

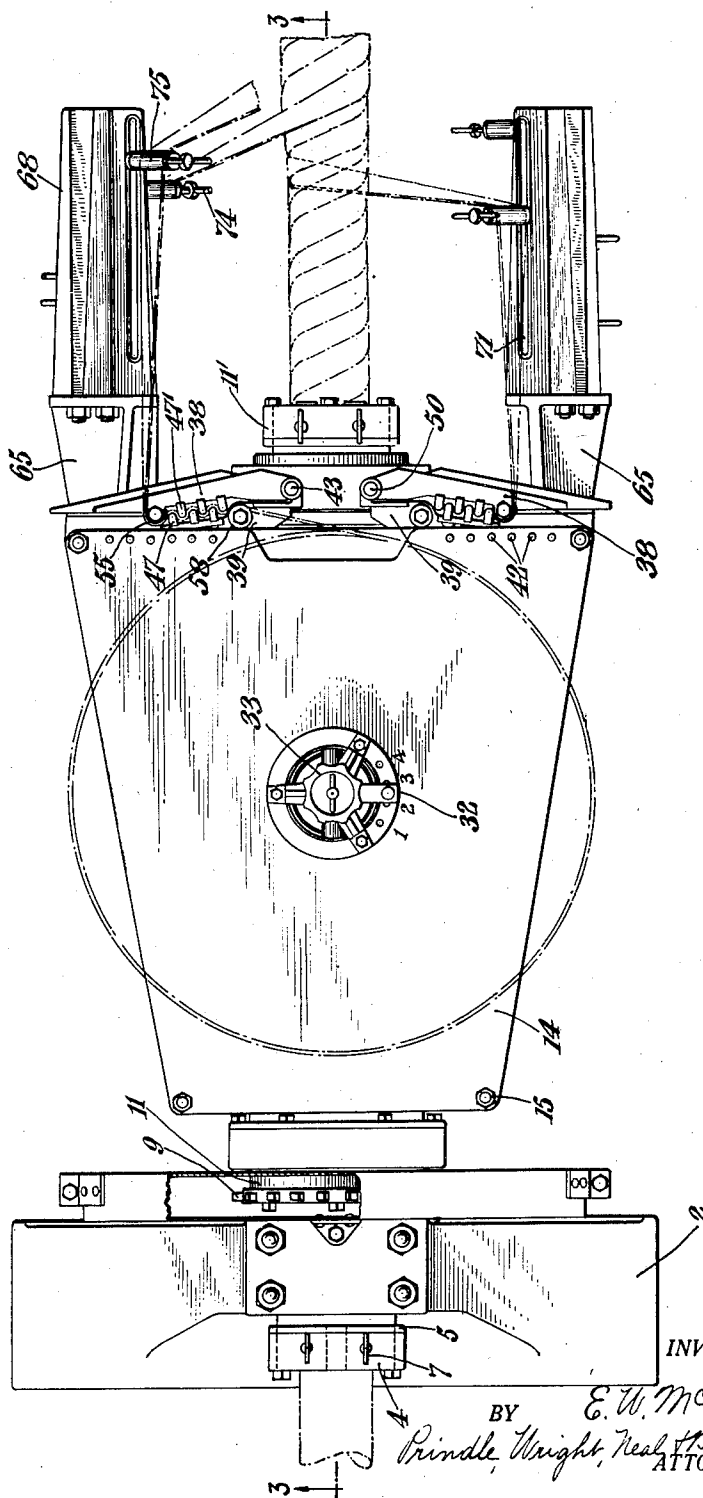
March 31, 1931.

