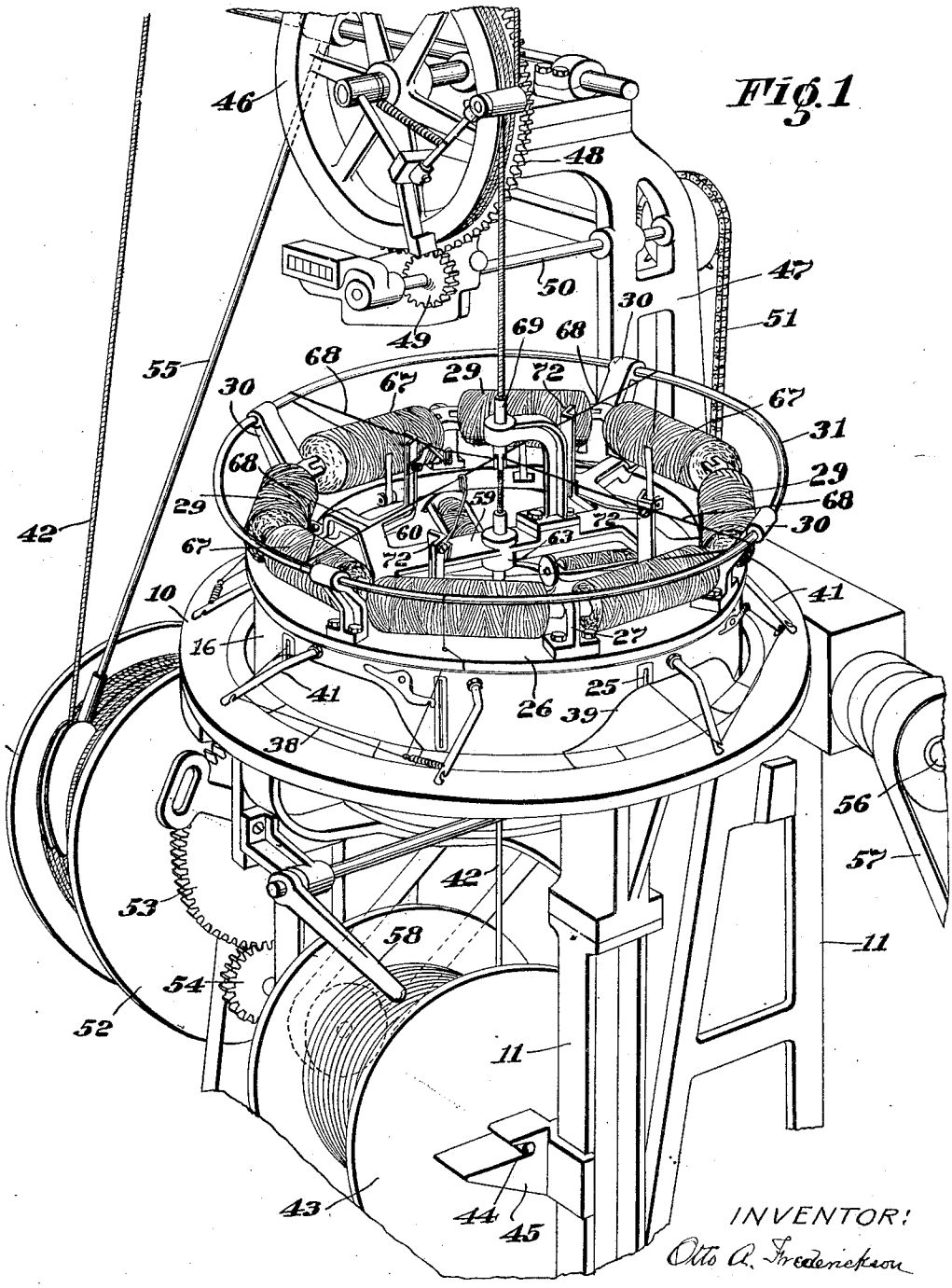
April 9, 1929. O. A. FREDERICKSON 1,708,537

