C. THACKER.

BUNDLING MACHINE.

APPLICATION FILED DEC. 3, 1914.

1,141,730.

Patented June 1, 1915.

3 SHEETS—SHEET 1.

Fig. 1.

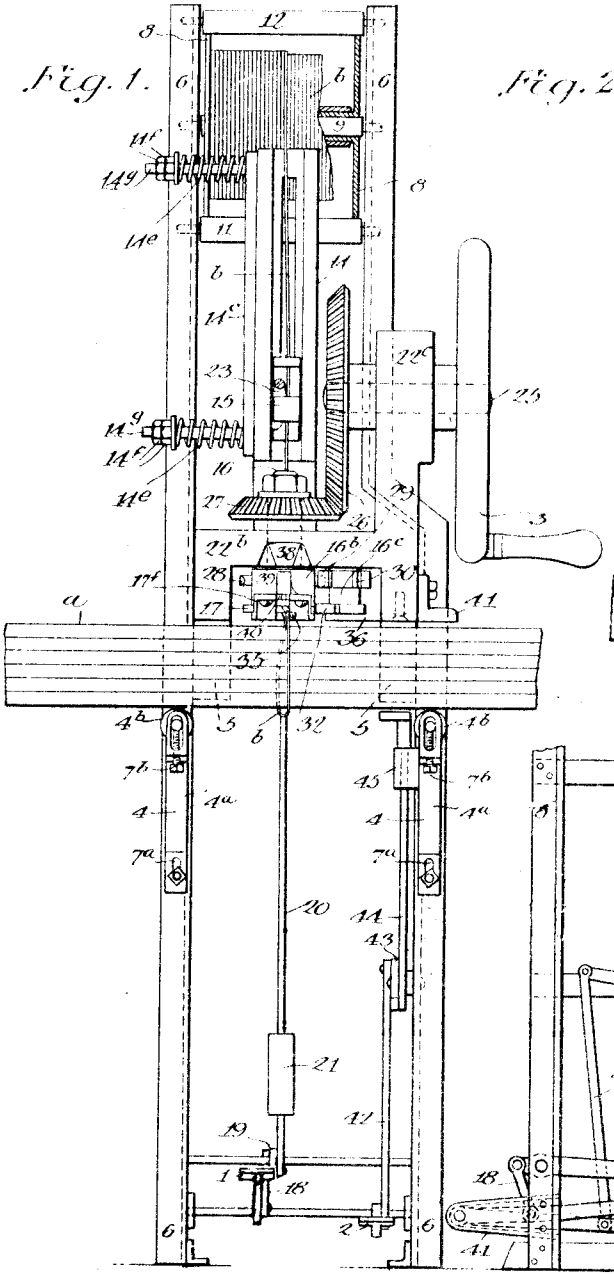
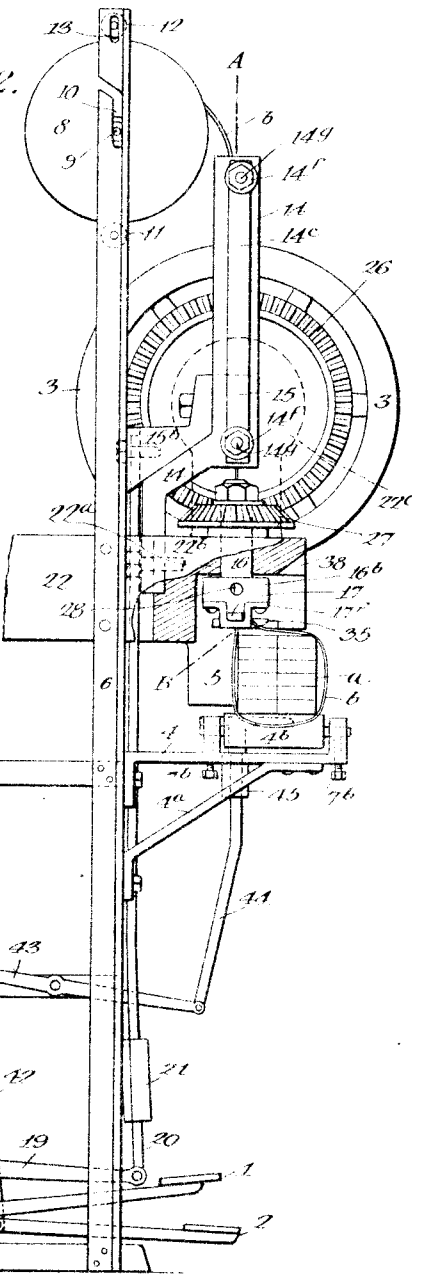


Fig. 2.