E. W. McKNIGHT
MECHANISM FOR WRAPPING STRIP MATERIAL AROUND
CONDUCTORS, CABLES, CORES, AND THE LIKE
Filed Sept. 1, 1926

1,798,334

5 Sheets-Sheet 1

Fig. 1



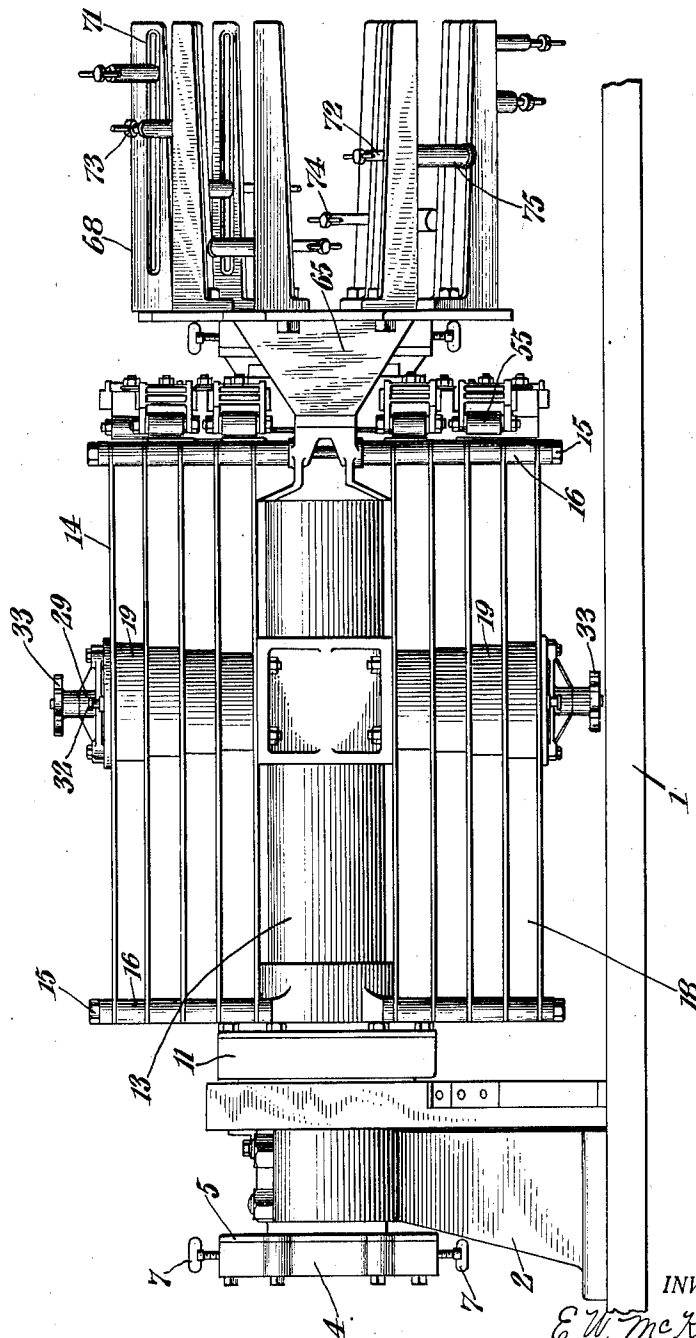
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Fig. 2.



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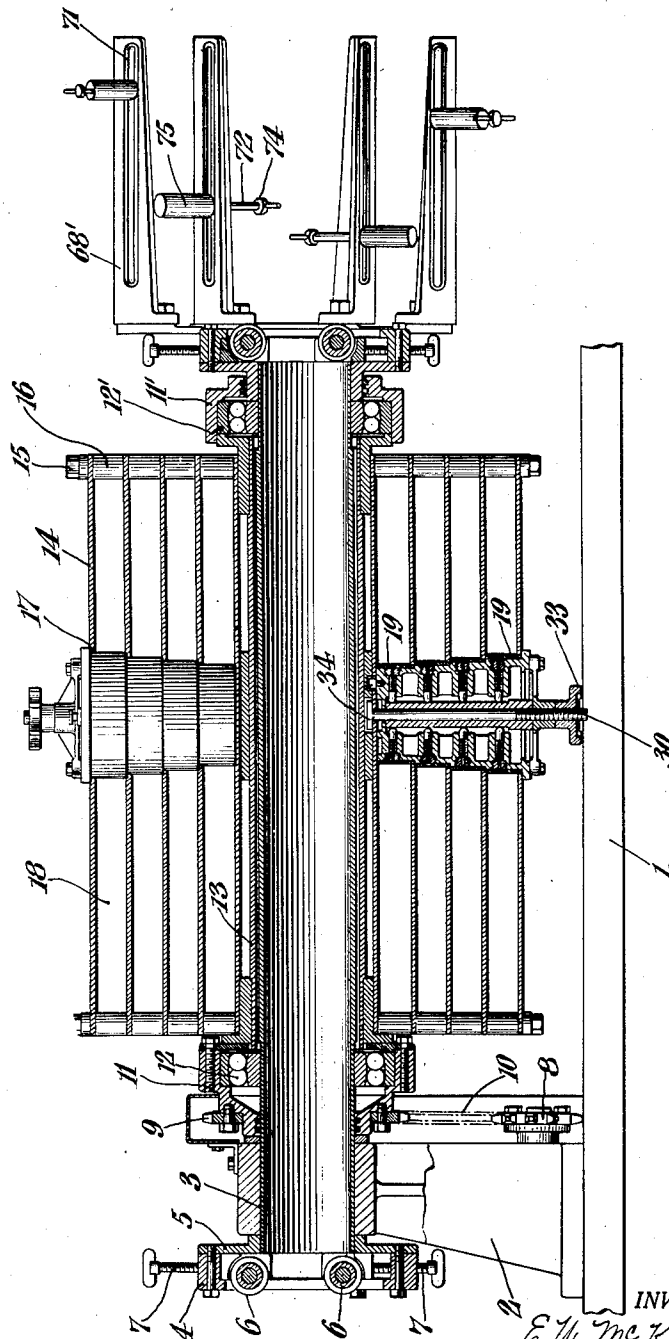
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Fig. 3.



