Sept. 1, 1942. C. O. BRUESTLE 2,294,653

WIRE COILING MACHINE

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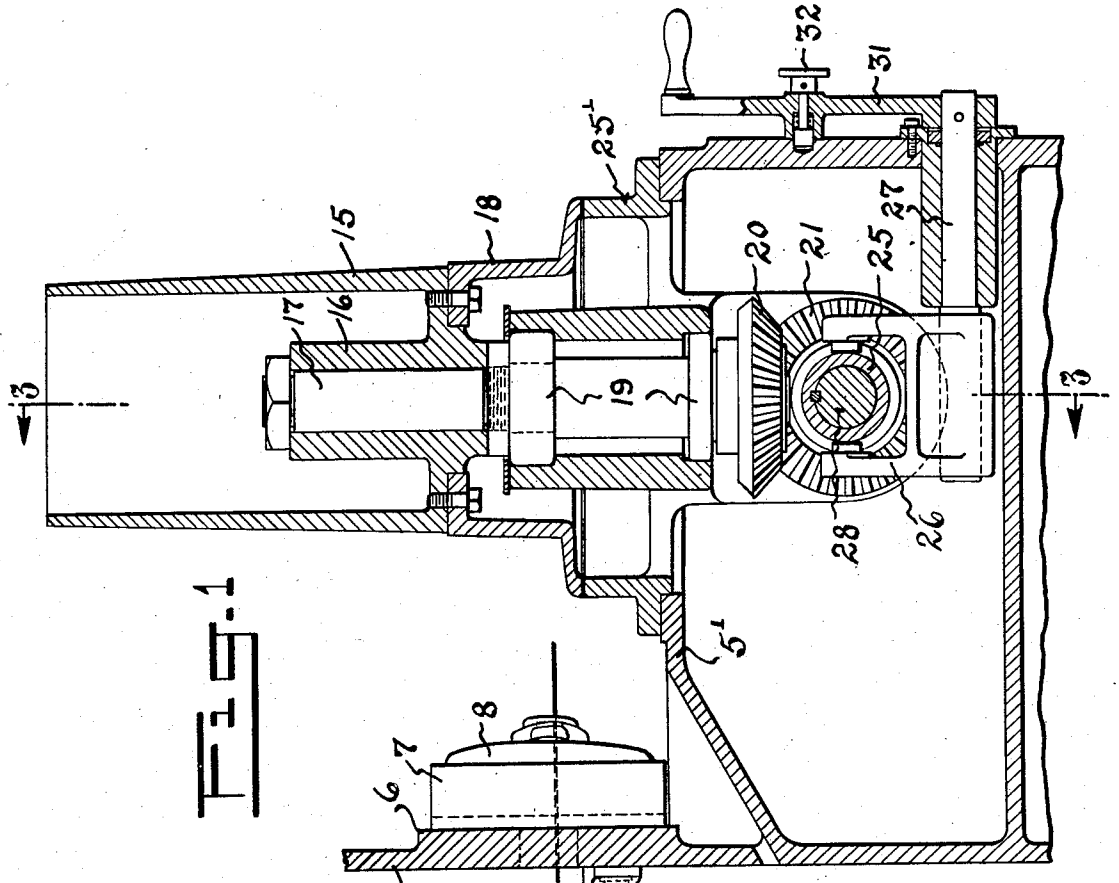


