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3,092,350

SCRAP WIRE COMPACTING APPARATUS

Filed Oct. 25, 1960

2 Sheets-Sheet 1

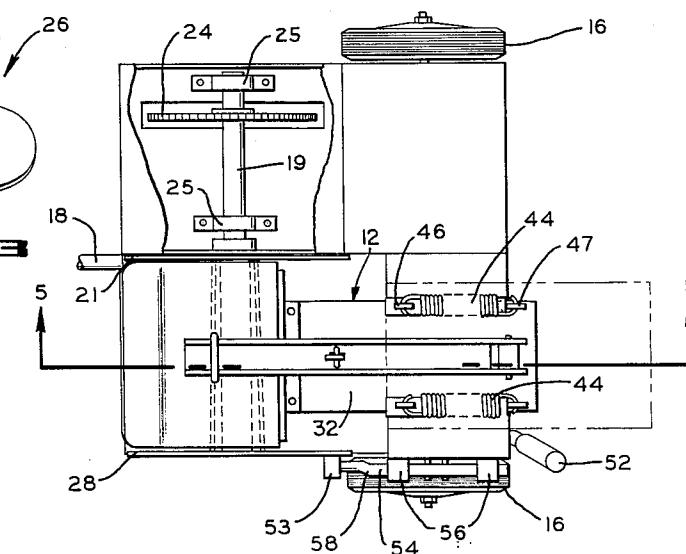
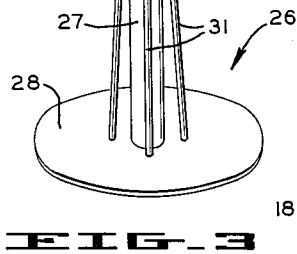
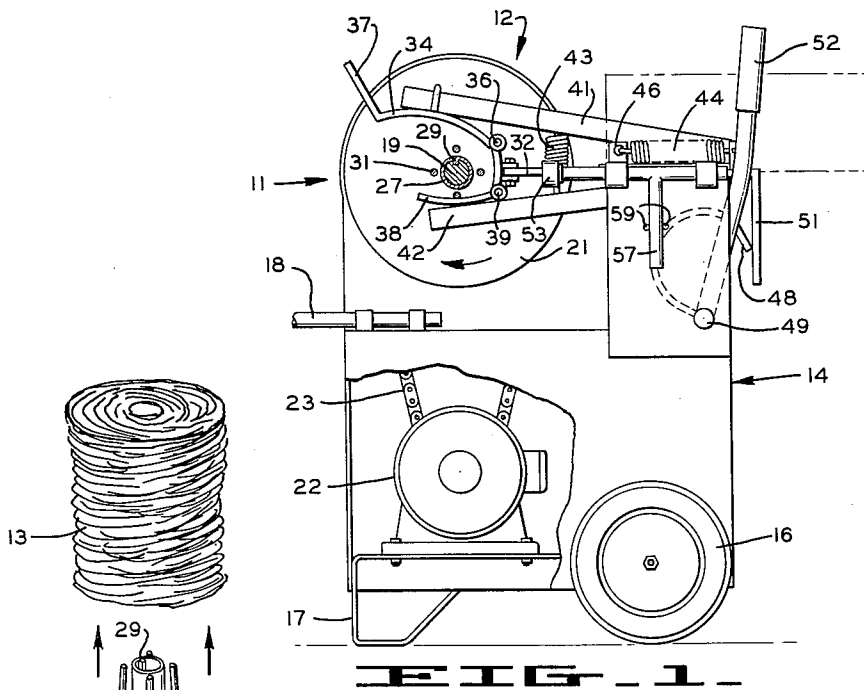