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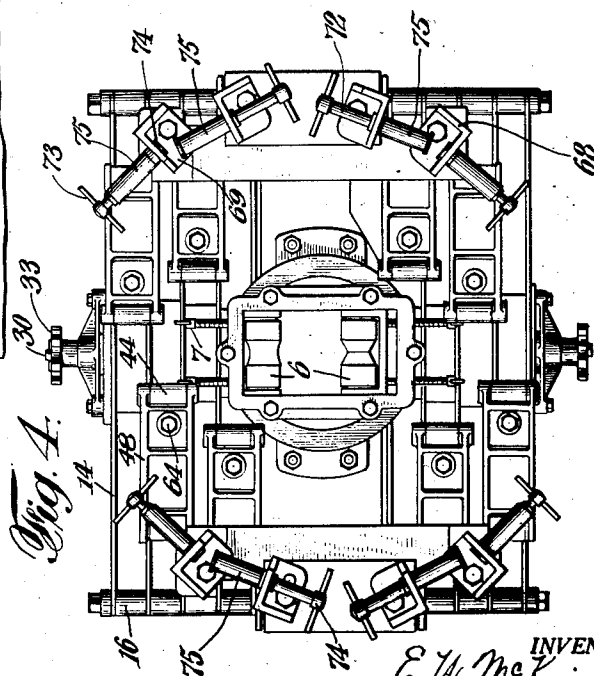
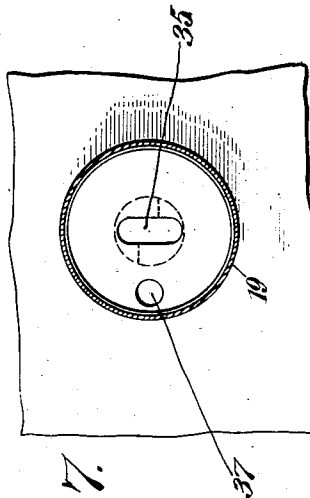
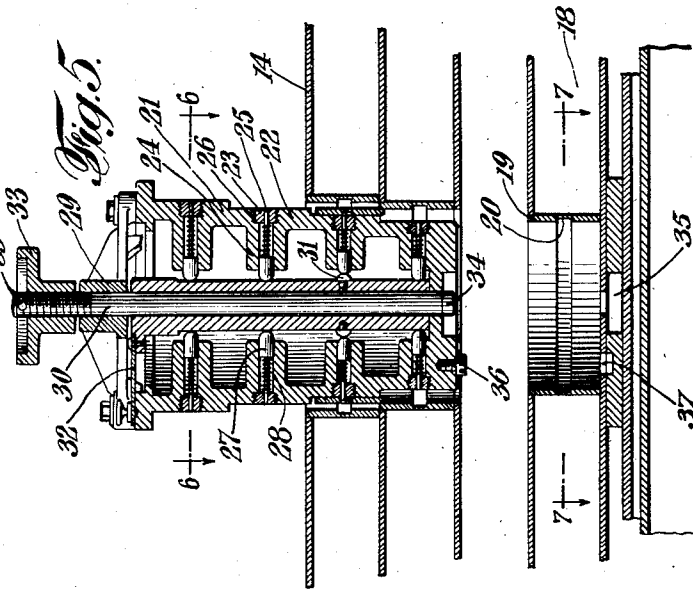
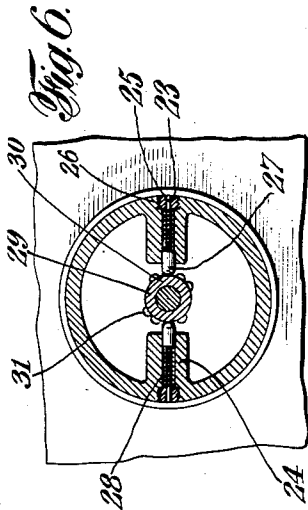


Fig. 7.

Fig. 4.

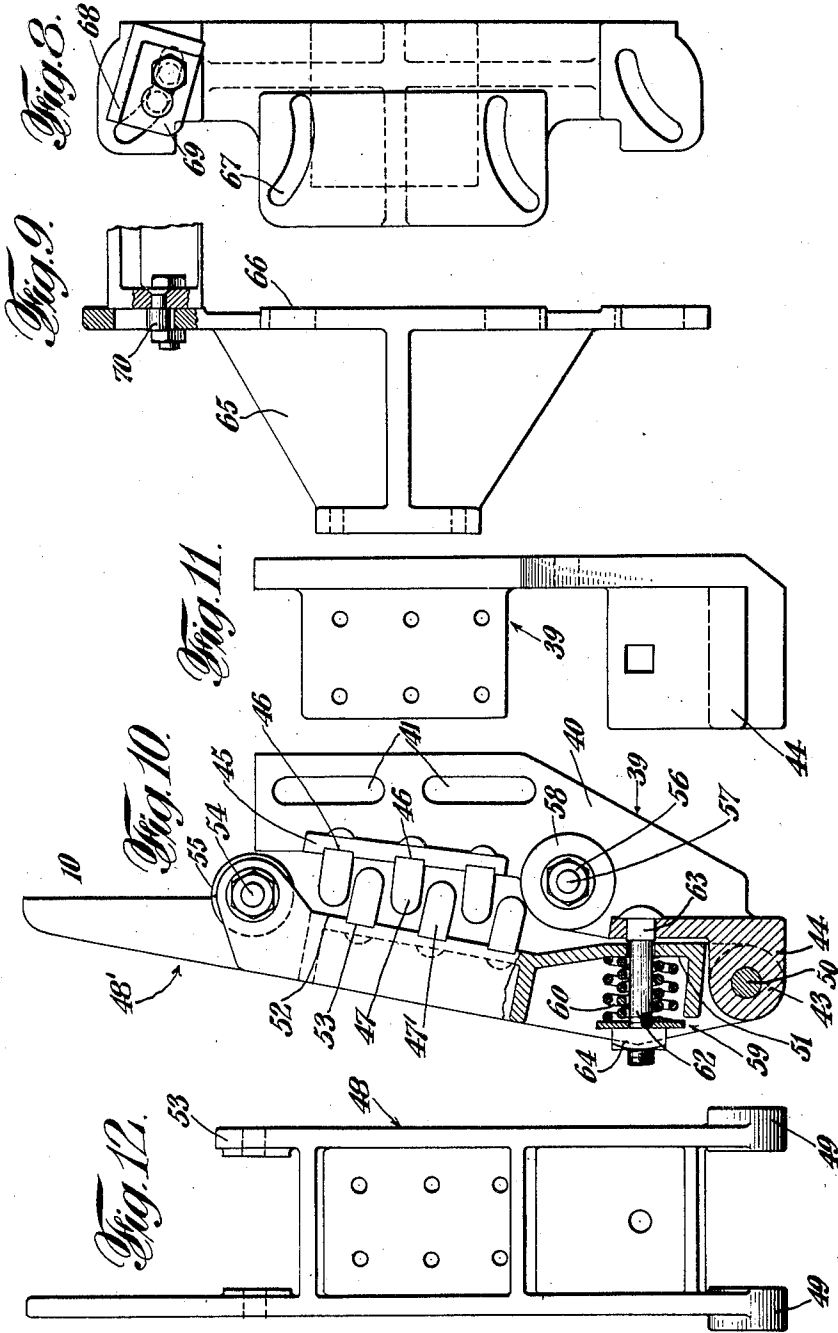
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5 Sheets-Sheet 5