FIG. 1

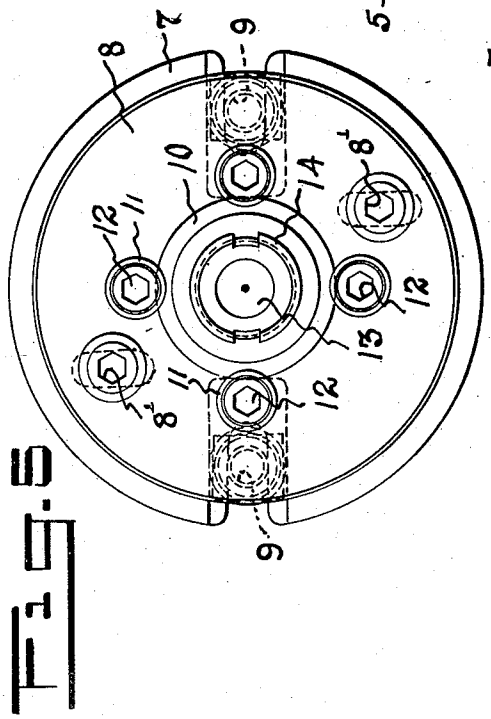
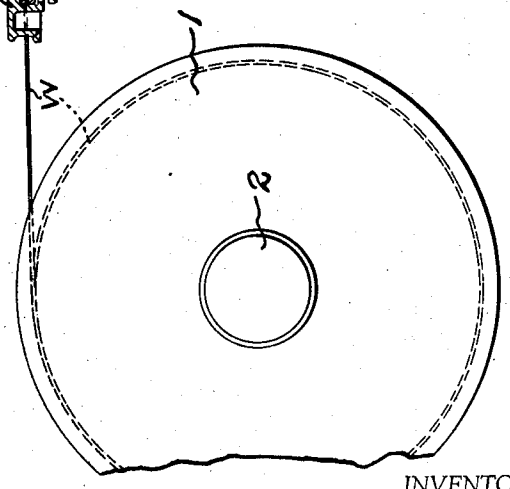


FIG. 5



INVENTOR.
Carl O. Bruestle

BY Darby & Darby.

