March 22, 1966 J. C. BITTMAN 3,241,786

WIRE PACKAGING MACHINE

Filed June 5, 1964 3 Sheets-Sheet 1

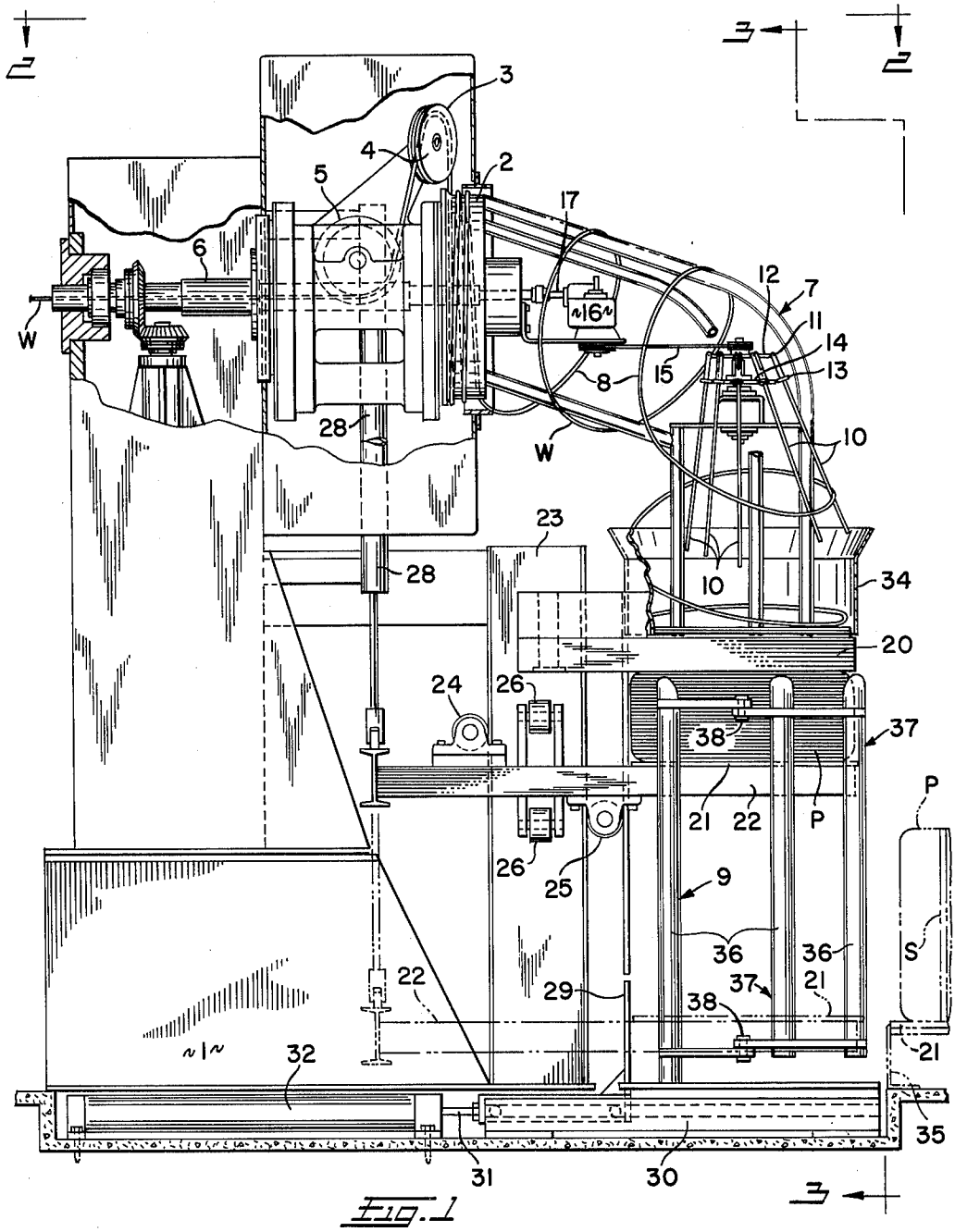


Fig. 1

INVENTOR.
JESS C. BITTMAN

BY

Oberlin, Maky & Donnelly
ATTORNEYS

March 22, 1966 J. C. BITTMAN 3,241,786

WIRE PACKAGING MACHINE

Filed June 5, 1964 3 Sheets-Sheet 2

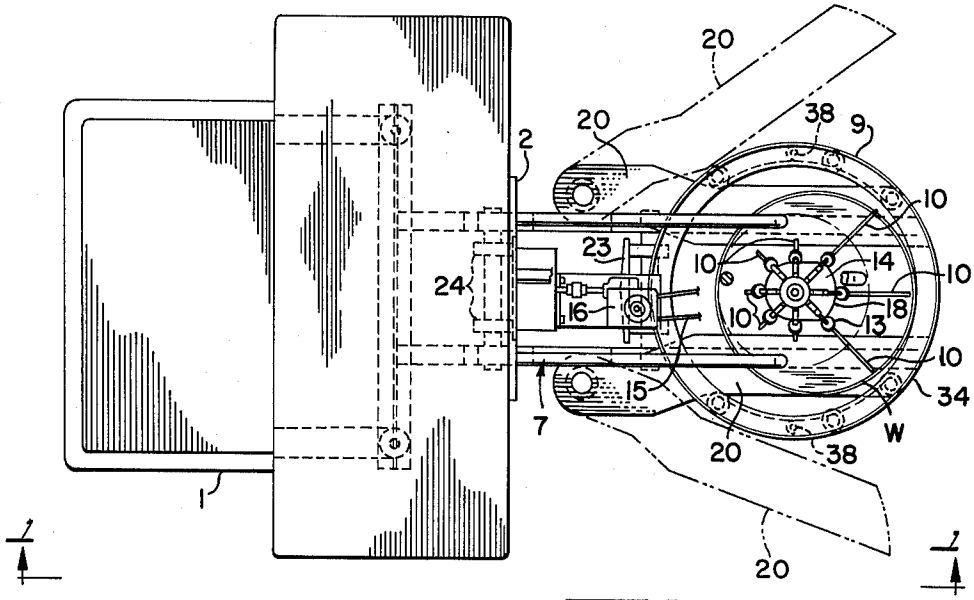


Fig. 2

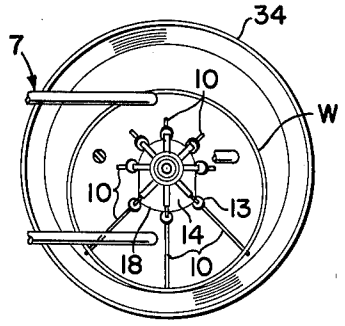


Fig. 4

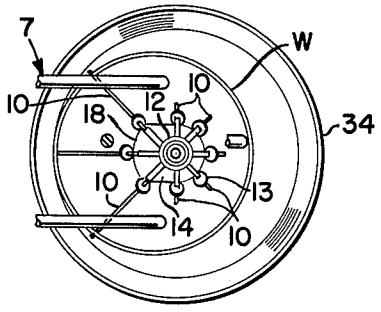


Fig. 5

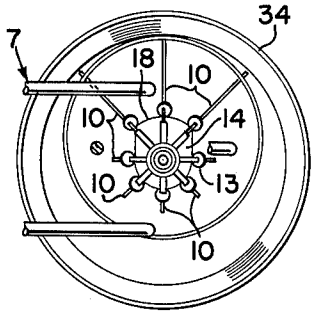


Fig. 6

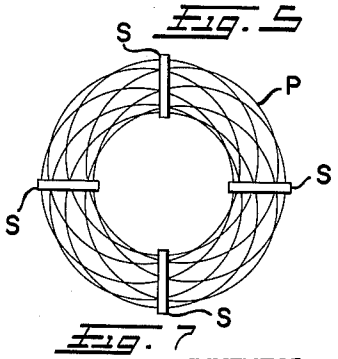


Fig. 7

INVENTOR.
JESS C. BITTMAN

BY

Oberlin, Maky & Donnelly