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UNITED STATES PATENT OFFICE

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MECHANISM FOR WRAPPING STRIP MATERIAL AROUND CONDUCTORS, CABLES, CORES, AND THE LIKE

Application filed September 1, 1926. Serial No. 132,960.

This invention relates to improvements in mechanism for wrapping strip material around conductors, cables, cores and the like and more particularly to an apparatus for
5 applying insulation or covering in strip form to a cable or electrical conductor.

One of the objects of this invention is the provision of such a mechanism which accomplishes the following desirable results
10 or advantages: improving the quality of the insulation, high production with a relatively low rotary head speed, a relatively small amount of floor space required due to the compact construction of the machine, and
15 low power consumption.

Another object of the invention is the provision of such a machine in which a plurality of rolls of material may be supported in one rotatable head and in which the application
20 of the material to the core is made in a fixed and predetermined manner whereby most effective insulation or wrapping is accomplished.

A further object of this invention is the provision of such a mechanism of a new and improved construction whereby a plurality of rolls of material may be inserted in each rotary head and located therein and readily removed therefrom, said rolls containing a
25 maximum length of rolled material.

Another object of this invention is the provision of a new and improved machine for providing uniform and regulated tension on the strip material to be applied to the core.

A further object of this invention is the provision of a new arrangement of guiding mechanism whereby the strip material is properly applied to the core, and the structure of the machine is encompassed within a minimum space.
30

Other objects of the invention include improvements in details of construction and operation such as easy access to the core at the point where the strip material is being applied, which is the point of greatest trouble, a new arrangement of mounting the rolls of strip material whereby they are arranged parallel to the axis of the rotary shaft and are rotated as a whole therearound, as well as other matters hereinafter referred to.

To the accomplishment of the foregoing and such other objects as may hereinafter appear, this invention consists in the construction, combination and arrangement of parts hereinafter described and then sought to be
55 defined in the appended claims, reference being had to the accompanying drawings forming a part hereof and which show, merely for the purpose of illustrative disclosure, a preferred embodiment of my invention, it being expressly understood, however, that various changes may be made in practice within the scope of the claims without digressing from my inventive idea.
60

In the drawings—

Figure 1 represents a top plan view of one portion of a machine showing what might be termed one "unit" or "head" and its correlated parts, it being understood that an assembly includes a plurality or a battery of
65 such heads, depending upon the number of wrappings of strip material to be applied to the core, cable or the like.

Figure 2 is a side elevation of the machine structure shown in Figure 1.
70

Figure 3 is a longitudinal cross section taken substantially on line 3—3 of Figure 1, some of the parts, however, being shown in elevation to facilitate the disclosure.

Figure 4 is an end elevation of one of the units or heads looking at the right-hand end of Figure 1 of the drawing.
75

Figure 5 is a vertical cross section, taken on an enlarged scale, of the mechanism for securing the rolls of strip material in position and permitting the insertion of other rolls of strip material.
80

Figure 6 is a horizontal cross section taken substantially on line 6—6 of Figure 5.

Figure 7 is a horizontal cross section taken
85 substantially on line 7—7 of Figure 5.

Figure 8 is a front elevation of one of the brackets for supporting the guiding means.

Figure 9 is a side elevation of the same, part being broken away and in section to facilitate the disclosure.
90

Figure 10 is an elevation of the tension device, the parts being in operative position, part being broken away and in section to facilitate the disclosure.
100

Figure 11 is a view of the bottom or rear face of one member of the tension device.