ATTORNEYS

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WIRE COILING MACHINE

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FIG. 2

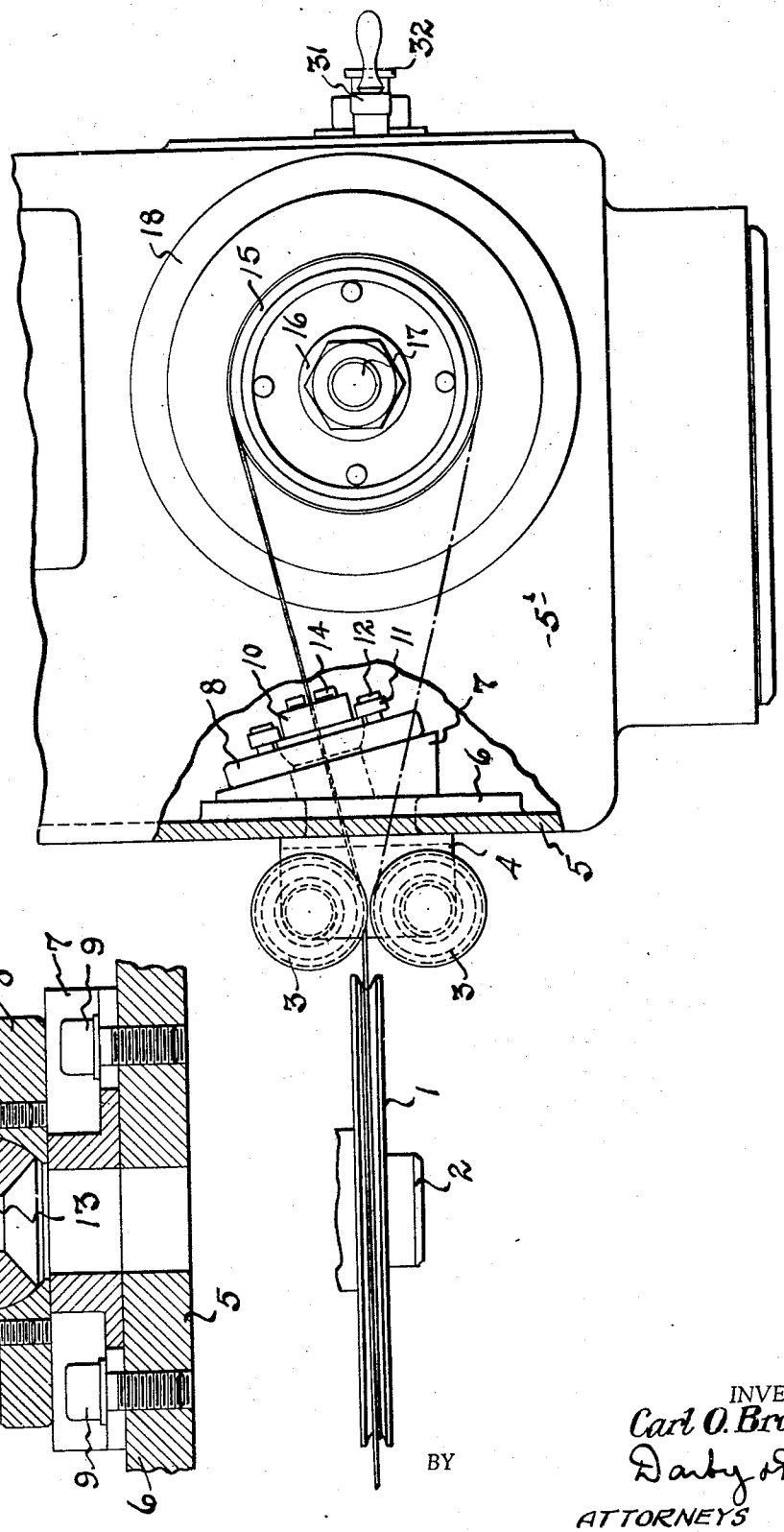


FIG. 6

INVENTOR.
Carl O. Bruestle
BY Darby & Darby
ATTORNEYS

Sept. 1, 1942. C. O. BRUESTLE 2,294,653

WIRE COILING MACHINE

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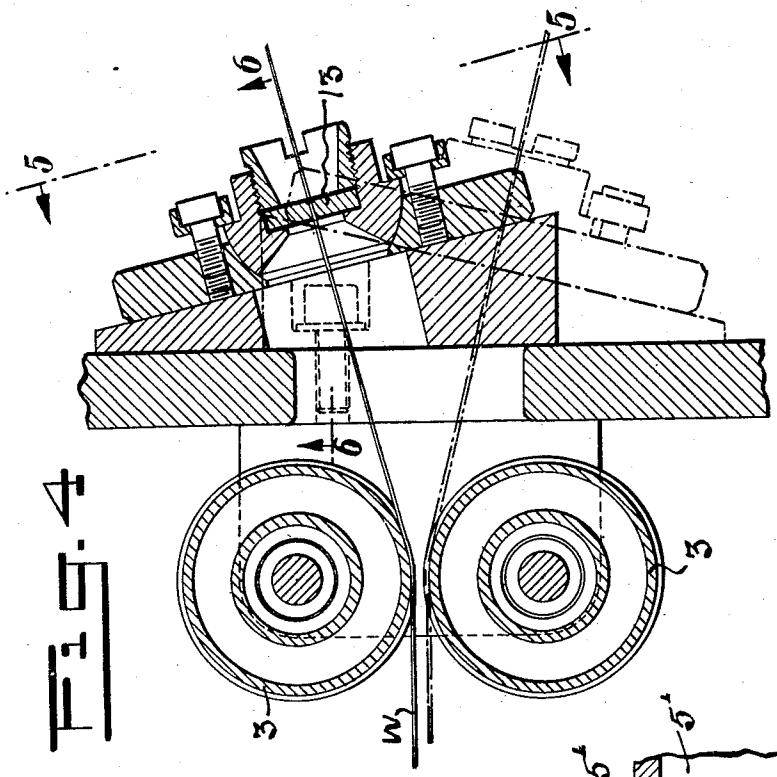


