

June 29, 1937.

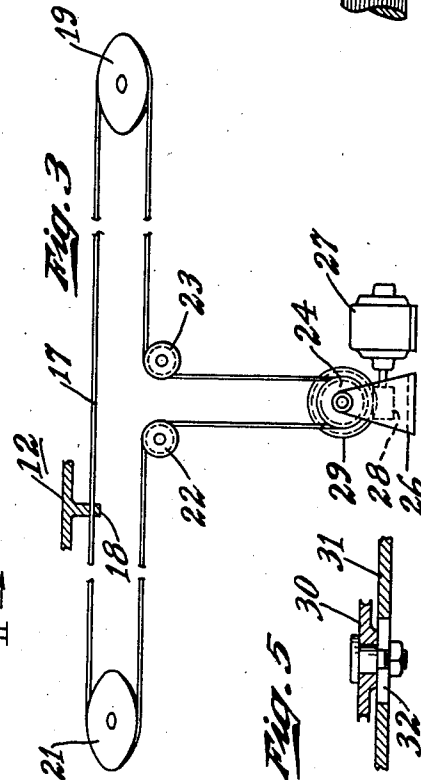
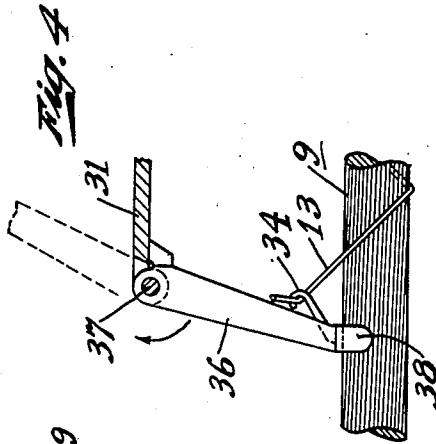
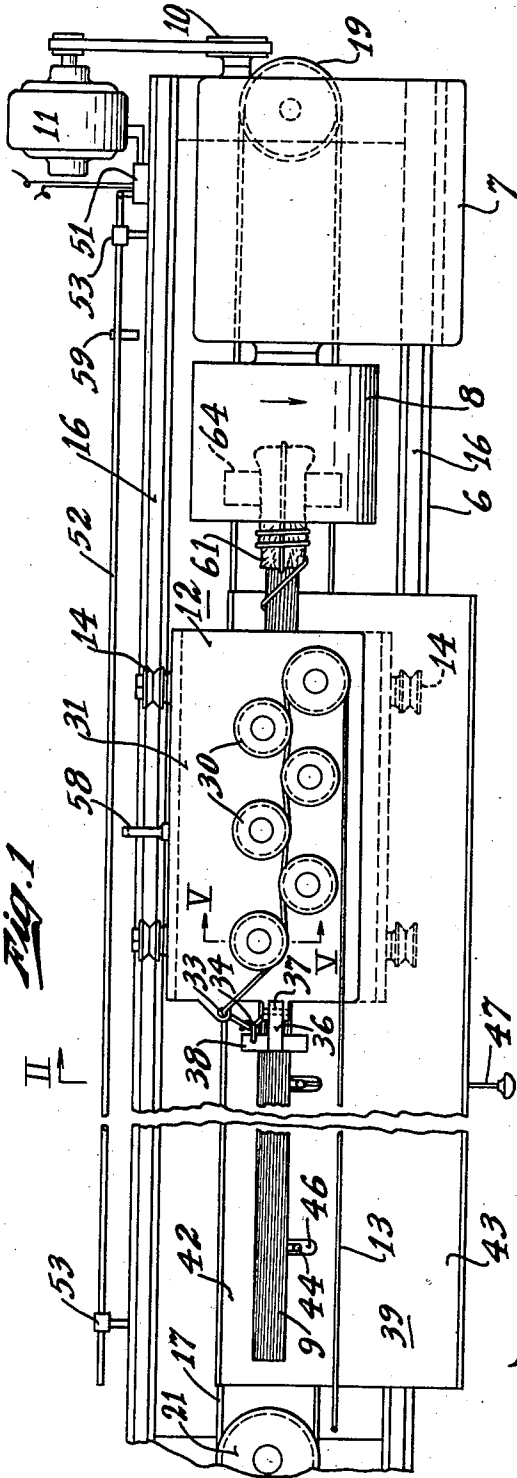
A. G. DELANY