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3 SHEETS—SHEET 2.

Fig. 3.

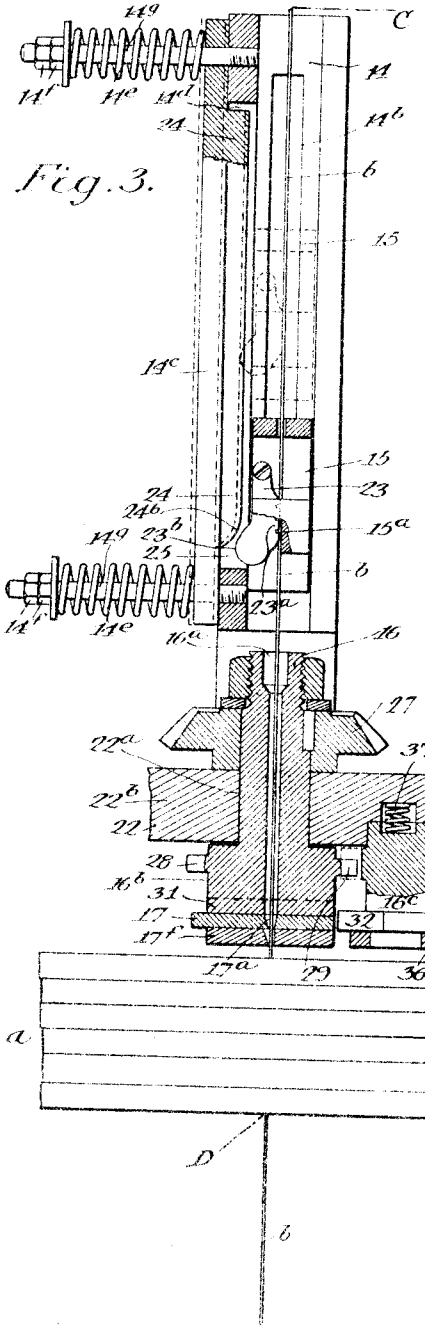
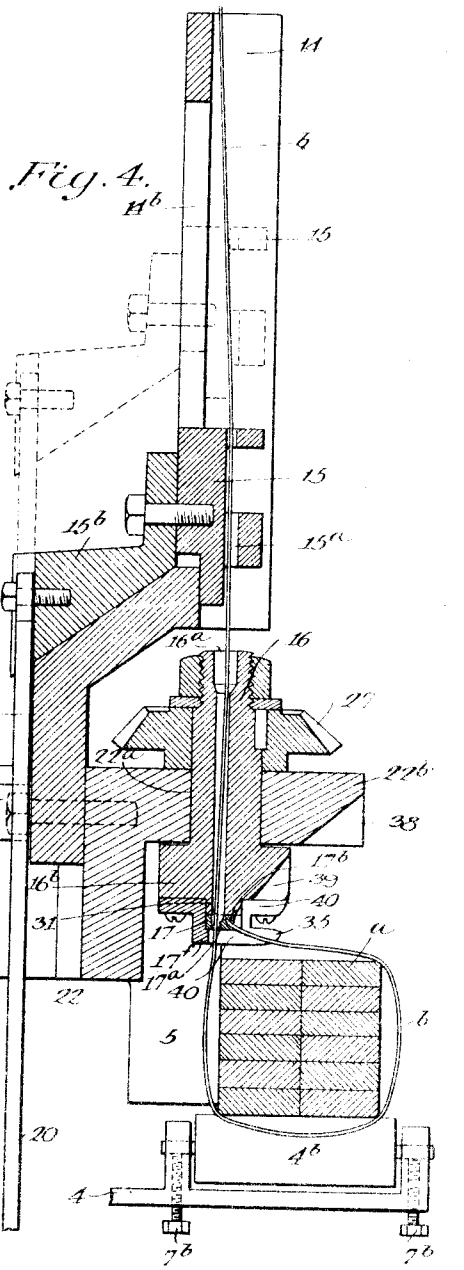


Fig. 4.