Fig. 4

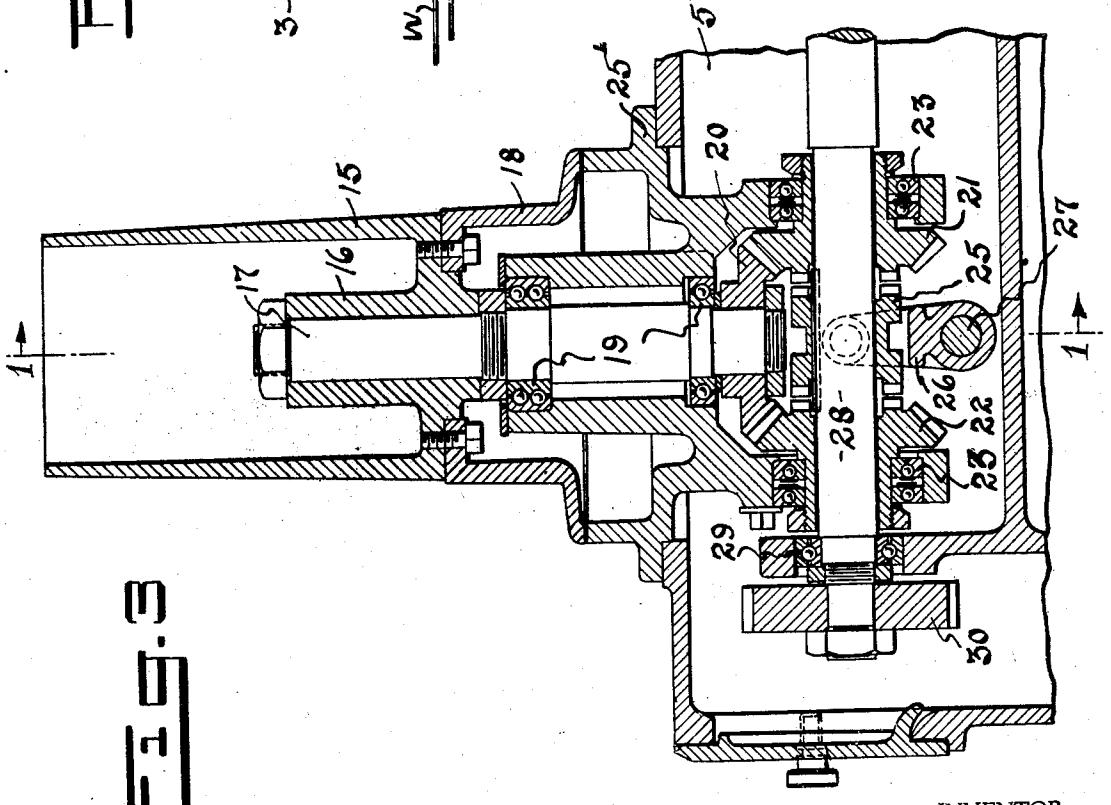


Fig. 3

INVENTOR.
Carl O. Bruestle
BY Darby & Darby.
ATTORNEYS

Sept. 1, 1942. C. O. BRUESTLE 2,294,653

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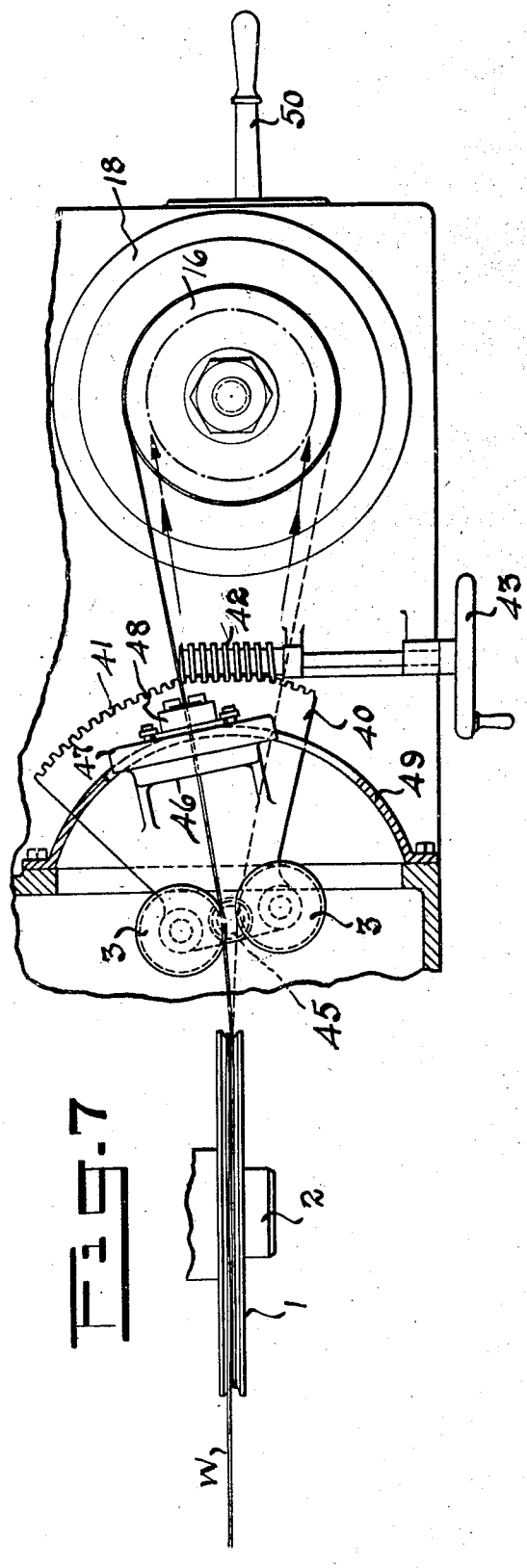