CONDUCTOR COVERING MACHINE

Filed Aug. 20, 1927 4 Sheets-Sheet 1

Fig. 1



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CONDUCTOR COVERING MACHINE

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Fig. 3

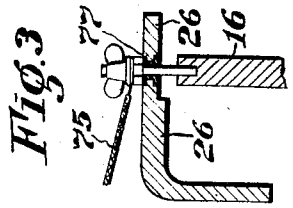
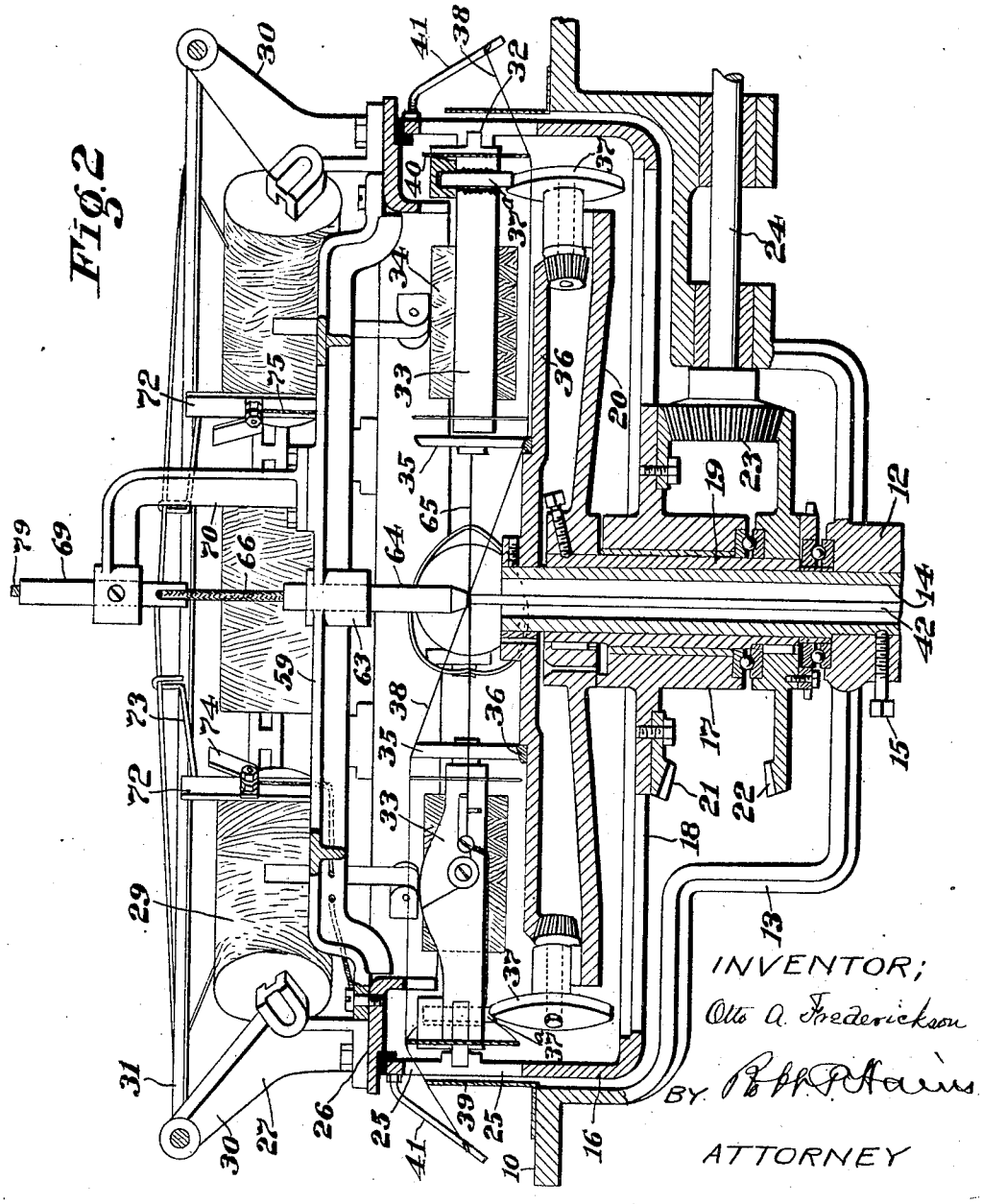


