

Sept. 1, 1959

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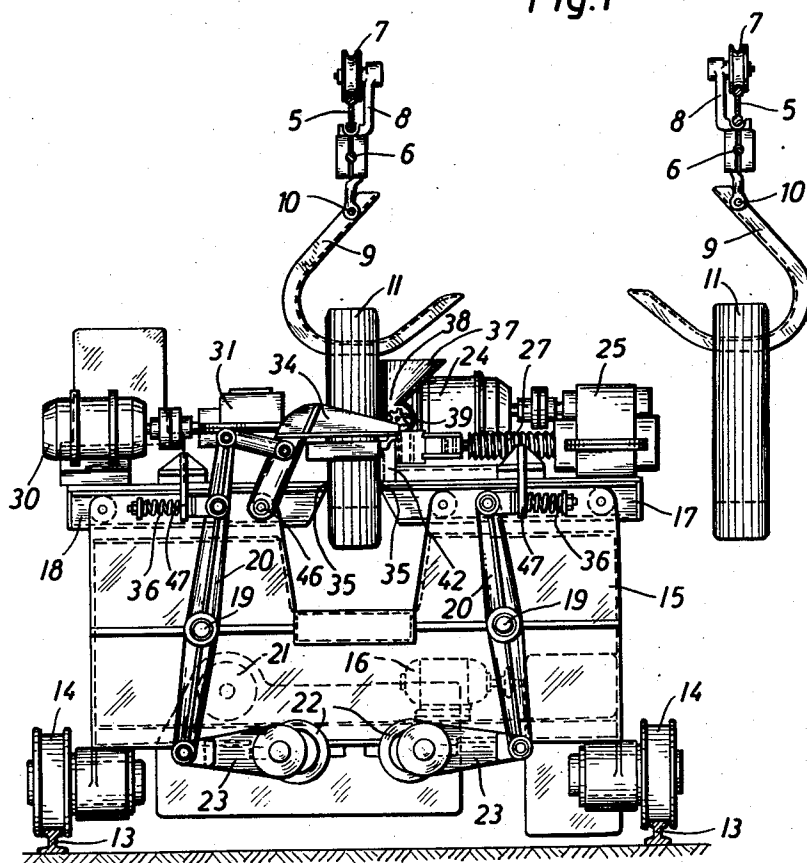
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AUTOMATIC BINDING OF COILS OF WIRE

Filed March 13, 1953

3 Sheets-Sheet 1

Fig. 1



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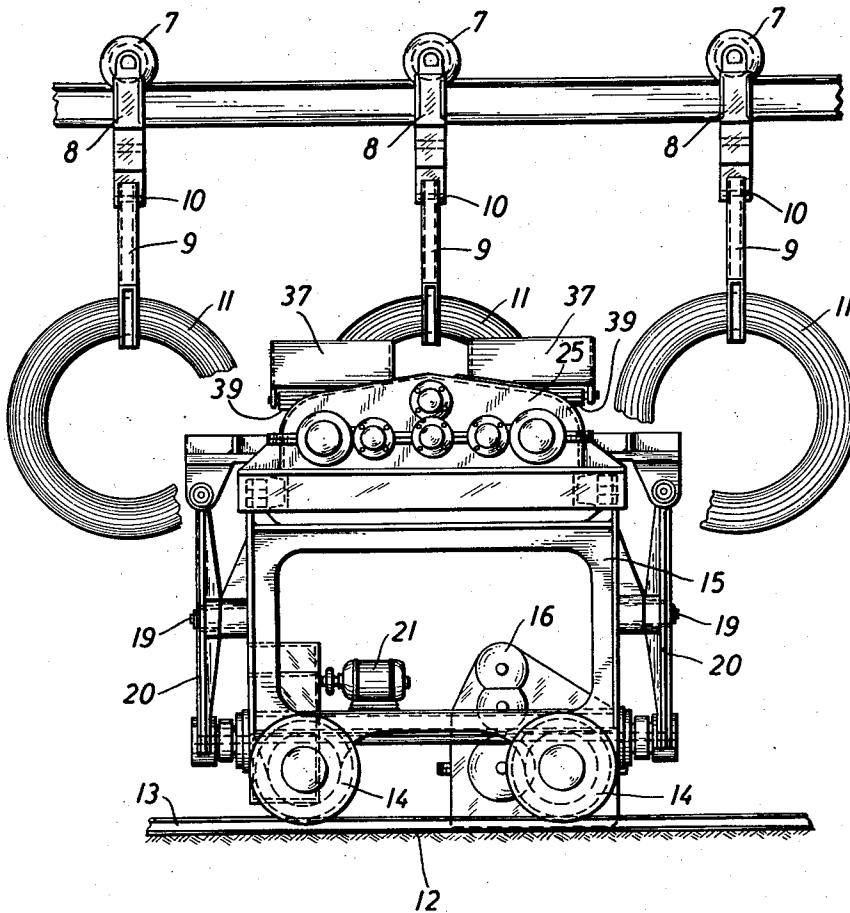
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Fig. 2