FIG. 7

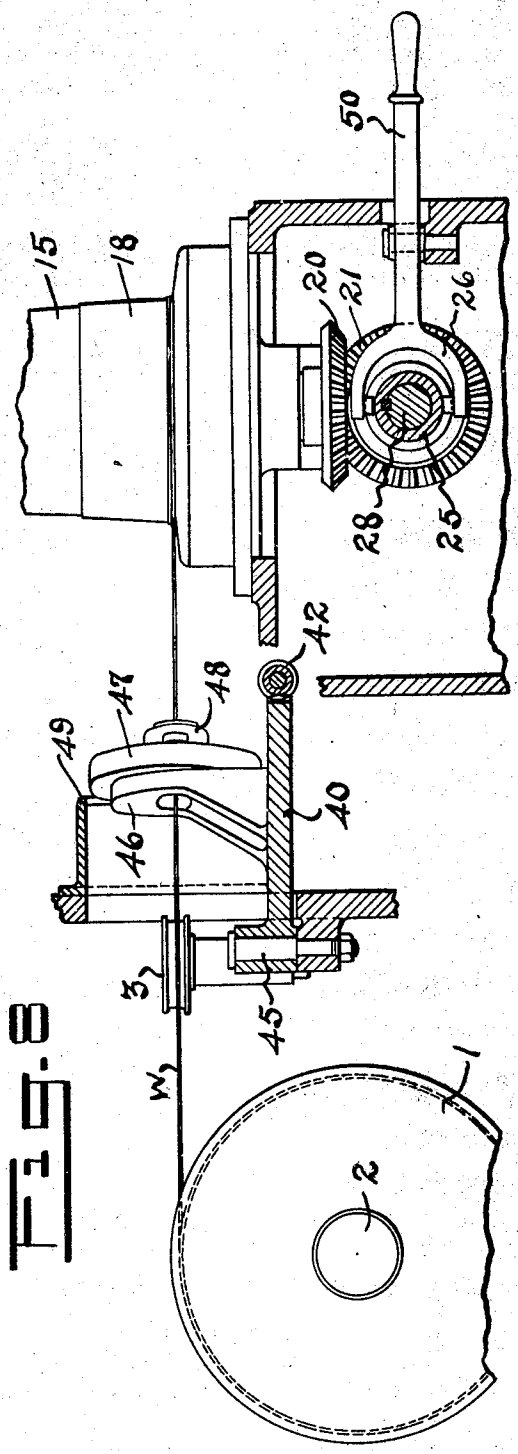


FIG. 8

INVENTOR.
Carl O. Bruestle

BY

Darby & Darby.
ATTORNEYS

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UNITED STATES PATENT OFFICE

2,294,653

WIRE COILING MACHINE

Carl O. Bruestle, Rahway, N. J., assignor to Syncro Machine Company, Rahway, N. J., a corporation of New Jersey

Application May 10, 1941, Serial No. 392,886

6 Claims. (Cl. 205—16)

This invention relates to improvements in machines for winding wire and the like into coils, and is particularly adapted but not limited to use with a wire drawing machine for forming the wire as it comes from the drawing machine into coils.