Fig. 2



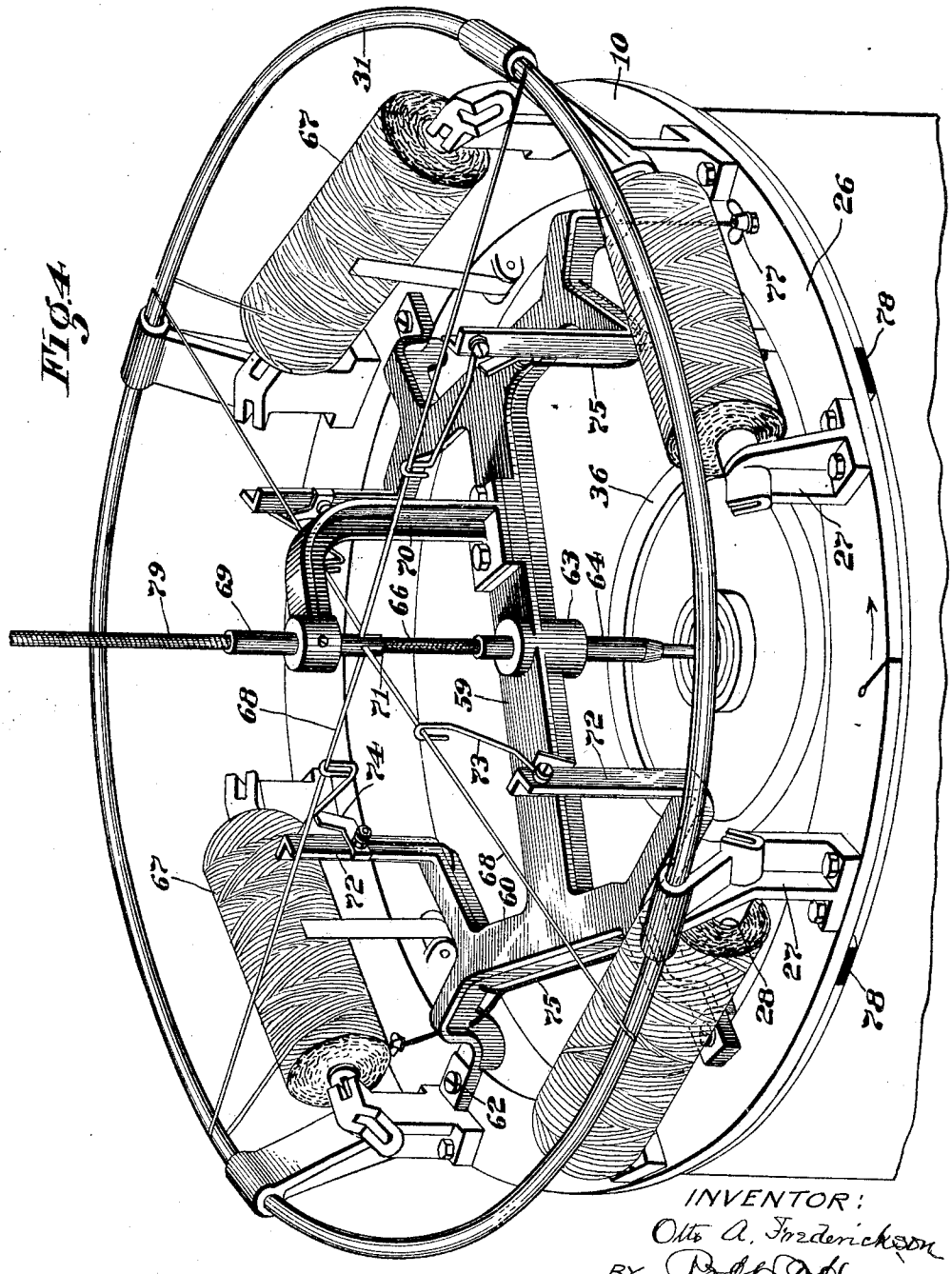
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CONDUCTOR COVERING MACHINE

Filed Aug. 20, 1927 4 Sheets-Sheet 3

Fig. 4.