ATTORNEYS

March 22, 1966 J. C. BITTMAN 3,241,786

WIRE PACKAGING MACHINE

Filed June 5, 1964 3 Sheets-Sheet 3

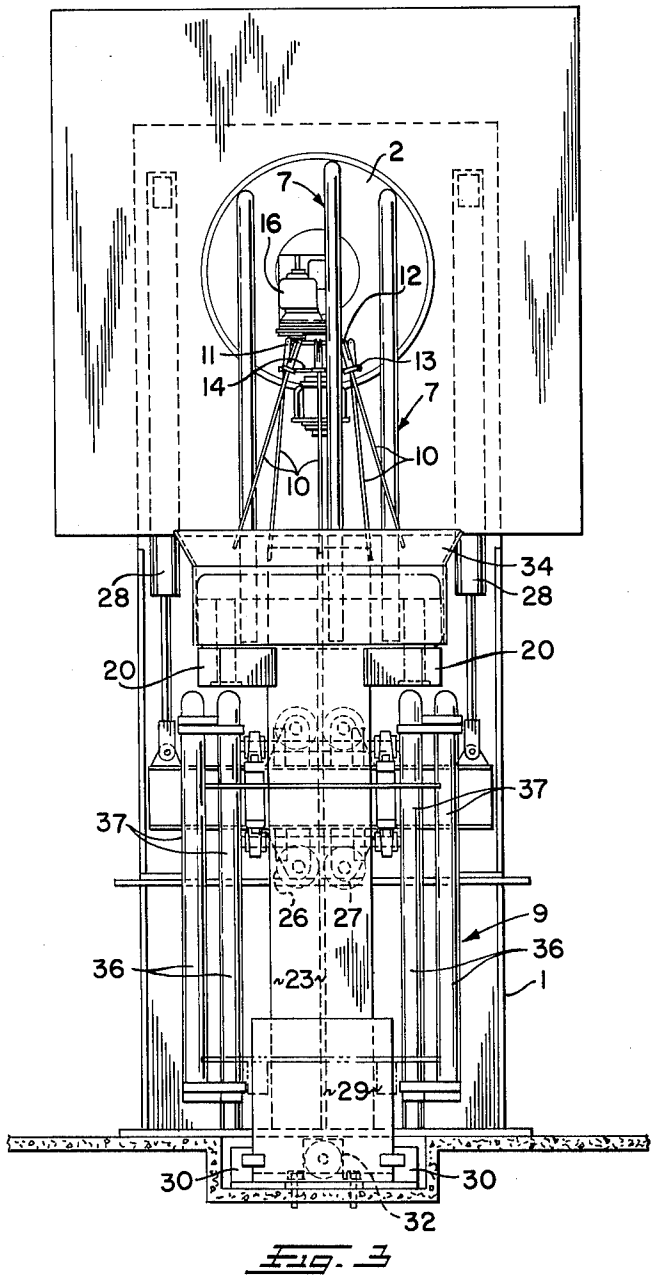


Fig. 3

INVENTOR.
JESS C. BITTMAN

BY

Oberlin, Maky & Donnelly
ATTORNEYS

United States Patent Office 3,241,786 Patented Mar. 22, 1966

3,241,786

WIRE PACKAGING MACHINE

Jess C. Bittman, Cuyahoga Falls, Ohio, assignor to The Vaughn Machinery Company, Cuyahoga Falls, Ohio, a corporation of Ohio

Filed June 5, 1964, Ser. No. 372,902
14 Claims. (Cl. 242—83)

The present invention relates generally as indicated to a wire packaging machine and more particularly to a machine in which loops or turns of wire and the like are collected in neat, compact packages or bundles, the loops being arranged in circular progression on a supporting platform with successive turns circumferentially displaced with respect to each other. For examples of that type of wire package and apparatuses for producing the same, reference may be had to the U.S. Patents Nos. 3,013,742, 3,054,570, and 3,064,919. In the aforesaid patents, coils or packages of the above-mentioned type are made by horizontally displacing the loops of wire as they drop down from a coiling device and land on a slowly rotating tilted turntable.