FIG. 2

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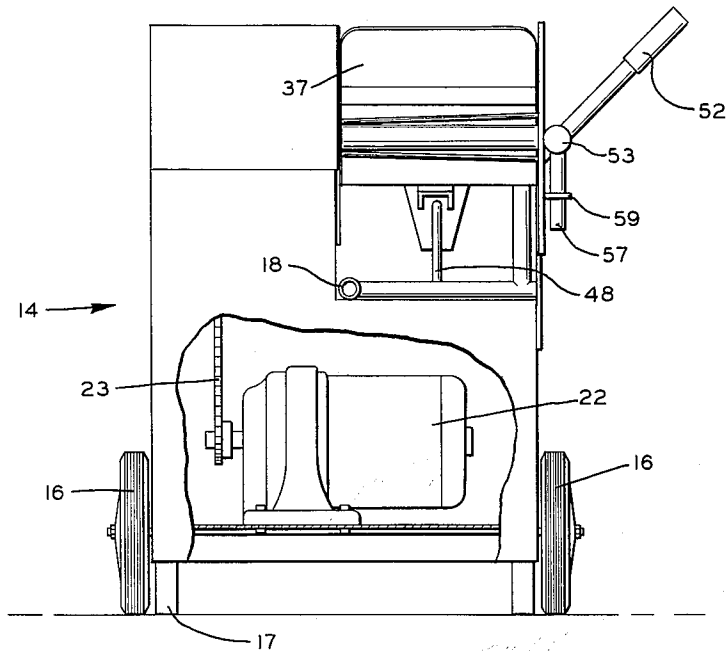


FIG. 4

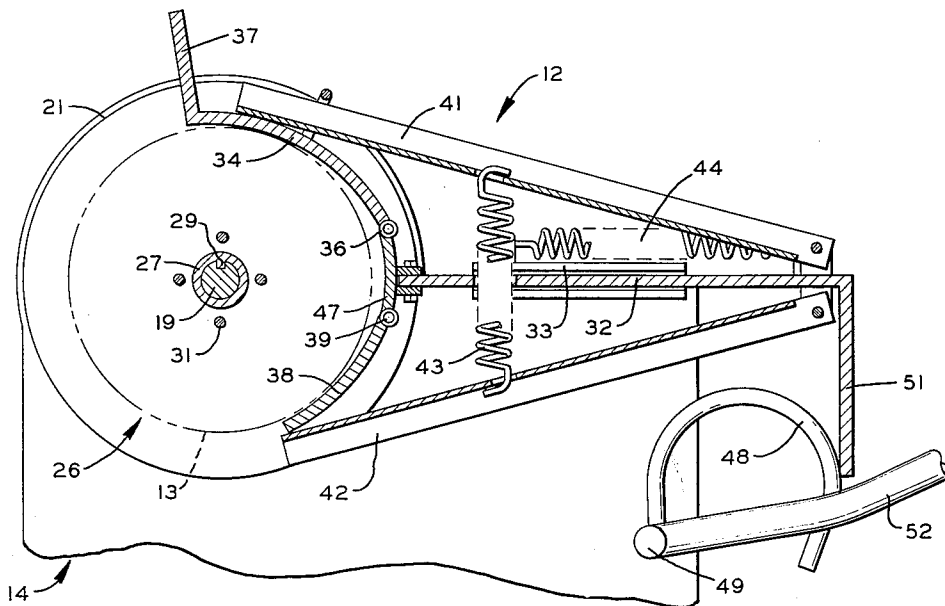


FIG. 5

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SCRAP WIRE COMPACTING APPARATUS

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This invention relates to improvements in a scrap wire compacting apparatus and more particularly to devices for forming scrap wire into easily handled, compact rolls or bales.

Disposal of random lengths of wire can often pose a serious problem. This is particularly true in the feeding of livestock where the hay or other feed is often compressed into bales and held in such form by several lengths of wire wrapped around the bale. This wire is cut with wire-cutters and removed from the bale prior to feeding the cattle.

The baling wire is usually made of soft iron and poses a serious safety hazard both as to the operator and the stock. Heretofore the wire has usually been placed in piles, creating the danger of the operators or the cattle becoming entangled in the pile, or of the cattle accidentally ingesting pieces of the wire with their feed. Moreover, the piles of rusting wire scraps are unsightly and difficult to dispose of.

The present invention contemplates a machine into which the random lengths of scrap wire may be fed as they are removed from the baled hay, and which will wind up this scrap wire into a compact roll which may be disposed of with comparative ease. Indeed, these rolls provide an additional source of revenue to the cattle raiser in that, being compact, they may be sold to scrap metal dealers.