Figure 12 is a view of the outer face of the other member of the tension device.

5 In the manufacture of insulated electric cable it is necessary to wrap the cable conductor concentrically with many layers of insulating tape and this wrapping should be applied with great exactness and precision.
10 This is particularly true of the modern high voltage or high tension cable. The machines heretofore available for this purpose have had certain difficulties in that they lack precision and are relatively inconvenient. Furthermore they cannot apply every form of
15 wrapping that might be desired. These older machines are disadvantageous in the manufacture of the modern type of high voltage or high tension cable in which no wrinkling of the insulation is tolerated. A necessary requirement of this type of cable is that the strips of insulation as they are wound on the cable should never overlap; that is the pitch
20 of the winding must not be less than the width of the strip, nor should it be appreciably greater. In other words, the winding should be perfect.

This invention relates to a machine for wrapping the strip or tape on the conductor
30 which machine has not the faults of the previous machines and will produce better cable at less expense than those machines. It consists essentially of a number of units or what may be termed "heads". Each unit is rotated
35 above a bed frame from a common drive shaft so that the speed of rotation is the same and each head supports a plurality of rolls of strip material whereby a plurality of wrappings is applied to the core by each head.
40 This strip material may be paper tape or other insulation or may be wholly or in part metallic or in fact of any material suitable for the purpose for which the core is being covered.

45 Referring first to Figures 1, 2 and 3, the numeral 1 designates the base of the frame of the machine having a suitable support or standard 2 in which is mounted a sleeve or conduit 3. On each end of this sleeve or conduit 3 is provided a guiding means 4 which
50 consists of a frame 5 having a pair of rolls 6 slidably mounted therein and adjustable by means of the screws 7. These rolls are for the purpose of engaging and supporting and
55 guiding the core or conductor which passes through the machine particularly where the strip material is applied. It is understood that these core rolls themselves rotate but the frame remains stationary as it is secured to the stationary sleeve or conduit 3. It is to be noted that the core rolls and frame may be adjusted on conduit 3 to any desired angle.
60 Each sleeve or conduit 3 is of sufficient length to pass entirely through each head or unit and

each sleeve or conduit forms the supporting means therefor.

Referring to the left in Figure 3, the numeral 8 designates an idler sprocket, 9 being the sprocket driven by means of the chain 10. This sprocket 9 is secured to a flanged cap member 11 which has a ball or roller bearing 12 interposed between it and the stationary sleeve or conduit 3. The rotatable sleeve or hollow shaft 13 is suitably secured to rotate with said flanged cap member 11. This description refers to the construction shown to the left in Figure 3 and it is duplicated on the right of the same figure, 11' designating the flanged cap member and 12' the ball or roller bearing member.

A plurality of plates 14 are suitably supported in spaced relation from the rotatable hollow shaft 13, this being accomplished by means of bolts 15 and spacing sleeve 16. These plates are preferably of trapezoidal shape (see particularly Figure 1) and each plate is formed with an opening 17 there-through at or about its center, the opening in the outer plate being the largest and the openings in the intermediate and innermost plates decreasing in diameter in order. See Figure 3 particularly. These plates are arranged in sets on the opposite sides of the hollow shaft 13 and while the drawings disclose two sets of such plates, it is to be understood that it is possible to use other sets of the plates on the same heads. Furthermore, these heads are illustrated with five plates to each set, leaving four spaces in each set, but it is to be understood that this number may be varied either by increasing or decreasing the same. These spaces 18 between the plates are for the purpose of receiving the rolls of strip material. This strip material is furnished with a hub opening of suitable width and in this hub opening is a core or hub of paper or other suitable material, as is well understood in this art. Positioned in each opening 17 (see particularly Figures 3 and 5) is a sleeve or ring 19 which is provided with a groove 20 on its inner surface. It is understood that these sleeves 19 would be of progressively increasing diameter from the inner space 18 outwardly. These sleeves 19 are adapted to fit within the hub or core of the roll of strip material above referred to and thereby hold the roll of material in proper position in the space between the plate members 14. When the machine is in operation these sleeve members 19 are held in proper position by means of the locking core member 21 (see particularly Figure 5). This core member 21 is in the form of a cylinder provided on its outside with a series of stepped annular surfaces 22 corresponding in diameter to the internal diameter of the sleeves or rings 19, there being one surface 22 for each sleeve 19 and, therefore, the smaller annular surface 22 is at the inner end