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3 SHEETS—SHEET 3.

Fig. 5.

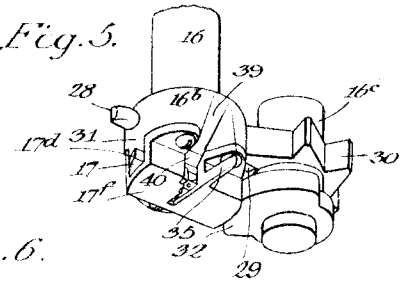


Fig. 6.

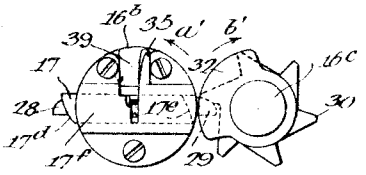


Fig. 7.

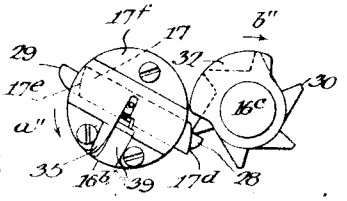


Fig. 8.

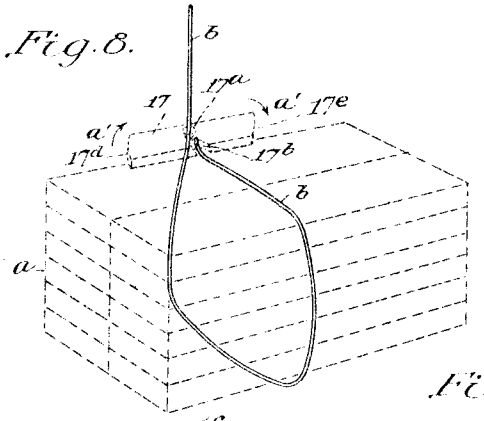


Fig. 9.

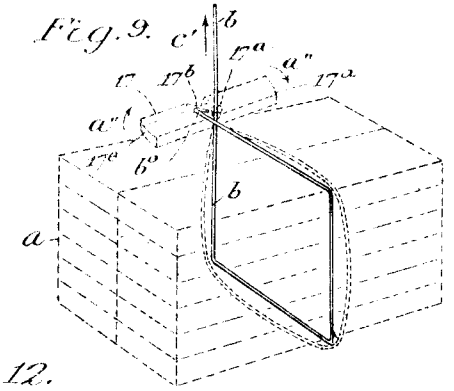


Fig. 10.

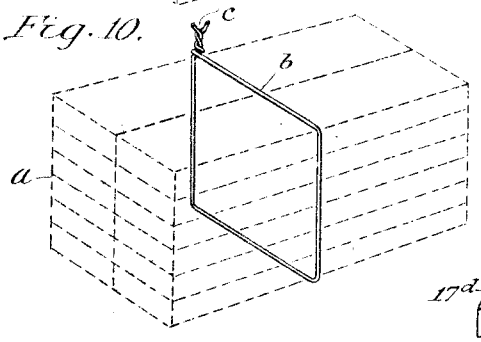


Fig. 12.

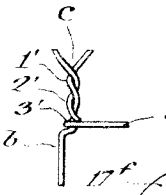


Fig. 13.

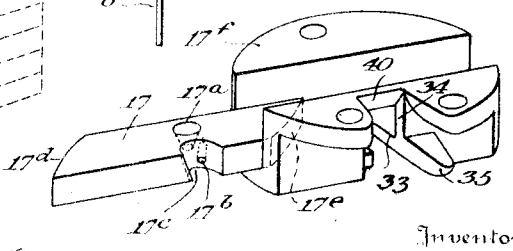
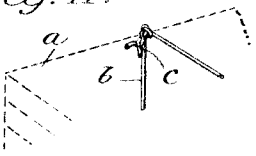


Fig. 11.



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UNITED STATES PATENT OFFICE.