The broad object of this invention is the provision in a coiling machine of simple and easily adjustable mechanism by means of which either left hand or right hand coils can be formed.

The more detailed objects of this invention will be apparent from the following description of several embodiments thereof when taken in connection with the attached drawings.

This invention resides substantially in the combination, construction, arrangement and relative locations of parts as will be described in detail below.

In the accompanying drawings,

Figure 1 is a vertical, central, cross-sectional view taken on the line 1—1 of Figure 3, through the coiling mechanism including a side elevational view of the last capstan wheel of the wire drawing machine and the holder for the final die;

Figure 2 is a top plan of this mechanism with a portion of the casing broken away;

Figure 3 is a cross-sectional view taken on the line 3—3 of Figure 1;

Figure 4 is a central, cross-sectional view of the holder for the final die, showing in dotted lines its other position;

Figure 5 is a front elevational view of the final die holder when viewed from the plane 5—5 of Figure 4;

Figure 6 is a central, cross-sectional view of the holder for the final die taken on the line 6—6 of Figure 4;

Figure 7 is a top plan view with some parts in section of a modified construction in accordance with this invention; and

Figure 8 is a side elevational view of this mechanism showing some parts in cross-section.

In the manufacture of wire, as for example copper wire, many users thereof require that the wire be put up in the form of open coils rather than wound on spools or reels. Furthermore, in adapting these coils to certain uses the users frequently require that the wire be formed into left hand coils as distinguished from the more usual requirement that they be formed into right hand coils. The coiling machines as commonly employed for forming right hand coils are not adapted, at least not without considerable change, to the formation of left hand coils, with the result that separate machines have been considered preferable for the forming of the two kinds of coils. This, of course, requires extensive and undesirable duplication of machines in order to equip a factory for the production of both types of coil.

In accordance with this invention there is provided in a single machine mechanism which may be easily adjusted so that the same machine may be employed to form either left hand wound or right hand wound coils. The manner in which this is accomplished will be quickly understood from the following description in detail of two embodiments of the invention.

Referring first to the structure illustrated in Figures 1 to 6 inclusive there is illustrated at 1 the last capstan wheel shown mounted on a power driven shaft 2. The wire W passes from the next to the last drawing die in the wire drawing machine to and once or more times around the capstan wheel 1, which being power driven by mechanism not shown, acts to draw the wire from the next to the last drawing die. The wire W passes from the capstan wheel 1 to and through a passage or space between a pair of idler guide wheels 3 which are freely and rotatably mounted on a bracket 4 mounted on the end wall of the casing 5. The wire engages one or the other of these idler wheels 3, depending upon whether a right hand or left hand coil is being formed, as will be referred to again.

The end wall of the casing has an opening and the region of the opening is preferably reinforced as indicated at 6 in Figure 1, to form a base upon which the adjustable holder for the final drawing die is mounted. Resting against this base is a wedge-shaped block 7 which is attached to the base by means of a pair of locking bolts 9 which lie in the radially aligned slots in the block. Attached to the outer face of the block 7 is a plate 8 which is attached thereto by means of bolts 8' which pass through elongated slots in the plate 8. As is clear from Figure 5, by means of this construction the plate 8 may be adjusted vertically within limits above the face of the block 7. The plate 8, as is clearly shown in Figures 4 and 6, is provided with a passage aligned with the passage in the housing 5 and the block 7, which is spherical in form to provide a seat for the die block holder 10 which is complementarily shaped so as to rest in this seat. The holder 10 is attached to the plate 8 by four screws 12 and cooperating washers 11, so that it may be locked to the plate 8 with its longitudinal axis at any desired angle with respect to the plane

of the plate 8. This holder 10 in actual use is only subjected to slight angular adjustments in order to properly align the die 13 which is mounted and locked therein by means of a tubular locking bushing 14. The die 13, of course, has a passage through it in accordance with usual practice, of a diameter such that when the wire is forcibly drawn therethrough it will be drawn out into a wire of finer gauge, which, of course, will be the final wire size.