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CONDUCTOR COVERING MACHINE

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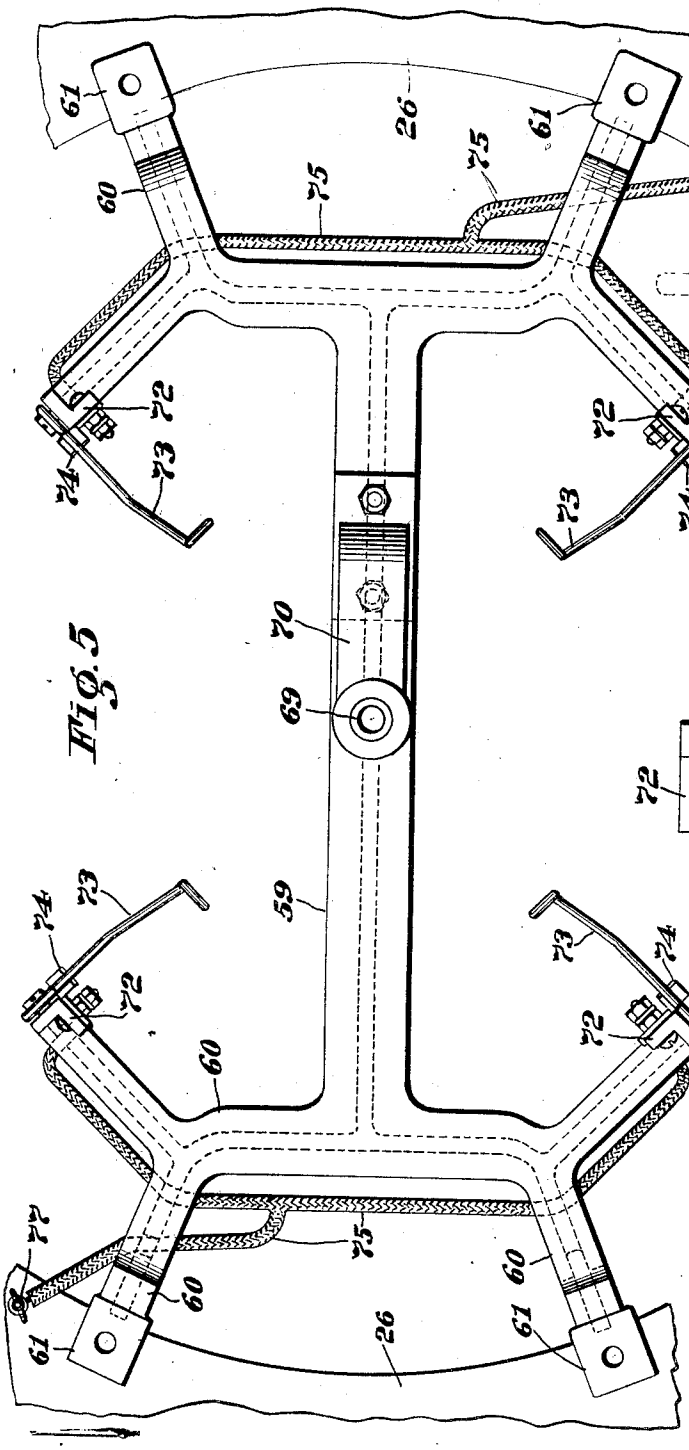