2,085,082

METHOD FOR BUNDLING BALE TIES AND THE LIKE

Filed Oct. 15, 1932

3 Sheets-Sheet 1



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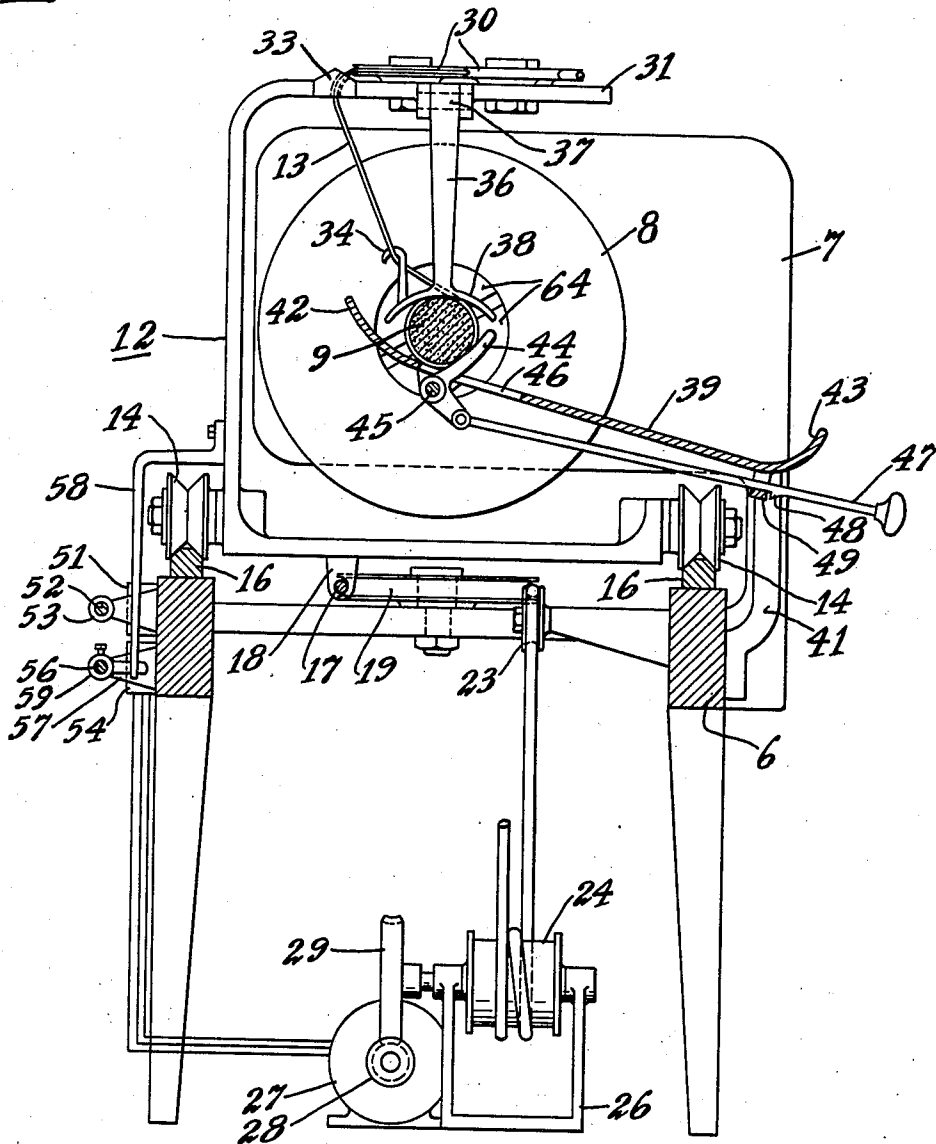
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**Fig. 2**



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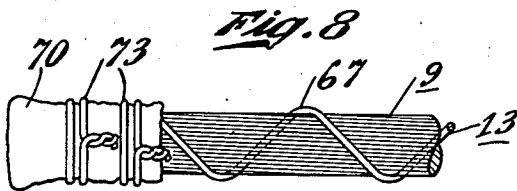
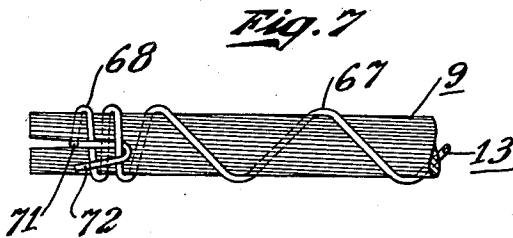
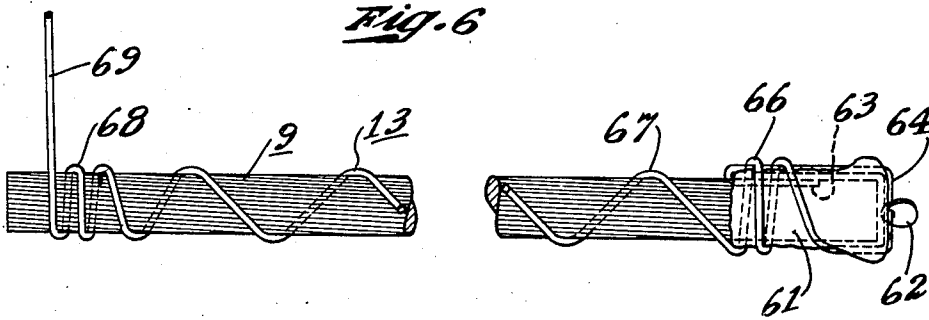
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METHOD FOR BUNDLING BALE TIES AND THE LIKE