The wire W then passes to the coiler block which is power driven and provided with mechanism for causing it to rotate either in the right hand direction or the left hand direction, that is clockwise or counterclockwise, as viewed in plane (Figure 2). The coiler block consists of a truncated conical tubular element 15 which is provided with an internal re-entrant hub 16 by means of which it is locked on a power driven shaft 17. Bolted to the lower end of the tubular element 15 is a skirt 18 having a conical main body. The coiler block, comprising the members 15 and 18 as herein disclosed, is shown in the form commonly used in this art. The flanged terminal end of the skirt 18 is inclined at a slight angle radially, as clearly shown in Figures 1 and 3, and the wire is delivered to the coiler block where this flange portion joins with the main body portion. Thus, in accordance with the usual practice each succeeding coil is delivered into the resulting fillet of annular form, and pushes the preceding coil upwardly, the block being slightly tapered, as shown, so that its upward movement loosens the succeeding coils as they are formed and travel upwardly.

The shaft 17 is journaled in bearings 19 mounted in a suitably shaped supporting member 25'. The lower end of shaft 17 is provided with a bevel gear 29 which meshes with a pair of companion bevel gears 21 and 22. The gears 21 and 22 are freely rotatable in the bearings 23 and on the shaft 28 which passes through them and is journaled at one end, as shown, in the bearing 29. Splined on the shaft 28 in the space between the gears 21 and 22 is a clutch sleeve 25 provided with clutch teeth on its ends to cooperate with similar clutching teeth on the adjacent faces of these gears, as clearly shown in Figure 3. Pins on the ends of the arms of yoke 26 engage in an annular groove on the surface of the clutch sleeve 25. The yoke 26 is mounted on a shaft 27 which extends exteriorly of the housing 5' in which this mechanism is mounted, and has attached to its extending end a hand operating lever 31. A spring pressed latch 32 mounted on this lever cooperates with the casing to lock the lever in central position or either one of its two other positions on opposite sides of central position. The projecting end of shaft 28 is provided with a change gear 30 adapted to mesh with other change gears, not shown, through which the driving power for the coiler is provided.

In the operation of this machine, assuming that shafts 2 and 28 are rotating, the wire passes from the capstan 61, which pulls it from the preceding die to and through the final die 13 and around the coiler block which is revolving. Assuming that lever 31 has been turned to proper position, clutch sleeve 25 will connect the corresponding one of the pair of gears 21 and 22 to the shaft 28, with the result that the block will revolve through power applied by the gear 20. Assuming that a right hand coil is being formed, as indicated in Figure 2, the coiler block will be revolving in a clockwise direction and the wire after leaving the capstan wheel 1 will engage the uppermost (Figure 2) of the two idler wheels 3 so that it can be deflected to the upper side of the coiler block (Figure 2). If it is desired to prepare a left hand wound coil, the operator removes screws 9 so that the wedge-shaped block 7 may be reversed from the position shown in full lines in Figure 4 to the dotted line position shown in the same figure. It is attached in this position and plate 8 is attached thereto by means of the screws 8'. By the proper adjustments of the block 7 and plate 8, because of the slotted passages for the corresponding locking screws, the die may be properly aligned. In adjusting the apparatus for the formation of either type of coil the die block holder 10 can have its longitudinal axis properly aligned with the path of travel of the wire by loosening and again tightening the screws 12. By reversing the wedge-shaped block 7 the parts will be aligned so that the wire W now engages the lower idler wheel 3 (Figure 2), so as to be delivered to the opposite side of the coiler block. Lever 31 is repositioned so that the clutch sleeve 25 now engages the other of the gears 21 and 22, with the result that the coiler block is caused to revolve in the opposite direction. Thus by those few simple adjustments the machine can be quickly adapted for the formation of either right hand or left hand coils.

For the operation of the machine at different speeds the change gears, including the gear 30, can be properly selected and when coils of different sizes are made coiler blocks of proper diameter can be mounted on the shaft 17. Thus the machine is universal in its application to the formation not only of coils of different wind, but of different sizes.