Fig. 5

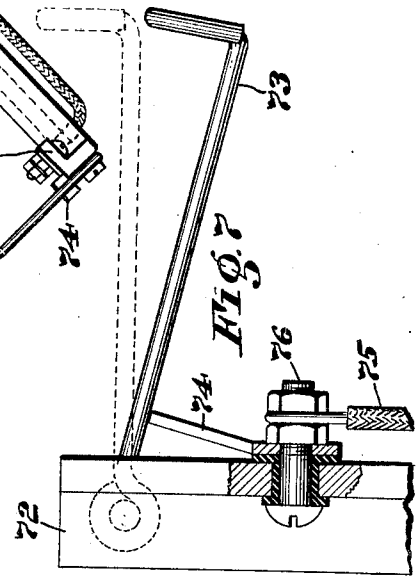


Fig. 7

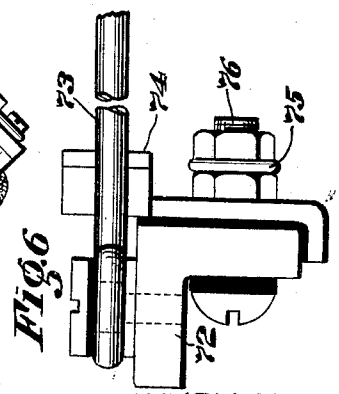


Fig. 6

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Patented Apr. 9, 1929. 1,708,537

UNITED STATES PATENT OFFICE.

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CONDUCTOR-COVERING MACHINE.

Application filed August 20, 1927. Serial No. 214,426.

This invention relates to a machine for placing successive coverings one over the other about an electric conductor, and more particularly to a wrapping attachment for conductor covering machines.

In the manufacture of insulated electric conductors it is frequently desirable to provide the conductor with a protecting covering formed of strands that are braided, woven or otherwise interlocked about the conductor so that the strands will not readily unravel to expose the conductor, and over the interlocked strands may be placed a protecting covering formed by wrapping strands or strips about the first covering.

In the manufacture of insulated electric conductors having the protecting coverings above mentioned, it has been customary heretofore to apply the covering of interlocked strands about the conductor upon one machine, and to apply the covering of wrapping material about the conductor on a separate and independent machine.

In my Patent No. 1,704,888, granted March 12, 1929, however, there is shown, described and claimed a combined braiding and wrapping machine adapted to place a braided covering and a covering of wrapping material simultaneously about a conductor, and the present invention relates to an improved form of wrapping attachment which may be applied to the braiding machine of said patent or to other forms of braiding machines or to different forms of conductor covering machines so that these machines will not only operate to form a covering of interlocked strands, but will serve also to wrap a protecting covering about the covering of interlocked strands.

Another feature of the invention resides in electric stop mechanisms associated with the wrapping attachment and operable to stop the cover forming machine when a wrapping strand breaks or becomes too slack.

The various features of the invention and novel combination of parts will be hereinafter described in connection with the accompanying drawings which illustrate one good practical form thereof.

In the drawings,—

Fig. 1 is a perspective view of a braiding machine provided with the novel wrapping attachment of the present invention;

Fig. 2 on an enlarged scale is a vertical sectional view through the machine of Fig. 1;

Fig. 3 is a detail sectional view of an electrical connection;

Fig. 4 is an enlarged perspective view of the wrapping mechanism shown in Fig. 1;

Fig. 5 is a top plan view of the wrapping attachment;

Fig. 6 is an enlarged plan view of electrical stop mechanism for one of the wrapper-forming strands; and

Fig. 7 is a side view of the same with parts in section.

The wrapping attachment of the present invention may be associated with various forms of machines that are adapted to produce a covering of interlocked strands about the conductor. In the drawings a braider is shown as one form of means for applying such first cover but this is merely illustrative of one application of the invention and it will be understood that the first covering may be braided, woven or otherwise applied, whereupon the second covering is directly applied by the wrapping attachment of the present invention.

The greater portion of the braiding machine shown in the drawings is of well known construction and operates in a well known manner, but is herein shown and described to make clear the manner in which the wrapping attachment of the present invention is associated therewith. The braiding machine illustrated in the drawings is provided with an annular table 10 which is supported the desired distance from the floor by the legs 11. The table 10 has a central hub 12 which is connected to the table by the radially extending arms 13. Within the hub 12 is mounted a fixed hollow shaft 14 which may be rigidly secured within the hub by the bolt 15, and this shaft forms the central axis about which the operating parts of the braiding machine revolve.