It is a principal object of this invention to provide a novel loop distributor which is driven by the coiling device and which is operative to horizontally displace the loops of wire as they drop from the coiling device, thus eliminating the need for a rotating turntable.

It is another object of this invention to provide in a wire packaging machine of the character indicated novel means operative to compress a finished package for strapping and removal from the machine.

Another object of this invention is to provide a wire packaging machine that has means for pushing the finished package from the supporting platform of the machine preparatory to starting the next package.

Other objects and advantages of the present invention will become apparent as the following description proceeds.

To the accomplishment of the foregoing and related ends, the invention, then, comprises the features hereinafter fully described and particularly pointed out in the claims, the following description and the annexed drawings setting forth in detail a certain illustrative embodiment of the invention, this being indicative, however, of but one of the various ways in which the principle of the invention may be employed.

In said annexed drawings:

FIG. 1 is a side elevation view of a preferred form of wire packaging machine according to the present invention, a portion of the casing being broken away to show the coiling device;

FIG. 2 is a top plan view as viewed from the top of FIG. 1 as designated by the line 2—2;

FIG. 3 is a front elevation view as viewed along the line 3—3, FIG. 1;

FIGS. 4, 5, and 6 are top plan views showing different positions of the loop distributor; and

FIG. 7 is a top plan view illustrating the wire package itself in the form in which it is collected for easy payoff and compacted and strapped for holding the loops in the prearranged form for payoff in a customer's plant or in a different portion of the wire processing plant.

Referring now in detail to the drawings, and first to FIGS. 1, 2, and 3, the machine herein illustrated comprises a base structure 1 on which is fixedly mounted a takeup block 2 around which wire W is wound and axially advanced by the rotating flyer arm assembly 3 having sheaves 4 and 5 over which the wire W passes through the central drive shaft 6. This type of apparatus, that is, one in which the takeup block 2 is fixed and a flyer 3 rotates around the block 2 may be of the general type illustrated in the Patent 3,049,315.

In the case of the horizontal takeup block 2 herein shown, there is attached thereto a so-called "horn" 7 along which the loops or convolutions 8 of wire slide, and thence turn to drop down horizontally. Of course, the flyer assembly 3 and takeup block 2 may be of the vertical type (see Patents 3,013,742, 3,013,741, 3,054,570, 3,064,919, and 3,113,745, for example) in which the wire loops are generally horizontal and drop downwardly by gravity to a cage or receiver 9 to form an upwardly growing package.

For horizontally displacing the wire loops as they drop from the horn 7 to form a package P in which the loops are arranged in circular progression there is provided a plurality of fingers or rods 10, which are pivoted at their upper ends 11 to a fixed plate 12 within the horn 7. Between the ends of rods 10 and preferably near the upper pivoted ends are cam follower rollers 13 engaged by the peripheral edge of a cam plate 14 which is driven very slowly through the belt drive 15 and speed reducer 16, the latter having its input shaft 17 coupled to the flyer drive shaft 6. Thus, the distribution of the loops is related directly to the speed of the flyer drive shaft 6 since if the flyer drive shaft 6 is driven faster or slower, the cam plate 14 will rotate correspondingly faster or slower so that the loops will be displaced horizontally in a manner to be described in detail to form the desired neat and compact package or coil.

As evident from FIGS. 2, 4, 5, and 6, as the cam plate 14 slowly revolves those fingers 10 which are engaged with the cam surface 18 have their lower ends disposed eccentrically of the axis of the horn 7, whereby as the loops drop past these outermost fingers 10 they will be displaced horizontally in that direction and, of course, as the cam plate 14 rotates other fingers 10 will be thus projecting laterally. In this way the loops will be displaced horizontally in circular progression to form a neat, and compact package such as illustrated in FIG. 7.