In Figures 7 and 8 is shown a modified arrangement for effecting similar changes by mechanism which makes these changes simpler. In this arrangement the guide wheels 3 are rotatably mounted at one end of a segment shaped plate 40 which is pivotally mounted at 45 on the end wall of the wire drawing machine. The plate 40 is provided with teeth 41 on its segmental edge, which mesh with a worm wheel 42 supported for rotation by means of a hand wheel 43. The opening in the end wall in which the plate 40 is mounted is provided with a curved cover plate 49 having an opening in which the parts may move. Mounted on the plate 40 is a bracket 46 to which the die block holder plate 47 is attached. This plate corresponds to the plate 8 of the previous construction and provides a socket for the holder 48 for the die block, which may be constructed as before. The coiler block and the drive mechanism is similar to that previously described but in the form shown the yoke 26 is directly provided with an extending arm 50 pivotally mounted on the housing so that the yoke can be moved to shift the clutch sleeve 25 directly in a manner similar to that previously described.

As will be apparent from the drawings in view of the previous description, the die block holder can be readily shifted from the position as shown in Figure 7, wherein a right hand coil is shown, to its other position wherein a left hand coil may be formed. With this arrangement the idler guide wheels 3 also shift, although with this modified arrangement they could be mounted on the end wall of the wire drawing machine housing as in the first arrangement described.

From the above description it will be apparent to those skilled in the art that the prin-

ciples of this invention may be modified in other physical forms, and I do not, therefore, desire to be strictly limited to the disclosure which has been presented in an illustrative sense, but rather to the scope of the claims granted me. In this connection it is pointed out that the principles of this invention need not necessarily be applied for use with a wire drawing machine since the apparatus is capable of use with any other machine from which strands are delivered. Likewise, the coiling mechanism may be used alone for coiling purposes, as for example in forming coils from wire mounted on reels or spools.

The principles of this invention are not limited to a structure in which the coiler block is supported from below so as to stand erect, but it may be equally well applied to a machine in which the drive is above so that the coiler block hangs downwardly. Likewise, when desired, the axis of rotation of the coiler block may be arranged horizontally.

What is claimed is:

1. In a machine of the type described the combination including a power driven coiler block, means for causing rotation of the coiler block in either of two directions, a die holder, and means for selectively positioning the die holder for supplying a strand to the coiler block along either of two paths tangential to the coiler block at opposite sides thereof.

2. In a machine of the type described the combination including a power driven coiler block, means for causing rotation of the coiler block in either of two directions, a die and holder therefor, means for positioning the die and holder to supply a strand to the coiler block along either of two paths tangential to the coiler black at opposite sides thereof, and means deflecting the strand from the supply point into either of said paths in advance of said die.

3. In a machine of the type described the combination including a power driven coiler block, means for causing rotation of the coiler block in either of two directions, means for selectively supplying a strand to the coiler block along either of two paths tangential to the coiler block at opposite sides thereof, and means for positioning said means for alignment with either of said paths.

4. In a machine of the type described the combination including a power driven coiler block, means for causing rotation of the coiler block in either of two directions, a die and holder therefor, guiding means for selectively supplying a strand to the coiler block through said die along either of two paths tangential to the coiler block at opposite sides thereof, and means for positioning said die and holder for alignment with either of said paths.

5. In a mechanism of the type described the combination including a rotatable coil forming member, driving means for causing rotation of said member in either of two directions, a die block holder positioned adjacent said coil forming member, means for guiding a strand to and through said die block holder to said member, and means for positioning said die block holder so as to deliver a strand therefrom tangentially to either side of said member.

6. In a mechanism of the type described the combination including a rotatable coil forming member, driving means for causing rotation of said member in either of two directions, a die block holder positioned adjacent said coil forming member, means for guiding a strand to and through said die block holder to said member, and means for positioning said die block holder so as to deliver a strand therefrom tangentially to either side of said member, said die block holder including means for axially aligning it with the axis of the tangential path to said member.

CARL O. BRUESTLE.