Within the annular table 10 is rotatably mounted the outer revolving drum 16 which is provided with the hub portion 17 that is secured to the outer portion of the drum by the horizontally extending spokes 18. The hub 17 is journaled upon a hollow rotating shaft 19 which shaft is journaled upon the fixed shaft 14 and to the upper end of the rotating shaft 19 is rigidly secured the driving frame 20 adapted to drive the inner yarn carriers. A driving gear 21 is secured to the

under face of the flanged portion 18 of the outer revolving drum, and a similar driving gear 22 is rigidly secured to the rotating shaft 19. The outer revolving drum 16 and driving frame 20 are rotated in opposite directions by the pinion 23 which meshes with the upper and lower gears 21 and 22, and this pinion is secured to and is driven by the shaft 24 that is rotatably supported by the frame or table 10.

The outer revolving drum 16 is provided with the usual thread-receiving slots 25 through which the strands of yarn from the outer carriers may pass to the braiding point, and upon the upper end of the outer revolving drum is mounted the top ring 26 which serves to support the outer yarn carriers. In the construction shown these carriers are supported by upstanding brackets 27 which are bolted to the top ring and each of these brackets has a shaft receiving socket adapted to receive a transversely extending shaft 28 upon which is mounted an outer yarn mass 29. The brackets 27 are also provided with upwardly extending arms 30 adapted to support the strand guiding ring 31 about which the strands are drawn as they are unwound from the yarn masses. At the inner face of the outer revolving drum 16 is provided the grooved runway 32 adapted to receive a projection provided at the outer end of each inner yarn carrier 33.

Each inner yarn carrier 33 is shown as having a hollow frame adapted to receive a yarn mass 34 and the inner end of each inner yarn carrier is supported by a rotating disk 35 that rests upon a fixed annular frame 36 which frame is rigidly secured to the upper end of the fixed central post 14. Each inner yarn carrier 33 is provided at its outer end with projecting shoes which extend into the annular groove 32. The inner carriers 33 are driven by the push wheels 37 that are advanced around the central axis of the braiding machine by the driving frame 20 and these push wheels cooperate with the disks 37ª mounted upon the inner carriers.

In the type of braiding machine illustrated the formation of the braid is effected by directing the inner carriers over some strands 38 extending from the outer supply of yarn to the braiding point and under other strands. The passage of the inner carriers 33 over some strands 38 and under others is effected, in the construction shown, by providing the outer frame 10 of the braiding machine with the fixed deflectors 39, and each inner yarn carrier is provided near its outer end with a deflector plate 40 the nose of which is so positioned that it will pass over the strands 38 when the same are held in a stretched condition between the braiding point and the strand guides 41 mounted upon the outer revolving drum 16 as shown. As the outer revolving drum 16 rotates in the direction indicated by the arrows one thread 38 after another will be elevated by the fixed deflectors 39, and as a result the inner yarn carriers 33 will pass under the elevated strands 38 and over those that are not elevated.

The braiding machine illustrated in the drawing is employed to place a covering of braid about an electric conductor 42 which conductor passes upwardly through the hollow fixed shaft 14 from a supply reel 43 which reel is conveniently mounted on a transversely extending shaft 44 the ends of which are journaled in brackets 45 secured to the legs 11 of the braiding machine. The electric conductor 42 is drawn upwardly through the braiding machine by any suitable form of take-up mechanism such as a take-up wheel 46 which is supported above the braiding machine by a column 47, and this wheel may be driven by the co-operating gears 48 and 49 the latter of which is secured to a shaft 50 that is driven by a sprocket chain 51. The covered conductor upon leaving the take-up wheel 46 passes downwardly to the take-up reel 52 which may be driven by the co-operating gears 53 and 54, and the traverse mechanism 55 is provided to coil the covered conductor 42 smoothly about the take-up reel. The various parts of the braiding machine are driven from the power shaft 56 having the driving belt 57, and the driving shaft 56 may be connected to the power shaft 24 by any suitable form of clutch (not shown), but which clutch may be controlled by the hand lever 58.