of the core 21 and the larger annular surface 22 is at the outer end of the core member 21, the surfaces therebetween being of increasing diameter. A pin 23 is movably positioned in a socket 24 and adapted to slidably move through an aperture 25 in the end of the screw-threaded plug 26 which is screw-threaded into the annular surface 22. The inner end of this pin is provided with a head member 27. Each pin member also has a spring 28 positioned thereon between the head member 27 and the inner surface of the screw plug member 26 so that the pin is normally in a position withdrawn from the surfaces 22. It is to be understood that a plurality of these pin constructions are provided for each of the annular surfaces 22. These pins are adapted to be projected when desired so as to engage in the annular groove 20 formed on the inner surface of the sleeve 19 and the projection of these pins is selective according to the desire of the operator. This selection is accomplished by means of the elongated sleeve 29 which extends into the core member 21 for its full length and is rotatably mounted on the locking bolt 30, this locking bolt 30 being rotatable and slidable for a slight distance within the sleeve 29. On the outside of the sleeve 29 are provided a plurality of headed screws or buttons or the like 31, a set of such devices being provided for each set of pins. These are arranged at different positions around the circumference of the sleeve 29 (see particularly Figure 6) and the position of the sleeve 29 relative to the core 21 is adjusted by means of a suitable hand or indicator 32. It is seen, therefore, that when this hand or indicator 32 is turned (see Figures 1 and 5) the sleeve 29 will be turned and the buttons 31 of one set will engage the head ends of the pin members 23 corresponding thereto and force the pin members out into engagement with the groove 20 in the sleeve or ring 19. The locking nut 33 is unscrewed until it engages the cross pin 33' and the locking bolt 30 is unlocked. This locking bolt may then be raised and with it the entire core, as well as the sleeve or ring 19 which has been engaged by the pin members as shown in Figure 5 where the second sleeve or ring from the bottom has been raised. This will permit the insertion of a new roll of strip material. The parts are then pushed down into their normal position so that the parts will assume the position shown in section in Figure 3. The end of the locking bolt 30 is provided with a bayonet or T-head 34 which is adapted to engage bayonet slot 35 in the bottom of the structure and the independent movement of the locking bolt 30 within the sleeve 29 is sufficient to permit the locking or unlocking of the bayonet and slot construction, as is well understood. Furthermore, a headed bolt 36 is provided on the bottom of the core 21 which is adapted

to rest in socket 37 formed in the lowermost plate 14 and adjacent part so that the core may always be properly centered and positioned within the head. Of course, it is understood that this construction is duplicated in connection with each set of plates of each head.

Particular attention is directed to the construction just described whereby the rolls of strip material are supported in the head, held and locked in position and whereby any one roll may be selectively released for replacement without the necessity of disturbing or interfering with the other rolls of material in any part of the head or unit. In other words, a roll may be removed or a new roll may be inserted in any of the spaces or compartments in the head without disturbing the other rolls and without any effect upon them at all, and furthermore, the construction whereby this is accomplished is of the utmost simplicity so that the operation of removing a roll or inserting a new roll may be accomplished in a minimum amount of time and in a very easy manner. In addition, it is to be noted that the rolls of material are supported in planes parallel to the axis of the shaft of the machine, one above the other, whereby a plurality of these rolls are mounted and supported within the length of machine necessary to take care of one of said rolls only. In other words, the size or diameter of a roll of material requires a head or unit of a certain length (see Figure 1) but once this length is determined a plurality of the same size of roll may be utilized in the same head or unit without the necessity of increasing the length of the unit. This is a very decided factor in limiting the length of the machine as a whole and results in decided economy in factory space and, furthermore, in a more readily observed and operated machine. Furthermore, the arrangement of the rolls parallel to the axis of the shaft and rotating them bodily around the shaft permits the use of rolls of much greater dimensions than heretofore in use for the reason that the diameter or width of the roll as a whole is arranged in the plane of the length of the machines and these rolls are rotated bodily around the central shaft.

In connection with each head it is also necessary to provide suitable tension devices for the strips of material and suitable guiding means for each strip of material whereby the material is properly applied with precision on the core, cable or the like. The tension means will be described, it being understood that one of such means is provided for each roll of strip material. One of such means is designated generally by the reference character 38 in Figure 1 and is shown in detail in Figure 10. Each of said means includes a base member 39 provided with a flange 40 having a pair of slots 41 whereby

it may be adjustably secured between the plate members 14 by means of bolts 42. This base member is provided at one end with a bored projection 43 and has a flat bearing flange 44 located adjacent thereto. At its other end this base member is provided with a supporting surface or area 45 having a plurality of grooves 46, each adapted to receive an elongated bearing member 47 which has its upper surface preferably rounded as shown. The other part of the tension device includes an elongated member 48 having a pair of spaced ears 49 on one end which are bored and adapted to fit over the bored projection 43 and to be pivotally secured thereto by means of bolt 50. This member 48 is provided with a substantially flat bearing surface 51 on one face and on its other face has a substantially flat surface or area 52, this latter face or area being provided with grooves 53, each to receive one of the bearing members 47'. These bearing members 47' are arranged in alternation and are adapted to register with the spaces between the bearing members 47 in the member 39 of the tension device. The opposite end of the member 48 is provided with spaced members 53 bored to receive a shaft or bolt 54 on which is rotatably mounted roller member 55. The base member 39 is likewise bored as at 56 to receive the supporting bolt 57 on which is rotatably mounted tension roller 58. As seen from Figure 10 in the drawing, the roller 58 is positioned at one end of the tension device and roller 55 at the other, the former being the end which receives the strip material from the head and the latter being the roll over which the strip passes on its way to the guiding means to be presently described. In its movement from one roller 58 to the other one 55 the tape moves in a serpentine path over the bearing faces of the bearing members 47 and 47'. The two members 39 and 48 of the tension device are resiliently held together by the spring construction 59, this being in the form of a relatively small coil spring 60 and a larger coil spring 61 mounted around the stem of a bolt 62, the head of which 63 engages the bearing surface 44 of the base member 39. One end of the spring construction bears against the bearing surface 51 of member 48 and the other end bears against the nut 64 of the bolt 62. By tightening and loosening the nut 64 the tension on the spring member is varied and the relative position between the bearing members of the tension device is varied, as is well understood. The tape leaving the tension pulls against roller 55 and compresses the springs tending to reduce the friction between the tape and the bearing faces, by straightening the serpentine path of the tape. The pull on the tape and the force compressing the spring must always be equal and in equilibrium. The nut 64 may be calibrated or

suitable calibration may be used in connection therewith whereby the adjustment may be calculated beforehand and proper tension may be accomplished with facility.