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Fig. 3

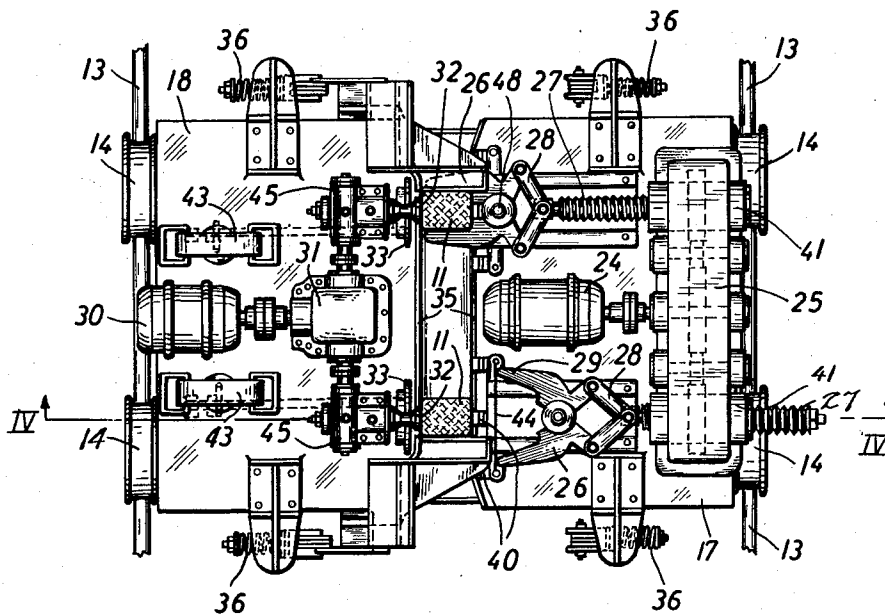
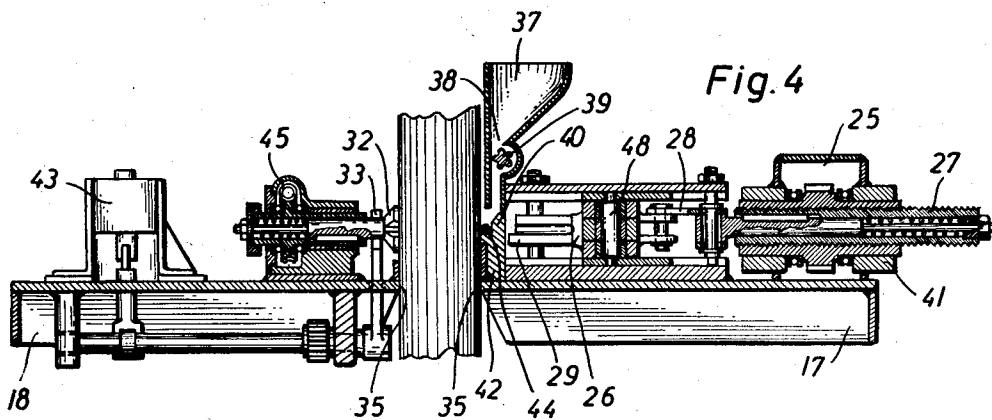