To be effective for this purpose, the machine must be relatively inexpensive, simple and foolproof in operation, and sturdy enough to provide a long, trouble-free life.

Accordingly, it is a principal object of the present invention to provide an apparatus for compacting scrap wire into a form which may be easily handled and disposed of so as to avoid unsightly and dangerous piles of scrap wire.

Another object of the present invention is to provide a scrap wire compacting apparatus of the character described which will accept random lengths of scrap wire which may be twisted and snarled together and which will rapidly and smoothly manipulate and wind the wire into a compact and easily handled roll.

A further object of the invention is to provide an apparatus of the character described in which the compacted roll of scrap wire may be easily and simply removed from the machine.

Yet another object of the present invention is to provide a scrap wire compacting apparatus incorporating a novel means for guiding and compressing the wire strands during the winding operation and mounting this means in such manner that it may be swung out of the way for easy removal of the roll from the machine.

Another object of the present invention is to provide an apparatus of the character described which is sturdy and simple in design so as to provide a long and trouble-free operating life, and which may be operated by unskilled persons under adverse conditions.

Further objects and advantages of my invention will be apparent as the specification progresses, and the new and useful features of my scrap wire compacting apparatus will be fully defined in the claims attached hereto.

The preferred form of my invention is illustrated in the accompanying drawings, forming part of this application, in which:

FIGURE 1 is a side elevational view of an apparatus constructed in accordance with the present invention,

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with portions thereof being broken away to illustrate internal detail;

FIGURE 2, a plan view of the apparatus of FIGURE 1;

FIGURE 3, a perspective view of a spindle forming a part of the apparatus of the present invention and illustrating the manner of removing the bale scrap wire therefrom;

FIGURE 4, a front elevational view of the apparatus of FIGURES 1 and 2; and

FIGURE 5, an enlarged fragmentary cross-sectional view taken substantially on the plane of line 5-5 of FIGURE 2.

While I have shown only the preferred form of my invention, it should be understood that various changes or modifications may be made within the scope of the claims attached hereto without departing from the spirit of the invention.

Referring to the drawings in detail, it will be seen that the scrap wire compacting apparatus of the present invention consists mainly of a motor-driven shaft means 11 and means 12 for guiding and shaping random lengths of scrap wire into a compact roll 13 on the shaft means.

Preferably, for reasons of portability, the means 11 and 12 are mounted on a frame 14 constructed in the form of a cart supported on a pair of wheels 16 and a supporting leg 17. Suitable handles 18 may be provided so that the cart may be pulled from place to place in the manner similar to wheeling a wheelbarrow.

The means 11 includes a shaft 19 journaled in bearings 20 and 25 supported on the frame 14. Secured to the shaft 19 is a flange 21 beyond which the shaft projects into the winding area.

The shaft 19 may be driven by any suitable motive means, but as here shown, the shaft is rotated by a motor 22 connected by a drive chain 23 to a sprocket wheel 24 secured to shaft 19. The motor 22 may be of any suitable type and is here illustrated as consisting of an electric motor. However, for operation in areas where electric power is not available, the motor may conveniently consist of a one- or two-cylinder gasoline engine.

The wire scraps are wound upon a spindle 26 carried on the shaft 19 for rotation therewith. This spindle includes a sleeve 27 and a radially extending end flange 28 mounted on the sleeve. When the spindle is in position on shaft 19, the end flange 28 cooperates with the flange 21 on shaft 19 to define a drum upon which the scrap wire is wound. The sleeve 27 may be held against rotation relative to the shaft 19 by a key or spline 29.

Secured to the end flange 28 and projecting therefrom in spaced relation around the sleeve 27, are a plurality of rods 31. As may best be seen from FIGURE 3 of the drawings, the rods 31 converge somewhat in the direction of the end of sleeve 27 remote from end flange 28. When the wire roll 13 is wound upon the spindle, the rods 31 define a tapered hole or core in the roll. This makes it much easier to remove the roll from the spindle than would be the case if the rods were parallel or if the wire were wound directly on the sleeve 27 due to the tight manner of winding the wire, which would cause a powerful frictional engagement between the roll and the spindle.