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3 Sheets-Sheet 3



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## UNITED STATES PATENT OFFICE

2,085,082

## METHOD FOR BUNDLING BALE TIES AND THE LIKE

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Application October 15, 1932, Serial No. 637,901

13 Claims. (Cl. 100—31)

My invention relates to an improved method for tying and binding bale ties, wires and the like securely into bundles.

More particularly, my invention contemplates assembling the bale ties to be bundled and winding about them a tie wire in such manner as to securely hold the ties in dense compact cylindrical form with the ends of the tie wire so anchored as to prevent any slippage that might loosen its coils and slacken its hold on the bundle.

A further important object of my invention is to subject the loose bundle of ties to a rotating action about their long axis applied from one end of the bundle and adapted to produce a twist in the bundled wires before they are bound, the advantage of this being that it will draw the bale ties into a more compact cylindrical mass and by giving a twist to all the ties that increases in degree from the axis outwardly so that the outer ones that are exposed having less tendency to pull or work loose under the binding wire as a result of handling, a better bundle results and one much safer to handle.

A further feature of my invention is to feed the binder wire under tension along the bundle while providing a moving stop or guide means against which the binder wire can draw the rotating bundle to insure its tight application.

My invention further contemplates a method for the production of an improved bundle in which the ends of the tie wire are anchored by being drawn transversely of, and interlocked with, the ends of the bundle of bale ties so that the coils of the tie wire cannot slip or loosen. This method of bundling is important because, to obtain the tightest possible bundle, it is essential to bring the bale ties compactly into cylindrical shape and then to tightly apply the binding coils of wire thereto and finally to so anchor both ends of the binding wire that its coils cannot slip and loosen their grip on the bundle, thereby permitting the latter to flatten out. When the bale ties in the bundle for any reason become loosened, handling will cause them to be pulled loose from the bundle with resultant loss in stock and frequent injury to the men handling the bundles.

More particularly my invention contemplates anchoring the ends of the tie wire by passing them transversely across the ends of the bundle, the tag bearing end of the tie wire being preferably applied outside of the canvas wrapping usually applied to the loop ends of the bale ties, and the other end of the tie wire is anchored by being drawn between the other ends of the bale

ties beyond the final tie coils and before the application of the binding canvas.

My invention embodies further novel features and details of construction hereinafter more particularly described and claimed, reference being made to the accompanying drawings wherein;

Fig. 1 is a plan view of my machine showing a bundle of twisted bale ties in position and partly wound with binding wire;

Fig. 2 is a transverse sectional view taken along the line II—II of Fig. 1;

Fig. 3 is a diagrammatic view of the carriage driving mechanism;

Fig. 4 is a detail view of the arm employed to hold the bundle against displacement during the binding operation and which also serves as a guide for the binding wire;

Fig. 5 is a sectional view taken along the line V—V of Fig. 1;

Fig. 6 is a detail view of a bundle of wires at the completion of the winding operation with the binding wire shown as cut off;

Fig. 7 is a detail view illustrating the manner in which the free end of the binding wire is anchored at the end of the bundle; and

Fig. 8 is a detail view showing the cap which is secured in position on the end of the bundle at the completion of the binding operation.

Referring now to the drawings for a better understanding of my invention, I show a base 6 on one end of which is mounted a headstock 7. A chuck 8, which may be of any suitable type and operated in any suitable manner such as by air or electricity, is mounted for rotation on the headstock to receive one end of a bundle of bale ties 9. The chuck 8 is driven by a pulley 10 from a motor 11 through suitable reduction gears (not shown) provided within the headstock.