As stated above, the strip of material is fed from the roll over the roller 58 to the bearing members 47 and 47' and over the roller 55 to a guiding means (see Figure 1). This tension device provides the proper tension whereby the strip material is wound upon the core, cable and the like under proper tension. The guiding means is suitably supported on the end of each head or unit by means of a bracket member 65, this bracket member being provided with a base or supporting portion 66 and this base or supporting portion has a plurality of curved slots 67 therein corresponding in number to one set of rolls supported by each head or unit, and these slots are preferably arranged two above the center line of the head and two below the center line of the head. The angle member 68 having end flange 69 bored to receive the bolt 70 is provided to be adjustably held in position due to the engagement of the bolt 70 with this curved slot 67. Each angle member 68 is provided on one of its angles with the elongated slot 71 and this elongated slot is adapted to receive the threaded end 72 of a bolt 73 which is adjustably held in said slot by means of a suitable nut 74. The bolt 73 is provided with a rotatable sleeve or spool 75 which forms the actual guiding means for the strip of material. It is to be understood that after the material leaves the tension device (see Figure 1) it passes over the guiding device proper 75 and is given a slight twist sufficient to enable it to be properly wrapped about the cable. Due to the construction of the guiding means, that is the curved slot 67 and the elongated slot 71, it is seen that all necessary angular adjustment, as well as all necessary linear adjustment, may be readily accomplished. These parts, of course, all rotate with the head and the rotary movement thereof about the core or cable, while the core or cable is being drawn through the machine by means common in the art, results in the application of the strip material to the core or cable in the proper manner.

The preferable arrangement of the guiding rollers in reference to the rolls of strip material is to place the guide roller which receives material from the outermost roll in the outermost position away from the face of the head and arrange the guide rollers which receive the strip material from the innermost rolls nearest the head. It is understood, however, that these guide rollers are arranged in alternation so that the strips of material are applied to the core one after or one on top of the other. Furthermore, they are arranged so that there is no registering of the lines between the convolutions of

the various layers of the strip material. This, of course, is accomplished by the linear adjustment of the guiding means.

In the use of this combination of guiding means and tension means the strip material is to be turned or twisted through a curve of about 90° but this is accomplished so gradually between the point of departure from the tension means to the point of application to the core that breakage of the strip material is eliminated and the amount of this twist may be readily controlled by the angular adjustment of the guiding means. This construction and arrangement also result in all of the strip material from the various rolls receiving substantially the same amount of twist or turn per unit of length as the strip which has the greatest turn has the greatest length between its point of departure from the tension means and the point of application to the core.

The tension means itself is simply and readily adjustable and very effective in providing the requisite tension without permitting breakage of the strip. It is readily accessible when necessary to thread the strip through the same and may be quickly and readily opened merely by pushing on the extreme end 48' of the member 48. When this is released the parts assume their normal position under the requisite tension and proper application of the strip is provided. The construction of the head itself provides for maximum capacity of strip material in units of maximum length. In other words, a relatively large number of rolls of strip material of maximum dimension particularly as far as length is concerned may be carried by these heads. The rolls are mounted in means arranged in sets so that the head is balanced and so that two rolls or multiples thereof may be used in each head, according to results desired. That is, of course, where the head is constructed as shown in the drawings, but additional sets may be provided on each head and the basic number of multiples may vary accordingly. These rolls are arranged with their axes at right angles to the axis of the rotary shaft. Or to express it another way, the rolls are positioned in their head flat or on their edge so that a diameter through the roll taken longitudinally of the head is parallel to the axis of the rotary shaft. In view of the fact that the rolls are carried in the head on their edges, a number of these rolls may be arranged one above the other without increasing the linear dimensions of the machine to any great extent, the only increase necessary being to provide room for the guiding means to give the necessary twist. This results in maximum compactness of machine construction for quantity of strip material carried.

Furthermore, in connection with each head is provided the locking and releasing mechanism which provides selective release of any

roll of strip material for replenishment or other purpose. The use of the large rolls results in a minimum number of splices due to the fact that, except in case of breakage, the splice is only necessary when the strip material from a roll is exhausted. This also results in a reduction in the number of stoppages necessary in machine operation, the larger quantity of strip material carried on the rolls giving this advantage. These factors are all very material from the standpoint of efficient factory practice. Furthermore, due to these factors the machine may be operated at a slower speed which results in a reduction in strip breakages.