In accordance with the present invention and as an important feature thereof, the means 12 is adapted to smooth out and evenly distribute tangles or snarls of wire as it is being wound upon the spindle 26, and is further adapted to compact the scrap wire into a tightly wound roll.

The means 12 consists essentially of a carriage 32 slidably mounted in guides 33 supported upon frame 14 for endwise movement toward and away from the spindle 26. Mounted on the carriage 32 is a plate 34 adapted to

be resiliently pressed toward the spindle 26. The plate 34 extends substantially the full width of the space between flanges 21 and 28, see FIGURE 2, and serves to engage and smooth out the strands of scrap wire as they are fed into the machine.

As may be seen from FIGURE 5 of the drawings, the plate 34 is curved about an axis parallel to the axis of shaft 19, that is, the plate 34 forms a portion of a cylinder which is axially parallel to the shaft 19. This curvature is preferably approximately the same as the curvature of the outer periphery of the finished roll of wire.

The rear end of plate 34 is pivoted to the carriage 32 by a hinge 36, and the forward end 37 of the plate is bent upwardly in the manner shown in FIGURES 1 and 5. A second, somewhat smaller plate 38 is pivoted to the carriage on a hinge 39 and is curved in a manner similar to the curvature of plate 34. As may be seen from a comparison of FIGURES 1 and 5, the plates 34 and 38 form something of a clamshell arrangement which can gradually open up to accommodate the roll of wire as it grows in diameter.

Also mounted on carriage 32 is spring means which serves to resiliently urge the plates 34 and 38 against the periphery of the wire roll at all stages of its growth. The cooperative action of the members 34 and 38 accomplishes the previously mentioned novel smoothing-out and even distribution of the scrap wire in the roll. As here shown, the spring means includes two sets of springs, one set serving to urge the members 34 and 38 toward each other, and the other set urging the carriage in the direction of the spindle. Urging of members 34 and 38 toward each other is accomplished by arms 41 and 42 pivoted at their rear ends to the carriage 33 and having their distal ends bearing against members 34 and 38, respectively. A coil spring 43 is mounted in tension between the arms 41 and 42 and is biased to urge the arms, and hence the members 34 and 38, toward each other.

A pair of coil springs 44 are mounted between upstanding ears secured to the guide member 33 and carriage 32 respectively. Springs 44 are biased to urge the carriage to the left as viewed in the drawings, that is, in the direction of the spindle 26.

As may be seen from FIGURE 5 of the drawings, the hinges 36 and 39 are preferably mounted at the upper and lower edges of a vertical curved plate-like member 47, which is secured to the end of carriage 32 confronting the spindle 26. When the clamshell is fully opened up, that is, when the members 34 and 38 are moved apart their maximum distance, members 34, 38 and 47 will define the peripheral edge of the maximum size of wire roll which can be accommodated.

For ease in removing the spindle 26 and the roll 13 carried thereon from the shaft 19, a cam 48 is pivoted on the frame at 49 in position to engage an extension 51 of carriage 32 and displace the carriage away from the spindle 26 when the cam is rotated around its pivot. A manually engageable handle 52 is secured to the cam 48 to facilitate this action. Thus, when handle 52 is moved to the position illustrated in FIGURE 5, the cam 48 has moved the members 34, 38 and 47 out of contact with the periphery of the roll 13, allowing its easy removal from the machine.

As may best be seen in FIGURES 1, 2 and 4 of the drawings, the spindle 26 is held against removal from shaft 19 by a roller 53 positionable in rolling engagement with and against the outer face of the spindle end flange 28. This provides a positive means for holding the spindle against accidental displacement on the shaft 19, while still permitting its rapid removal whenever desired.