The braiding machine so far described will operate in a well-known manner to form the covering of braid about the conductor 42 as the latter is fed upwardly through the braiding machine, and as above stated the primary feature of the present invention resides in a wrapping attachment which may be applied to a braider or other form of machine for producing interlocked strands about a conductor, the construction and operation of the wrapping device being such that it will place a covering of wrapping material over the covering formed of interlocked strands. This wrapping attachment, as illustrated in the drawings, consists of a spider frame best shown in Fig. 5 and having a bridge bar 59 near the opposite ends of which are provided the spreading legs 60 at the ends of which are formed feet 61 that are adapted to be secured by bolts 62 to the upper face of the top ring 26, the arrangement being such that this spider frame will rotate with the top ring and yarn carriers mounted thereupon. The bridge bar 59 is provided with a hub 63 in which is mounted the braiding die 64 the lower end of which is positioned to guide the outer

strands of yarn 38 and the inner strands of yarn 65 to the braiding point. It should be noted that as a result of the construction just described the braiding die 64 is rotated with the outer revolving drum instead of being held in a fixed position as is customary in the ordinary braiding machine. In order to form a covering of wrapping material over the braided covering 66, it is merely necessary to support the desired number of yarn masses 67 upon the outer revolving ring 26 so that the rotative movement of this ring will serve to wrap the strands of wrapping material 68 about the covered conductor, as will be apparent from Fig. 4. The strands 68 preferably are led from the yarn masses 67 over the guide ring 31 and then inwardly to the conductor about which they are to be wrapped, and in order to insure the proper disposition of the strands 68 upon the conductor a second guiding die 69 is provided which is supported above and in spaced relation to the die 64 by the upstanding bracket 70. The lower end of the die 69 is preferably provided with the strand receiving slots 71 adapted to receive the strands 68 and guide them about the electric conductor.

The braiding machine illustrated in the drawings is provided with only four outer yarn carriers 29, whereas a sufficient number of upstanding brackets 27 are provided to support eight outer yarn carriers; it is therefore feasible in the braiding construction shown to utilize the brackets 27 to support both the outer yarn carriers 28 and the outer yarn masses of wrapping material 67. It will be apparent, however, that if desired the yarn mass 67 might be supported upon the ring 26 in a position above the outer yarn carriers 28 rather than in the plane of these carriers, as shown.

It is desirable to provide the strands of wrapping material 68 extending inwardly from the supporting ring 31 to the wrapping die 69 with electric stop mechanism which will serve to stop the braiding machine in case these strands break or become too slack. This is accomplished by providing the spider frame 59 with the upstanding arms 72 to which are pivotally secured the drop wires 73, the arrangement being such that as long as the strands 68 are held taut the wires 73 will be supported in the raised position as shown in Fig. 4, but when these strands break or become too slack, the wires will move downwardly until they rest upon the contact fingers 74 which fingers are electrically insulated from the supporting arms 72 upon which they are mounted, as will be apparent from Fig. 7. Each finger 72 is electrically connected, or is grounded to the main frame of the braiding machine by a conductor wire 75 one end of which is attached to the finger supporting bolt 76 and the other end of this wire is attached to a bolt 77 which is insulated from the work supporting ring 26, but is secured to the upper end of the outer revolving drum 16, as will be apparent from Fig. 3. The work supporting ring 26 is insulated from the outer revolving drum which supports it by the insulating blocks 78 and as a result of the electrical connections just described the electric circuit controlled by the drop wires 73 will not be closed to stop the braiding machine until one of the wires 73 is permitted to move downwardly into the position in which it is shown in full lines in Fig. 7 to engage the finger 74 thereupon the current supplied by a wire 75 will flow from a finger 74 through the drop wire 73 resting thereupon and from the latter through the spider frame 59 to the ring 26 from which ring the current may pass through a contact brush, not shown, but which may be similar to the contact brush 86 shown in the O. A. Frederickson Patent No. 1,572,713, dated February 9, 1926, and the current passes from said contact brush to electrically controlled stop mechanism as in said patent.