Fig. 4



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## AUTOMATIC BINDING OF COILS OF WIRE

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Claims priority, application Germany March 26, 1952

3 Claims. (Cl. 100—12)

According to the invention the apparatus consists essentially of two parts, one part comprising bending and pressing jaws which at their free ends carry a piece of binding wire and are thrust forward perpendicularly against the periphery of the coil, so that the binding wire extending between the ends of the two jaws and freely supported thereby is during this movement wrapped round three sides, that is through 180° about the cross-section of the coil. At the same time in the final position these jaws press the coil cross-section together, so that the binding wire closely encloses the coil.

The other part comprises a pressing member which is thrust forward in the opposite direction to the forward movement of the bending and pressing jaws, which supplements the jaws compressing the coil cross-section, so that the latter is engaged on all sides. At the same time with this pressing member a twisting device is moved forward which seizes the two ends of the binding wire and twists them together.

It will be understood that desirably the binding of each coil is effected not at one point but at at least two and preferably three points, these points being relatively spaced, preferably at equal intervals.

The two parts of the apparatus described above, namely, the bending and pressing jaws on one hand, and the pressing member, with twisting device, on the other, are then preferably mounted each on a slide and thrust forward in opposite directions, in which case in particular in an embodiment in which these two parts are moved in a direction parallel to the axis of the coil, for each part a single slide carries all the parts of the one kind and both slides, the one for all the binding and pressing jaws and the other for all the pressing members and twisting devices, can be moved forward on the carriage transversely to the direction of movement of the conveyor and the carriage.

An example embodying the invention is illustrated in the accompanying drawings.

Figure 1 is a front view of an automatic binding device in accordance with the invention.

Figure 2 is a side view and

Figure 3 is a plan view.

Fig. 4 is a section taken on line IV—IV of Fig. 3 with elements 30 and 31 omitted for clarity.

Conveyor members 8 carrying running rollers 7 and connected together by a conveyor cable 6 are movable on a conveyor rail 5. On the lower ends of the members 8, conveyor hooks 9 are swingably mounted on pivots 10. The finish-rolled and wound wire coils 11 are suspended from these hooks 9.

On the floor 12 are laid running rails 13 upon which a carriage 15 runs by means of wheels 14. The wheels 14 are driven from a motor 16 through gearing (not numbered) and the motor is set in rotation in the direction corresponding to forward movement of the carriage by a switch mechanism not shown, when a coil 11 is moved into position over the carriage, the motor being reversed at the end of the binding operation and switched

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off in the starting position of the carriage, when the wheels run against stops (not shown).

In the carriage are supported two slides 17 and 18 which can be moved forward by levers 20 pivoted at 19. These levers are actuated from a motor 21 and through eccentric shafts 22 and connecting rods 23.