Rapid removal of the roller 53 out of the way of flange 28 is provided by mounting the roller on the end of the shaft 54 journaled in bearing members 56 secured to the cart 14. A handle 57 extends laterally from shaft 56 by which the shaft may be rotated and moved axially in its bearings. The shaft 54 is formed with a slight off-

set at 58 so that the center of the roller 53 is eccentric with respect to the axis of the bearings 56. The parts are proportioned so that when handle 57 is hanging straight down, as illustrated in the drawings, the offset 53 will be in the direction of the flange 28. When the handle is moved upwardly 90 degrees, this moves the roller 53 away from flange 28 and permits the shaft 54 to be slid axially in bearings 56 far enough to remove the roller completely out of the way of the end flange 28. A spaced pair of pins 59 project from the side of cart 14 and serve to prevent axial movement of shaft 54 when the handle 57 is in down position.

From the foregoing it will be seen that I have provided a novel apparatus for compacting scrap wire in a tightly and evenly wound roll, the apparatus operating in a simple and foolproof manner, and it being of a simple and sturdy construction, affording a long operating life.

I claim:

1. A machine for compacting scrap wire, comprising a frame, a shaft mounted for rotation on said frame, a motor on said frame having an operative connection to said shaft for rotating same, a spindle demountably carried on said shaft for rotation therewith and formed for winding random lengths of scrap wire upon the spindle during said rotation, and means on said frame for guiding and shaping said wire into a compact roll, said means including a member having a concavely curved face confronting said shaft for engagement with the periphery of the wire roll, a pair of curved plates hinged on said member and movable toward and away from said shaft, and a spring resiliently urging said plates toward said shaft.

2. A machine for compacting scrap wire, comprising a frame, a shaft mounted for rotation on said frame, a motor on said frame and having an operative connection to said shaft for rotating same, a spindle demountably carried on said shaft for rotation therewith and formed for winding random lengths of scrap wire upon the spindle during said rotation, and means on said frame for guiding and shaping said wire into a compact roll, said means including a member having a concavely curved face confronting said shaft for engagement with the periphery of the wire roll, a pair of curved plates hinged on said member and movable toward and away from said shaft, and a spring resiliently urging said plates toward said shaft, and said spindle including a sleeve mountable on said shaft, an end flange, and a plurality of rods spaced from the sleeve and converging toward the end opposite to the flange so as to permit the wire roll to be slid from the spindle.

3. A machine for compacting scrap wire, comprising a frame, a shaft mounted for rotation on said frame, a motor on said frame having an operative connection to said shaft for rotating same, a spindle demountably carried on said shaft for rotation therewith and formed for winding random lengths of scrap wire upon the spindle during said rotation, and means on said frame for guiding and shaping said wire into a compact roll, said means including a carriage mounted on said frame for movement toward and away from said shaft, a spring urging said carriage toward said shaft and a member mounted on said carriage and having a concavely curved face confronting said shaft for engagement with the periphery of the wire roll.

4. A machine for compacting scrap wire, comprising a frame, a shaft mounted for rotation on said frame, a motor on said frame and having an operative connection to said shaft for rotating same, a spindle demountably carried on said shaft for rotation therewith and formed for winding random lengths of scrap wire upon the spindle during said rotation, and means on said frame for guiding and shaping said wire into a compact roll, said means including a carriage mounted on said frame for movement toward and away from said shaft, a spring urging said carriage toward said shaft, and a member

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mounted on said carriage and having a concavely curved face confronting said shaft for engagement with the periphery of the wire roll, a pair of curved plates hinged on said member and movable toward and away from said shaft and a spring resiliently urging said plates toward said shaft.

5. A machine for compacting scrap wire, comprising a frame, a shaft mounted for rotation on said frame, a motor on said frame and having an operative connection to said shaft for rotating same, a spindle demountably carried on said shaft for rotation therewith and formed for winding random lengths of scrap wire upon the spindle during said rotation, and means on said frame for guiding and shaping said wire into a compact roll, said means including a carriage mounted on said frame for movement toward and away from said shaft, a spring urging said carriage toward said shaft, a member mounted on said carriage and having a concavely curved face confronting said shaft for engagement with the periphery of the wire roll, a pair of curved plates hinged on said member and movable toward and away from said shaft, a spring resiliently urging said plates toward said shaft, a cam pivoted on said frame and formed to displace said carriage away from said shaft against the action of the first named spring upon rotation of the cam, and a manually engageable handle for rotating said cam.