CHARLES THACKER, OF IRONTON, OHIO.

BUNDLING-MACHINE.

1,141,730. Specification of Letters Patent. Patented June 1, 1915.

Application filed December 3, 1914. Serial No. 875,271.

To all whom it may concern:

Be it known that I, CHARLES THACKER, a citizen of the United States of America, and a resident of Ironton, in the State of Ohio, have invented a new and useful Improvement in Bundling-Machines, of which the following is a specification.

This invention relates to machines for bundling in lengths; especially for bundling flooring, siding, laths, box shooks and other like dressed lumber at the mill; to obviate handling the pieces singly in transit from place to place.

The present invention consists in certain novel combinations of parts, and in an improved machine embodying such combinations or any of them, as hereinafter particularly described and claimed.

The leading objects of this invention are to provide for so bundling with wire that the bundles may be effectively tightened by means of the wire itself, and with greater rapidity and economy of wire than heretofore.

Other objects will be set forth in the general description, which follows:

Three sheets of drawings accompany this specification as part thereof.

Figures 1 and 2 are respectively a front view and a left-side elevation of the improved machine, with parts broken away to show features of construction; Fig. 3 represents a fragmentary vertical section on the line A—B, Fig. 2, on a larger scale, and Fig. 4 a vertical section on the line C—D, Fig. 3, with two positions of the wire tightener represented in full and dotted lines, respectively; Fig. 5 is a perspective view of the principal members of the wire-twisting and cutting device, detached; Figs. 6 and 7 are bottom views of said members of the wire twisting and cutting device in different positions illustrating the wire twisting and cutting operation of the machine; Figs. 8 to 11 inclusive are diagrammatic perspective views illustrating the effects of the operation of the machine; Fig. 12 is a magnified detail view of the locked twist by which the wire is fastened; and Fig. 13 is a perspective view on a larger scale of the wire-cutting knife and its counterpart detached and partly separated to more clearly show the cutting edges.

Like reference characters refer to like parts in all the figures.

The improved machine is an "upright" built of iron and steel, and adapted to be worked by an operator standing before it and using a pair of pedals, 1 and 2, and a hand wheel, 3.

The material for a bundle, *a*, is assembled by the operator or a helper upon a pair of horizontal supports, 4, and against a pair of depending stops 5, at the front of the machine. Each of said supports 4 is preferably composed of a knee, 4^a, rigidly bolted to one of the front uprights of the main frame, 6, and a superposed roller 4^b; either or both of them adjustable, vertically, to provide for bundling different material by one and the same machine. As shown, the attaching bolts pass through slots, 7^a, in the knees 4^a, and vertical screws 7^b beneath the trunnions of the rollers 4^b render the rollers independently adjustable for minor variations.

The bundling wire, *b*, is taken from a reel, 8, at the top of the frame 6; said reel being preferably telescopic as shown in Fig. 1, and thus adapted to have the coil of wire easily transferred bodily thereto from the shipping spools on which it comes from the wire mill. A horizontal spindle, 9, having trunnions at its ends is movable with the reel 8, and is removably mounted in slotted bearings, 10, Fig. 2. The end disks of the reel rest upon a steel roller, 11, and a like roller, 12, removably mounted in slotted bearings, 13, Fig. 2, rests upon the upper edges of the reel disks to prevent any possible escape of the wire in coils, and to obviate keeping the coil compact. The reel requires no attention in operating the machine.

The wire *b* is fed downward from the reel 8 through the guideway 14 of a wire tightening device through a slide 15 within said guideway and through the spindle member 16 and knife 17 of a wire twister and cutter; and at the beginning of each bundle operation the wire *b* hangs vertically behind the bundle *a* as represented in Fig. 3. Said slide 15 is operated by the main treadle 1 through the medium of connections, shown as a whole in Fig. 2, consisting of a link, 18, a superjacent lever 19 fulcrumed in the frame 6, and a pitman 20; the latter provided with a weight 21 to insure the return of the slide 15 and its movable appurtenances by gravity to the positions of rest in which they are shown in Figs. 1 and 2 and in full lines in Figs. 3 and 4, with the slide 15 at the bottom of the