It will be apparent from the foregoing description, when read in connection with the drawings, that when it is desired to convert a braiding machine of the general type herein described into a combined braiding and wrapping machine, all that is necessary is to provide such braiding machine with the spider frame 59 adapted to support the upper and lower guide dies 69 and 64 and arrange the wrapping strands 68 as shown, so that during the operation of the braiding machine a covering of braid will be placed about the electric conductor 42 at the braiding point defined at the lower end of the die 64, while at the same time the covering of wrapping material 79 will be placed over the braid at a point defined by the lower portion of the guiding die 69.

It will also be apparent that the wrapping attachment of the present invention may be mounted upon other forms of conductor covering machines than braiders so that as an electric conductor is advanced through the covering machine a covering of interlocked strands will be placed about the conductor and a covering of wrapping material will be placed over the covering of interlocked threads.

What is claimed is:—

1. In combination with a machine for forming a covering of interlocked strands about an electric conductor, a wrapping attachment adapted to be mounted upon said machine and rotated thereby to form a second covering upon the conductor, comprising a spider frame having a die supporting bridge bar and projecting feet for supporting the bar, means for wrapping a protect-

ing covering about the conductor over the covering of interlocked strands, and a conductor receiving die supported by the bridge bar and adapted to direct the wrapper forming strands about the conductor into their cover forming position.

2. In combination with a machine for forming a covering of interlocked strands about an electric conductor, a wrapping attachment adapted to be mounted upon said machine and rotated thereby to form a second covering upon the conductor, comprising a spider frame having a bridge bar and projecting feet for supporting the bar, means for wrapping a protecting covering about the conductor over the covering of interlocked strands, and a pair of conductor receiving dies supported by the bridge bar in spaced relation to each other and one die being positioned to guide said interlocking strands about the conductor and the other die being positioned to direct the wrapper forming strands about the conductor.

3. In combination with a machine for forming a covering of interlocked strands about an electric conductor, a wrapping attachment adapted to be mounted upon said machine and rotated thereby to form a second covering upon the conductor, comprising a spider frame having a bridge bar and projecting feet for supporting the bar, means for wrapping a protecting covering about the conductor over the covering of interlocked strands, a conductor receiving die supported by the bridge bar to rotate therewith, and guides upon the spider frame for guiding the strands of the wrapped cover toward the wrapping point.

4. A wrapping attachment for electric conductor covering machines, comprising a frame having a bridge bar and laterally spaced supporting feet at its ends, and a conductor receiving die mounted upon the bridge bar to form a guide for the conductor and constructed to guide the covering forming material onto the conductor.

5. A wrapping attachment for electric conductor covering machines, comprising a frame having a bridge bar and laterally spaced supporting feet at its ends, a pair of conductor receiving dies mounted upon the bridge bar to form guides for the conductor and one die being positioned to guide the material forming one covering onto the conductor and the other guide being positioned to guide the material forming the second covering onto the conductor.

6. A wrapping attachment for electric conduit covering machines, comprising a spider frame, having a die holding portion and supporting feet, a conductor receiving die mounted upon the spider frame to form a guide for the conductor and constructed to guide the cover forming material onto the conductor, and stop means supported by the spider frame and operable to stop the machine if the material being wrapped about the conductor and guided by said die breaks or becomes too slack.

7. A wrapping attachment for electric conductor covering machines, comprising a spider frame having projecting legs for attachment to the covering machine, a guide die mounted upon the frame and adapted to guide strands of wrapping material to the wrapping point upon the electric conductor, uprights on said frame, and drop wires mounted upon the uprights in position to engage the wrapper forming strands.

In testimony whereof, I have signed my name to this specification.

OTTO A. FREDERICKSON.