

5. A wire binding machine comprising, in combination, a base plate, a radially slotted pinion
 30 journaled in the front of such base plate, a horizontal wire guide disposed on each side of such pinion, a horizontal main shaft journaled on the base plate at the rear of the pinion, a gear wheel mounted loosely on such shaft and gearing with
 35 the said pinion, a second gear wheel keyed upon such shaft, a hand lever fixed upon the shaft and adapted to lock with and turn the first gear wheel when the lever is moved in one direction but to move freely thereof when it is moved in
 40 a reverse direction, a tensioning arm pivoted on the base plate, near each end thereof, having one end provided with a wire grip and extending forwardly outside the said wire guide upon that side of the slotted pinion and its other end ex-
 45 tending rearwardly, a horizontal countershaft journaled in the rear of the main shaft, a pinion fixed thereon and gearing with the said second gear wheel upon the main shaft, a screw worm fixed, or formed upon each end of the counter-
 50 shaft, one of which screw worms is formed with a left hand thread and the other with a right hand thread, connections between each screw worm and the rear thread, connections between each screw worm and the rear end of the ten-
 55 sioning arm on its side of the machine, which connections are designed to provide for the reverse rotations of the countershaft, caused by the said hand lever being turned in opposite directions, conveying inward and outward turning
 60 movements to the tensioning arm, and wire cutting means associated with the said wire guides and the hand lever to actuate when the hand lever is moved over to a front position.

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