6. In a machine for winding scrap wire on a revolving spindle, a feeding and compacting device comprising a carriage movable toward and away from the spindle, a pair of plate members hingedly supported on the end of said carriage on opposite sides of the spindle and substantially coextensive therewith, and spring means urging said plate members toward the spindle whereby random lengths of scrap wire may be fed between the distal ends of said plate members onto the revolving spindle to form a wire roll, and the plate members will bear against the periphery of the roll to smooth out and compact the wire.

7. In a machine for winding scrap wire on a revolving spindle, a feeding and compacting device comprising a carriage movable toward and away from the spindle, a pair of plate members hingedly supported on the end of said carriage on opposite sides of the spindle and substantially coextensive therewith, and spring means urging said plate members toward the spindle whereby random lengths of scrap wire may be fed between the distal ends of said plate members onto the revolving spindle to form a wire roll and the plate members will bear against the periphery of the roll to smooth out and compact the wire, said plate members being curved about an axis parallel to the axis of rotation of the spindle with the radius of curvature approximately the same as the radius of the compacted wire roll.

8. In a machine for winding scrap wire on a revolving spindle, a feeding and compacting device comprising a carriage movable toward and away from the spindle, a pair of plate members hingedly supported on the end of said carriage on opposite sides of the spindle and substantially coextensive therewith, and spring means urging said plate members toward the spindle whereby random lengths of scrap wire may be fed between the distal ends of said plate members onto the revolving spindle to form a wire roll and the plate members will bear against the periphery of the roll to smooth out and compact the wire, said plate members being curved about an axis parallel to the axis of rotation of the spindle with the radius of curvature approximately the same as the radius

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of the completed wire roll, said spring means including a spring biased to urge said carriage toward the spindle and a second spring biased to urge said plate members together and against the wire roll.

9. A machine for compacting scrap wire comprising a frame, a shaft journaled on said frame, a circular flange on the shaft, said shaft having a free end projecting past said circular flange, a motor on said frame having an operative connection to said shaft for rotating same, a spindle having a sleeve removably mountable on the free end of said shaft and a circular end flange cooperative with the flange on said shaft to define a wire receiving drum, and means on said frame for guiding and shaping said wire into a compact roll, said spindle having a plurality of rods extending from said end flange in spaced relation around the sleeve and converging toward the end of the sleeve opposite to said end flange, so as to permit the wire roll to be slid from the spindle when the latter is removed from the shaft, a carriage mounted for sliding endwise movement on said frame toward and away from said spindle, a pair of plate members hingedly supported on the end of said carriage on opposite sides of the spindle and substantially coextensive therewith and spring means urging said plate members toward the spindle whereby random lengths of scrap wire may be fed between the distal ends of said plate members onto the revolving spindle to form a wire roll and the plate members will bear against the periphery of the roll to smooth out and compact the wire, said plate members being curved about an axis parallel to the axis of rotation of the spindle with the radius of curvature approximately the same as the radius of the completed wire roll, said spring means including a spring biased to urge said carriage toward the spindle and a second spring biased to urge said plate members together and against the wire roll.

10. A machine for compacting scrap wire, comprising a frame, a shaft journaled on said frame, a circular flange on the shaft, said shaft having a free end projecting past said circular flange, a motor on said frame having an operative connection to said shaft for rotating same, a spindle having a sleeve removably mountable on the free end of said shaft and a circular end flange cooperative with the flange on said shaft to define a wire receiving drum, and means on said frame for guiding and shaping said wire into a compact roll, means for releasably holding said spindle on said shaft, said means including a roller journaled on the end of a shaft mounted for axial reciprocation on said frame whereby said roller may be selectively moved into rolling engagement with the face of said end flange opposite said sleeve and radially away from said end flange so as to permit the spindle to be removed axially from the shaft, said spindle having a plurality of rods extending from said end flange in spaced relation around the sleeve and converging toward the end of the sleeve opposite to said end flange so as to permit the wire roll to be slid from the spindle when the latter is removed from the shaft.

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