A carriage 12 is employed to guide the binding wire 13 onto the bundle 9 and is provided with rollers 14 for movement along the tracks 16. The carriage is drawn back and forth along the tracks 16 by an endless cable 17 which engages a bracket 18 provided on the underside of the carriage. The cable is passed around loose pulleys 19 and 21 mounted at the ends of the base 6 and then downwardly around loose pulleys 22 and 23 mounted at the center of the machine for engagement with a cable drum 24, (see Figs. 2 and 3). The drum 24 is mounted for rotation on a stand 26 and is driven by a reversible motor 27 through a worm 28 and a worm gear 29.

A plurality of loose pulleys 30 are mounted on the top 31 of the carriage 12 for engagement with the binding wire 13 and are adjustably

mounted in slots 32 (see Fig. 5) in order that the desired tension can be placed on the binding wire throughout the winding operation. The binding wire passes from the tension pulleys through an eye bracket 33 and under a hook guide 34 for engagement with the bundle. The guide 34 is secured to a holddown arm 36 which is pivotally mounted on the carriage top at 37 and provided with a transversely arcuate foot 38 for engagement with the bundle as a holddown means therefor during the bundle tying operation.

A bundle support plate or apron 39 is secured to the base of the machine by brackets 41 and has its side edges upturned to form flanges 42 and 43. A plurality of arms 44 are mounted on a rocker shaft 45 journaled below the plate 39 and then project up through slots 46 in the plate to hold the bundle in position throughout the binding operation, after which they are lowered to permit the wrapped bundle to roll down the plate and into the trough formed by the flange 43. A push rod 47 is employed to rock shaft 45 and raise and lower the arms 44 and it is provided with a boss 48 for engagement with a bracket 49 when it is desired to hold the arms 44 in their upright or operating position.

The motor 11 is controlled by a switch 51 which is adapted to be actuated by a control rod 52 slidably mounted in bearing brackets 53. A switch 54 (Fig. 2) is mounted below the switch 51 and actuated by a control rod 56, mounted to slide in brackets 57, to start, stop, and reverse the motor 27. An arm 58 is secured on the carriage 12 for engagement with a collar 59 on rod 56 to throw the switch 54 which is adapted to stop the motor upon the return of the carriage to its initial starting position. Other automatic stop means may be advantageously employed where the length of the bundles does not vary, for example, such as would stop the carriage at the completion of the winding operation illustrated in Fig. 6.

In tying a bundle of wires in accordance with my improved method, a canvas cap 61 is first placed over the eye bearing ends of the bale ties forming the bundle 9 and a metal information tag 62 is provided with a small opening by which it is strung onto the end of the binding wire 13. The end portion 63 of the binding wire is then placed within the cap after which the wire is bent back and drawn tightly across the end of the bundle at 64 and returned along the opposite side of the cap from the portion 63 (see Fig. 6). The capped end of the bundle is then mounted between the chuck jaws 64 with the bundle resting freely on the plate 39 between its flange 42 and the arms 44.

The winding operation is started by throwing the switch 51 to cause the motor 11 to revolve the chuck, and the switch 54 is thrown to start the motor 27 which causes the carriage 12 to move on its wheel supports along the tracks 16 towards the free end of the bundle. The motors 11 and 27 are so controlled as to form several initial turns 66 of the binding wire about the cap 61 and wire end 63 thereby fixedly securing the end 63 of the binding wire in position, after which the motors are operated to form the spiral windings 67, the pitch of which is controlled by the rate of carriage feed. The foot 38 on the arm 36 serves to hold the rotating bundle of ties 9 against the upward pull applied thereon by the tension on wire 13 as it is wound about the bundle. As the carriage approaches the free end

of the bundle the switch 54 is thrown to stop the carriage, after which the rotation of the bundle will form the closely wound turns 68 and the switch 51 is then thrown to stop the rotation of the chuck.

The binding wire 13 is then cut to leave an end portion 69 (Fig. 6) which is drawn in between the ends of the ties 9 at 71 and is drawn under and then bent back over the turns 68 at 72, see Fig. 7. The chuck jaws are released and the arms 44 are lowered to permit the bundle to roll down the plate 39 into the trough formed by the flange 43 where a cap 70 is secured on the end of the bundle by means of wires 73 (see Fig. 8).

It will be observed readily that the wires making up the bundle of ties are left loose at one end and therefore when the rotation of the bundle commences they will readily and freely set themselves in a twist which is increased by the drag imposed tangentially (see Fig. 2) on the bundle wires by the tension on the tie wire which the rotating bundle must draw off as it is coiled about the bundle. This twist together with the application of the tie wire to hold the bundle wires firmly in twisted position will produce in the finished bundle greater compactness and rigidity than has heretofore been attained.