guideway 14, and the wire *b* free to be pulled by hand from the reel 8 and wrapped around the bundle *a* as shown in Figs. 4 and 8, and in dotted lines in Fig. 9. A main casting, 22, with which the bundle stops 5 are conveniently integral, is common to said wire tightening and wire twisting and cutting devices, and is fixedly riveted in place in the frame 6 at mid-height. (Compare Figs. 1 to 4, inclusive.) The principal member of said guideway 14 is bolted fast to and extends above said main casting, and is preferably open in front so as to expose the wire *b* to view within it, as in Fig. 1. It is fitted internally to the body of said slide 15; a rib portion of which protrudes through a slot 14^b, in the guideway, and is provided with a rigid offset extension 15^b to which the upper end of the pitman 20 is bolted. The interior of said slide 15, through which the wire *b* extends, is provided with a tightening dog 23 pivoted to the body of the slide at one end and constructed at its other end with a clamping face, 23^a, Fig. 3, opposed to a clamping surface 15^a within the slide, and with a reversely projecting cam portion, 23^b, Fig. 3, opposed to the straight face of a wire-holding rib, 24, on a guideway cap member 14^c; said rib 24 projecting inward through a slot 14^d in the body of the guideway, and normally held in place by strong springs 14^e compressed between the back of said cap piece and washers backed by adjusting nuts 14^f at the outer ends of the bolts 14^g. The lower end of said wire-holding rib 24 is rounded or beveled as represented at 24^b in Fig. 3, above a space 25 within the lower end of said slot 14^d, into which space said cam portion 23^b projects, as in Fig. 3, when the machine is at rest, to free the wire *b* as aforesaid. The said spindle member 16 of the wire twister and cutter is rotatable in a vertical bore 22^a in a shelf portion 22^b of said main casting 22, and has in turn an axial bore, 16^a, through which the wire *b* extends. (Compare Figs. 3 to 9 inclusive and Fig. 13 as to the details of this device.) The hand wheel 3, Figs. 1 and 2, is fast on a horizontal shaft, 25, which is mounted in a bearing 22^c on said main casting, and is connected with the upper end of said spindle member 16 by bevel gearing, 26, 27. The lower end of the spindle member forms a peculiarly recessed and equipped head, 16^b, which rotates close beneath said shelf portion 22^b of the main casting, and is provided with a pair of tappet lugs, 28, 29, which successively engage the faces of beveled teeth, 30, on a parallel tumbler, 16^c, in the wire twisting and cutting operation hereinafter more particularly described. The lower face of said head 16^b is constructed with a transverse rib, 31, rectangular in cross section, through which the bore 16^a extends. Beneath this rib the knife 17 slides; said knife having a trumpet shaped wire guide, 17^a, in constant communication with said bore 16^a, and forming a wire-cutting edge at its lower end; a socket, 17^b, adapted to receive the extremity of the wire preliminary to the twisting operation as in Figs. 1, 2, 4 and 8, and to securely hold the same during that operation; and a notch, 17^c, within which said socket 17^b is formed, and which forms a cutting edge for severing the scrap wire. The knife 17 is further constructed with cam extremities, 17^d 17^e, adapted to protrude alternately, and the tumbler 16^c is constructed with a matching segmental projection, 32, which engages said extremities 17^d 17^e successively, and by a rolling action slides the knife 17 back and forth. A last member 17^f, of the wire twister and cutter, made in common with the knife 17 of tool steel, is attached by screws to the bottom of the head 16^b, being fitted internally to said rib 31 and knife 17, and is recessed to form cutting edges, 33, 34, Fig. 13, arranged to interact with the opposing edges of the knife at the wire cutting operation. This bottom member 17^f is further provided with a rigid finger, 35, which engages the wire *b* during the first half turn of the spindle member 16 to press the wire down clear of any edges of the spindle head 16^b and bottom member 17^f with which the wire might otherwise be entangled. The tumbler 16^c turns step by step in bearings formed respectively in the bottom of the shelf 22^b and in a subjacent support 36, and the upper bearing is provided with a compressed frictional spring 37, Fig. 3, to prevent its angular displacement by momentum.