On the carriage 17 is arranged a motor 24 which through gearing 25 actuates pairs of bending and pressing jaws 26. In Figure 3 the pair of jaws 26 on the left-hand side is shown in open and retracted position. On the right-hand side is shown that when a spindle 27 has been thrust forward through the gearing 25 a toggle 28 is actuated and the pair of jaws 26, thus close as they are thrust forward. Gearing 25 includes a gear which is held against axial displacement and in the interior of which threaded spindle 27 extends so that upon turning the gear, which is interiorly threaded in a known manner, the spindle, which is retained against rotation, is displaced outwardly. The supplying of binding wire is effected, as will appear from Figures 1 and 3, in such a manner that above each jaw pair 26 a conventional hopper receptacle 37 of sheet metal is provided into which the straightened and cut to predetermined length wire ends are delivered. The receptacle is funnel-shaped and tapers at the bottom to slot 38 which permits the passage of only one wire. A conveying roller receives one wire at a time in a groove and deposits it on three receiving members 40 at a time, which are illustrated in Fig. 3. In Fig. 3 the sheet metal container 37 with conveying roller is not drawn for the sake of better illustration. The wire lying on receiving members 40 is taken along by the jaw pair 26 and bent around the wire coil like a U. The projecting ends enter the slots of the twisting device 33 and are twisted thereby. Simultaneously the wire coil is pressed firmly together by pressing piece 32. After finishing the twist all parts holding the wire coil are released so that it may be taken out of the machine and a new wire may be supplied whereupon the operating cycle of the machine is repeated. The binding wire is supported by the forward ends 29 of the pair of jaws 26 when they are in the position shown on the left-hand side of Figure 3 and thus when they reach the position shown on the right-hand side, the wire is wrapped round the coil 11 on three sides. It will be understood that in normal operation both pair of jaws 26 are moved forwards and backwards together. They are shown in different positions on the left- and right-hand sides of Figure 3, merely to illustrate the mode of operation.

On the other slide 18 a motor 30 is arranged which through a gear 31 actuates two twisting heads 32 and two wire clamping members 33 adapted to compress the two free ends of the wire toward the twisting heads in a conventional manner after the jaws 26 have closed. As shown in Fig. 3, first jaws 26 perform the pressing together of coil 11 and simultaneously therewith, or possibly somewhat later in time, the mushroom shaped twisting heads 32 press the coil together from the side still open. These twisting heads are rotatably journaled in their housing and are rotated from the motor through bevel gearing 31 and the two worm gearings (not numbered). The twisting heads include on their periphery recesses slightly directed toward the center, which recesses are so arranged with respect to the direction of rotation that the wire ends are then seized by the slots and twisted together if previously the wire ends are positioned by clamping members 33 against the stem of the twisting head thus preventing the wire ends from jumping out of the twisting head.

Abutments 34, visible in Figure 1, are carried on the carriage 15 and are swung forward through the action of the levers 20 and links 18, in order to hold the coil within the apparatus and prevent it from swinging out,

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The front edges 35 of the slides 17 and 18, as can also be seen in Figures 1 and 3, at the same time bear firmly against the coil 11 and press this together, variations in the thickness of the coil being allowed for by springs 36, which are interposed between the levers 20 and the slides 17 and 18.

What I claim is:

1. In an apparatus for binding coils of wire, the combination comprising a movable carriage, a plurality of pairs of pivoted bending and pressing jaws adapted to carry a piece of binding wire forward by contact with their respective free ends, a conveyor device to present to said carriage a coil for binding, means on said carriage for thrusting said pairs of jaws toward different points on said coil and for closing said jaws thereby to wrap said binding wire around three sides of the section of the coil and compress said coil, a twisting head corresponding to each said pair of jaws, means on said carriage for thrusting said respective twisting heads toward the corresponding pair of jaws to seize and twist the ends of said binding wire, means for guiding said carriage in a path parallel to the path of said conveyor device, and a motor to move said carriage at conveyor speed during coil binding.

2. In an apparatus for binding coils of wire moving in

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a vertical position hanging from an overhead conveyor, the combination comprising a movable carriage, a plurality of pairs of horizontally movable pivoted pressing jaws adapted to receive a piece of pre-cut binding wire at their respective free ends, a device to introduce a piece of binding wire at the said free ends, means on said carriage for thrusting said pairs of jaws toward different points on a coil of wire to close said jaws thereby to wrap said binding wire around three sides of the section of said coil, a twisting head corresponding to each said pair of jaws, means for thrusting said respective twisting heads toward the corresponding pair of jaws and means to move the free ends of said wires toward said twisting heads whereby said heads seize and twist together the ends of said binding wire.

3. The invention as set forth in claim 2, including means to guide said carriage in a path parallel to the path of said conveyor, and a motor to move the said carriage at conveyor speed.

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