As bundles of wire are ordinarily placed in piles on a floor, or in racks having only their eye ends exposed to view, I have secured the information tag on the end of the bundle in order that the information contained thereon could be observed without moving the bundles. The bundle as an article of manufacture is not claimed herein but forms the subject matter of a copending application Serial No. 47,084.

While I have shown my invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications, without departing from the spirit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are imposed by the prior art or as are specifically set forth in the appended claims.

What I claim is:—

1. The method of tying bundles of wires or the like, which comprises securing one end of the binding wire to the bundle, rotating the bundle in a manner to twist its wires about the long axis of the bundle with one end of the bundle of wires left free, guiding the binding wire lengthwise of the twisted bundle to wind it spirally thereon in the direction of the twist imparted to the wires in the bundle, and securing the other end of the binding wire to the bundle against endwise slippage.

2. A method according to claim 1, in which the bundle of wires is rotated from one end only so as to twist its component elements while colling the binding wire thereon.

3. The method of tying the bundles of wires or the like, which comprises securing one end of the binding wire to the bundle at one end with the other end of the bundle left free, rotating the bundle in a manner to twist its wires about the long axis of the bundle, guiding the binding wire to tightly coil it about the rotating twisted bundle to increase its twist and bind it intermediate its ends, guiding the binding wire to provide several close turns adjacent to the other end of the bundle, and securing the free end of the binding wire to the bundle against endwise slippage.

4. A method according to claim 3, in which the

ends of the binding wire are passed both around and over the bundle ends and then made fast to secure it against lengthwise slippage with respect to the ends of the bundle.

5 5. The method of tying bundles of wires which comprises placing a cap over one end of the bundle, placing one end of the binding wire inside the cap, drawing the binding wire transversely across the adjacent end of the bundle, rotating the bundle, guiding the binding wire to provide several closely wound turns around the cap and the said end of the binding wire, guiding the binding wire about the rotating and slightly twisted bundle to provide tightly applied binding coils intermediate 10 the bundle ends, guiding the binding wire to provide several closely wound turns at the uncapped end of the bundle, and securing the free end of the binding wire to the bundle.

20 6. A method according to claim 5, in which the binding wire is drawn across and between the bundle wires at the uncapped end of the bundle and interlocked therewith, and a cap is then placed over said uncapped end of the bundle and tied in position.

25 7. The method of tying bundles of wires and the like, which comprises grouping the same into a bundle and applying a twist from one end of the bundle to the component elements of the bundle about the long axis of the bundle while winding a flexible binding strand tightly about the twisted bundle, the wires at the other end of the bundle being left free to assume a twisted position and securing the ends of the binding wire against 30 slippage on the bundle.

35 8. The method of tying bundles of wires and the like, which comprises grouping same into a bundle, gripping the bundle at one end only and rotating it about its long axis with its other end left unbound so as to twist its component elements about said axis, connecting a flexible binding strand to one end of the bundle and guiding said strand under tension along the rotating bundle to coil it tightly about the twisted bundle, and making the ends of the strand fast so as to hold 40 the bundle's component elements against untwisting.

9. The method of tying bundles of wires and the like as described in claim 8, in which the flexible binding strand is wound about the bundle while it is under rotational stress and the ends of the strand are passed about the bundle ends and then made secure to prevent any material loosening of its coils responsive to handling of the bundle. 5

10. The method of tying bundles of wires and the like, which comprises making a binder fast to one end of the bundle, rotating the bundle and guiding the binder so as to put a twist in the wires while winding the binder spirally about them, and making the binder fast at the other end of the bound twisted bundle. 10

15 11. The method of tying bundles of wires and the like, which comprises grouping the wires into a bundle, securing the binder to one end of the bundle, rotating the bundle by said end and guiding the binder under frictional restraint so as to put a twist in the bundle wires while winding the binder spirally about them from end to end of the bundle, and making the binder fast at the other end of the bound twisted bundle. 15

25 12. The method of tying bundles of wires and the like, which comprises grouping the wires into a bundle, grasping the bundle at one end while leaving the other end free, rotating the bundle about its long axis, securing a binder to the driven end of the bundle, and guiding said binder to apply a twisting stress to the bundle wires while coiling the binder from end to end of the bundle, and making fast the binder at the other end of the bundle against endwise slippage thereon. 30

35 13. The method of tying bundles of wires and the like, which comprises gripping the wires at one end only and rotating the bundle, causing a binder to be coiled tightly about the bundle from end to end responsive to its rotation, causing the wires to set themselves freely in a twist responsive to the application of the binder thereon, and making the binder fast at both ends of the twisted bundle against endwise slippage. 40

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