Before describing the steps which follow assembling the material *a* with the wire *b* as in Fig. 3, and drawing the wire forward by hand and passing it upward in front of the bundle and horizontally across its top, into the end holding socket 17^b of the knife 17 as in Fig. 4, attention is called to the way so manipulating the wire is facilitated by the ample space between the bundle supports 4, as shown in Fig. 1, and by notches, 38, 39, 40, in the shelf 22^b of the main casting 22, and in the head 16^b and bottom member 17^f of the twister and cutter, which, as best shown in Fig. 4, expose to view the end holding socket 17^b and the adjacent portion of the wire *b*. The operator is thus enabled to quickly insert the wire end, and to satisfy himself that the wire end is in place, before turning the hand wheel 3. The condition of the wire *b* and of the wire twister and cutter, with the wire end so inserted as shown in Fig. 4, is further illustrated by Figs. 6 and 8, which see. A part turn of the hand wheel 3 next follows, sufficient to give the spindle member 16 and knife 17 a half turn represented by the arrows *a'*. The simulta-

neous part turn of the tumbler 16ᵉ represented by the arrow b', Fig. 6, is an idle movement. At the end of said part turn of the twister and cutter members, its members occupy the positions in which they are shown in Figs. 7 and 9; and the wire is in the condition represented in dotted lines at b in Fig. 9, with a short and substantially rigid bend b^6 in the wire to resist its withdrawal from the recessed end-holding socket 17^b. The operator's foot now presses on the main pedal 1; and motion is transmitted therefrom by the link 18, lever 19 and pitman 20 to the slide 15 of the wire tightener, which rises to the position in which it is shown in dotted lines in Fig. 4, or as high as may be required, to tighten the loop of the wire b around the bundle a as represented in full lines in the lower portion of Fig. 9, and by the same action to tighten the bundle. As soon as the slide 15 begins to rise, the dog 23, leaving the releasing space 25, Fig. 3, at the bottom of the guide-way 14, and engaging the rib 24, is made to tightly clamp the straight wire against the clamping surface 15^a, and the two maintain their hold on the wire until the required pull on the wire itself, represented by the arrow c', Fig. 9, is completed, and until the slide 15 is returned by gravity to its position of rest, where the dog 23 is freed by said space 25. While the wire b is held taut by pressure on the pedal 1, the rotation of the hand wheel 3 is resumed, and this motion is continued until three turns of the twister spindle 16 and knife 17, as represented by the arrows a'', Figs. 7 and 9, and one full turn of the tumbler 16ᵉ as represented by the arrow b'', are completed. During the first part of this motion the two wire portions available for the wire-fastening twist yield about equally endwise as the wire is freed from slack, and two twists 1′ 2′ Fig. 12, are usually formed substantially alike in the two wire portions. During the concluding turn, practically the only lengthwise yield being in that portion of the wire at the front of the bundle, a tight locking coil, 3′, Fig. 12, is formed, and unfastening by strain is thus prevented. As the single turn of the tumbler 16ᵉ approaches completion, the segmental projection 32 engages the protruding cam end 17^a of the knife 17, and by a rolling action the knife is forced endwise into its reverse position, pressing the wire against the cutting edges 33, 34, of the cutter member 17ᶜ, and severing simultaneously the fastened loop or band from the wire depending from the reel 8, and the scrap wire from the locked twist. Owing to the peculiar construction of the twister and cutter above described, the scrap wire is reduced to pieces only about one-quarter of an inch in length, as compared with pieces several inches long in previous bundling machines. A locked twist as it appears at the end of the cutting operation is represented at c in Figs. 10 and 12. Before stopping the hand wheel 3, the operator continues its motion another part turn; during which said motion of the twister spindle 16 and knife 17 represented by the arrows a'' b'', Figs. 7 and 9, is continued until the cam end 17^a of the knife and the segmental projection 32 of the tumbler 15^e engage each other, and the knife is moved endwise into its position of rest, with its wire guide 17^a in line with the spindle bore 16^a, the end receiving socket 17^b opposite the operator, and the sight notches 38, 39, 40 (Fig. 4) in line with each other. The bundle is then shifted by hand toward the operator, so as to clear the space beneath the twister and cutter, and endwise on the rollers 4^b so as to bring the upstanding locked twist c beneath an inverted anvil 41, Fig. 1, rigidly attached to the right-hand side of the frame 6; and, the main pedal 1 having been freed, the operator forces down the second pedal, 2, to lift the bundle and press the twist c against said anvil to bend down the wire twist c as represented in Fig. 11, so that the ends of the wire will be masked.