In the present case with the bar-like accumulator arms 20 swung out to the dot-dash position shown in FIG. 2, the thus horizontally displaced loops will drop down on the platform or skid 21 carried on support arms 22 and if desired, and as shown herein, the arms 22 are mounted for vertical movement along the column 23 by flange engaging rollers 24 and 25 and by web engaging rollers 26 and 27. The arms 22 are vertically moved as by means of a pair of hydraulic cylinders 28, 28. If it is desired to drop the loops through a constant distance throughout the packaging operation fluid metering means or the like (not shown) may be employed to control the escape of liquid from the rod end of the cylinders 28, 28 thus to maintain the top of the package P at a prescribed level. It is also to be understood that if the package P is to be of specified weight, a suitable scale and control mechanism (not shown) may be provided to swing in the accumulator arms 20 at the proper time and to reverse the cylinders 28, 28 to move the platform arms 22 upwardly to compress the coil or package P between the lower sides of said arms 20 and said platform or skid 21. With the package P thus compressed, it may be bound with straps S or the like, so that upon lowering of the platform arms 22 to the dot dash position of FIG. 1, it, together with skid 21, may be removed from the platform arms 22 and the building up of the next package started. During the compacting, strapping and removing operation, the convolutions or loops of wire W will accumulate on the upper surface of the arms 20 and when the arms 20 are again spread apart, the hank of convolutions will drop down on the new skid 21 placed on the arms 22 and the winding operation continued as previously explained.

When the platform arms 22 are lowered to the dot-dash position of FIG. 1 the compacted and strapped package P will be shoved off the platform 21 toward the right

by the actuation of the push-off plate **29** which is mounted on rails **30** and secured to the piston rod **31** of the hydraulic cylinder **32**.

By way of example, a coil or package P weighing 1500 pounds with an outside diameter of 29" and in inside diameter of 15", has a height of 31" when completed, but when compacted, will have a height of only 21". The compacting cylinders **28**, **28** are of such size that when the hydraulic pressure is 1,000 p.s.i. the compacting force may be as much as 25,000 pounds. However, in most cases a compacting force of about 10,000 pounds is adequate. It is to be noted that the compacting bars **20** back up the top of the coil P across four relatively wide areas so as not to damage the wire W.

When the next coil P is to be wound a strap guide (not shown) may be placed in the center of the platform **21** with four straps S extending radially and equally spaced. To start the next coil or package P, the elevator arms **22** will preferably be raised to about the full line position of FIG. 1 and the collector or compactor arms **20** are spread apart to clear the inside of the guide funnel **34** and the hank of convolutions which has accumulated on said arms **20** during the compacting and strapping of the previous coil P is placed on the platform **21** around such strap guide and on the radially extending portions of the straps S. The building up of the next coil P then continues as previously explained, the platform **21** preferably being gradually lowered so that the loop drop from the distributor fingers **10** will remain approximately constant. When the coil P has the required weight of wire as determined by suitable weighing means, not shown, the collector arms **20** will at once be swung in and the wire W cut thereat, whereupon the elevator arms **22** may be raised to compact the coil P and the strap ends fastened together whereupon the elevator arms **22** are lowered, and the pushoff cylinder **32** is actuated to push off the finished and compacted and strapped coil P from the platform arms **22** onto a suitable conveyor **35** or the like preparatory to operation of the machine to produce the next coil P.

To assist in maintaining the package P in cylindrical form, vertical bars **36** are provided to form the cage or receiver **9** for guiding the horizontally displaced loops as they drop from the fingers **10**. Portions **37** of the cage are hinged at **38** so that the cage **9** may be opened for discharge of the completed package P.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the features stated in any of the following claims, or the equivalent of such, be employed.

I therefore particularly point out and distinctly claim as my invention:

1. A wire packaging machine comprising a coiling device of the type in which a rotary flyer helically wraps wire around a stationary takeup block from which the nonrotating wire convolutions descend by gravity onto a supporting platform thus to form an upwardly growing package; a distributor mounted on said takeup block in the path of descent of such convolutions effective to horizontally displace such convolutions in circular progression as they drop toward said platform onto the top of the package being formed; and a drive shaft operatively connected to said flyer and to said distributor.

2. The machine of claim **1** wherein said distributor comprises a circular series of downwardly extending fingers; and cam means driven by said shaft effective to successively move said fingers so that their lower end portions lie in the path of descent of the convolutions thus causing the convolutions to be horizontally displaced in circular progression.

3. The machine of claim **1** wherein said distributor comprises inclined movable wire guide means that horizontally displaces such convolutions in circular progression as aforesaid.

4. The machine of claim **1** wherein a base structure thereof has a member horizontally movably mounted from a position clearing the horizontally displaced convolutions to a position in the path of such horizontally displaced convolutions; and means for relatively moving said platform and said member toward each other for squeezing the wire package therebetween while a hank of convolutions accumulates on said member.

5. The machine of claim **1** wherein a base structure thereof has a horizontally movable member effective to engage one side of the package on said platform to push the package off the platform preparatory to producing another package thereon.

6. The machine of claim **1** wherein a base structure thereof has bar-like members horizontally swingably mounted into and out of the path of descent of the horizontally displaced convolutions; and wherein said base structure has means for raising and lowering said platform whereby, when said members are in the path of descent of the convolutions and when said platform is raised, the wire package on the latter is vertically compacted for tying; said platform, when subsequently lowered, carrying the compacted and tied package therewith for removal from said platform.

7. A wire packaging machine comprising a coiling device of the type in which a rotary flyer helically wraps wire around a stationary takeup block from which the nonrotating wire convolutions descend by gravity onto a nonrotating supporting platform thus to form an upwardly growing package; a distributor in the path of descent of such convolutions effective to horizontally displace such convolutions in circular progression as they drop toward said platform onto the top of the package being formed; said distributor comprising an inclined wire guide which describes a circular path while engaging but one side of such convolutions as they drop therealong.

8. The machine of claim **7** wherein said guide comprises a circular series of downwardly extending fingers; and cam means effective to successively move said fingers so that their lower end portions lie in the path of descent of the convolutions thus causing the convolutions to be horizontally displaced in circular progression.

9. The machine of claim **7** wherein a base structure thereof has a member horizontally movably mounted from a position clearing the horizontally displaced convolutions to a position in the path of such horizontally displaced convolutions; and means for relatively moving said platform and said member toward each other for squeezing the wire package therebetween while a hank of convolutions accumulates on said member.

10. The machine of claim **7** wherein a base structure thereof has a horizontally movable member effective to engage one side of the package on said platform to push the package off the platform preparatory to producing another package thereon.

11. The machine of claim **7** wherein a base structure thereof has bar-like members horizontally swingably mounted into and out of the path of descent of the horizontally displaced convolutions and wherein said base structure has means for raising and lowering said platform whereby, when said members are in the path of descent of the convolutions and when said platform is raised, the wire package on the latter is vertically compacted for tying; said platform, when subsequently lowered, carrying the compacted and tied package therewith for removal from said platform.

12. A wire packaging machine comprising base structure having a coiling device from which helical, nonrotating convolutions of wire descend by gravity onto a supporting platform thus to form an upwardly growing package; a distributor in the path of descent of such convolutions effective to horizontally displace such convolutions in circular progression as they drop toward said platform onto the top of the package being formed; and a compacting member horizontally movably mounted on said base structure from a position clearing the horizontally displaced convolutions to a position in the

path of such horizontally displaced convolutions; and means for relatively moving said platform and said member toward each other for squeezing the wire package therebetween.

13. The machine of claim 12 wherein a push-off member is horizontally movably mounted on said base structure to engage one side of the package on said platform to push the package off the platform preparatory to producing another package thereon.

14. The machine of claim 12 wherein said compacting member comprises bar-like members horizontally swingably mounted on said base structure into and out of the path of descent of the horizontally displaced convolutions; and wherein means are provided on said base structure for raising and lowering said platform whereby,

when said members are in the path of descent of the convolutions and when said platform is raised, the wire package on the latter is vertically compacted for tying; said platform, when subsequently lowered, carrying the compacted and tied package therewith for removal from said platform.

References Cited by the Examiner

UNITED STATES PATENTS

2,703,686	3/1955	Bell	242—82
3,013,742	12/1961	Bittman	242—83

MERVIN STEIN, *Primary Examiner.*