Said pedal 2, Figs. 1 and 2, is connected by a link 42, and lever 43, to a lifter 44, which is normally supported beneath but clear of the bundle by a guide, 15, fixedly attached to the adjoining bundle support 4.

Ordinarily the bundle will be wire bound at two or more points according to its length; but for short stuff a single wire band suffices.

The twister and cutter may obviously be constructed to make a longer or shorter locked twist as desired; known or improved brakes may be added to or substituted for the frictional spring 37, as means for controlling or steadying the motion transmitted by the hand wheel 3; and other like modifications will suggest themselves to those skilled in the art.

Having thus described said improvement, I claim as my invention, and desire to patent under this specification:

1. An upright machine for bundling with wire, adapted to be worked by an operator standing before the machine: the same having, in combination, a suitable frame, provided with bundle supports and a wire reel, a wire twister and cutter including a spindle and head member having an axial vertical bore through which the wire can be pulled downward to form successive loops around the bundles, and cutter members rotatable with said spindle and head member, means for actuating said twister and cutter, and means for pulling the wire upward to tighten its successive loops.

2. An upright machine for bundling with wire, adapted to be worked by an operator standing before the machine: the same having,

in combination, a suitable frame provided with bundle supports and a wire reel, a wire twister and cutter including a spindle and head member having an axial vertical bore through which the wire can be pulled downward to form successive loops around the bundles, and cutter members rotatable with said spindle and head member, an upwardly pulling wire tightener, a hand wheel and bevel gearing for manually actuating said twister and cutter, a pedal and connections for actuating said wire tightener, and a pedal and appurtenances for bending down the fastening twists of the wire.

3. In a bundling machine, the combination of a wire twister and cutter including rotatable members adapted to fasten the wire loops with locked twists, said members having an axial bore and a wire guide within which the wire is freely movable in the loop forming and tightening operations, and an end holding socket adapted to impart a withdrawal resisting bend to the wire during a part turn of said rotatable members; means for actuating the twister and cutter to form said bend and subsequently to complete the twisting and cutting operation; and means for pulling the wire to tighten a loop around the bundle immediately after said part turn and before the resumption of the twisting operation.

4. In a bundling machine, the combination of a wire twister and cutter, including a spindle and head member having an axial bore, an endwise movable knife and a counterpart rotatable with said spindle and head member; said knife having a trumpet-shaped wire guide in communication with said bore, a wire holding socket, a notch within which said socket is formed and cutting edges formed by said guide and said notch, and said counterpart having cutting edges matching those of said knife; means for actuating said twister and cutter first to impart to the socket held end of the wire a withdrawal resisting bend, and subsequently to complete the twisting and cutting operations, and means for tightening the wire around the bundle between said bend forming actuation and the resumption of the twisting operation.

5. In an upright machine for bundling with wire, means for fastening tightened loops of the wire around the bundles by locked twists, comprising a rotatable twister head having an axial vertical bore, a transverse bottom rib through which said bore extends and a pair of peripherally projecting tappet lugs; a subjacent endwise movable knife having a wire guide in communication with said bore, a socket to admit the free end of the wire, a notch within which said socket is formed, cutting edges formed by said guide and said notch respectively and alternately protruding cam ends; a bottom member embracing said rib and said knife, attached to said head, and provided with cutting edges matching those of said knife; means for giving said twister head and knife a part turn to impart to the wire a withdrawal resisting bend and subsequently continuing their rotation to complete the twisting operation; means for pulling the wire upward through said guide and bore to tighten a loop around a bundle after said part turn and before the twisting operation is resumed; and a tumbler mounted parallel to said head, having peripheral teeth engaged by said lugs, and a segmental projection which successively engages said cam ends of the knife after the twisting operation, to sever the wire and scrap, and to restore the knife to its normal position; substantially as hereinbefore specified.

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