These results may be summarized by stating that a machine embodying this invention will give greater production at a decreased speed with a material reduction in the necessary splices. Supervision is less difficult and much more efficient because as the machine is relatively short, all parts of it are visible from any one point and may be quickly reached for the purpose of shutting off in case of a defect occurring which might injure the wrapped core; the factory space required is much less and the number of times the core must be passed through the machine to receive the requisite number of layers is much less. This results in a much lower cost and a more homogeneous structure of layers.

This machine is readily adaptable to an automatic stop and a signal. Due to its construction and relatively slow speed and anti-friction bearing structure, the moment of inertia of the machine is low so that an automatic stop construction will function advantageously. While each head carries a substantial weight of strip material, this weight is arranged close to the axis of rotation so that there is a relatively low moment of inertia to be overcome in starting and accelerating the machine.

What I claim is:—

1. In combination in a machine of the character described, a rotatable head constructed to receive on opposite sides of its axis of rotation a plurality of rolls of strip material with the axes of said rolls arranged at right angles to the axis of rotation of the head, the rolls on each side of said head being parallel, adjacent, and in edge to edge relation, and means for holding said rolls in said head in said position.

2. In combination in a machine of the character described, a rotatable head constructed to receive on opposite sides of its axis of rotation a plurality of rolls of strip material with the axes of said rolls arranged at right angles to the axis of rotation of the head, the rolls on each side of said head being parallel, adjacent, and in edge to edge relation, and means for holding said rolls in said head in said position, and means for applying tension to said strip material after

it leaves said rolls, and guiding means for turning said strip material so that it may be applied to a moving core helically.

3. In combination in a machine of the character described, a rotatable head provided with means for receiving and holding on opposite sides of its axis of rotation a plurality of rolls of strip material with the axes of said rolls at right angles to the axis of rotation of the head, the rolls on each side of said head being parallel, adjacent, and in edge to edge relation.

4. In combination in a machine of the character described, a rotatable head provided with means for receiving and holding on opposite sides of its axis of rotation, a plurality of rolls of strip material with the axes of said rolls at right angles to the axis of rotation of the head, the rolls on each side of said head being parallel, adjacent, and in edge to edge relation, said holding means including selective means for releasing any desired roll without releasing any other roll.

5. In combination in a machine of the character described, a rotatable head having means for holding a plurality of rolls of strip material in sets on opposite sides thereof, each of said sets being composed of a plurality of rolls arranged one above the another, said head also having tension means for the material from each roll, and guiding means for the material from each roll, said guiding means being adapted to turn the material and guide and position the material so that it may be applied to a moving core helically in the form of non-registering layers.

6. In combination in a machine of the character described, a rotatable head having means to receive a plurality of rolls of strip material on opposite sides of its axis of rotation, means for holding said rolls in said head in parallel and edge to edge relation to each other with the axes of said rolls at right angles to the axis of rotation of the head, said head also having a tension member for each roll adapted to receive the strip after it leaves the roll and a guide member for each roll adapted to receive the strip after it leaves the tension member.

7. In combination in a machine of the character described, a rotatable head having means to receive a plurality of rolls of strip material on opposite sides of its axis of rotation, means for holding said rolls in said head in parallel and edge to edge relation to each other with the axes of said rolls at right angles to the axis of rotation of the head, said head also having a tension member for each roll adapted to receive the strip after it leaves the roll and a guide member for each roll adapted to receive the strip after it leaves the tension member, said guide member being adjustable to position the strip longitudinally of the machine.

8. In combination in a machine of the character described, a rotatable head having means to receive a plurality of rolls of strip material, means for holding said rolls in said head with the axes of said rolls at right angles to the axis of rotation of the head, said head also having a tension member for each roll adapted to receive the strip after it leaves the roll and a guide member for each roll adapted to receive the strip after it leaves the tension member, said guide members being adjustable angularly with reference to said head, whereby all of the strip material from the separate rolls receives substantially the same amount of twist or turn per unit of length between the point of departure from the tension means and the point of application to the core.

9. In combination in a machine of the character described, a rotatable head having means to receive a plurality of rolls of strip material, means for holding said rolls in said head with the axes of said rolls at right angles to the axis of rotation of the head, said head also having a tension member for each roll and a guide member for each roll adapted to receive the strip after it leaves the tension member, said guide members being adjustable longitudinally and angularly with reference to said head, whereby all of the strip material from the separate rolls receives substantially the same amount of twist or turn per unit of length between the point of departure from the tension means and the point of application to the core.

10. In combination in a machine of the character described, a rotatable head having means to receive a plurality of rolls of strip material on opposite sides of its axis of rotation, means for holding said rolls in said head in parallel and edge to edge relation to each other with the axes of said rolls at right angles to the axis of rotation of the head, said head also having a tension member for each roll and a guide member for each roll adapted to receive the strip after it leaves the tension member, said guide members being arranged out of alignment so that the strips may be applied to a moving core as a plurality of non-registering layers.

11. In combination in a machine of the character described, a rotatable head having means to receive a plurality of rolls of strip material on opposite sides of its axis of rotation, means for holding said rolls in said head in parallel and edge to edge relation to each other with the axes of said rolls at right angles to the axis of rotation of the head, said head also having a tension member for each roll and a guide member for each roll adapted to receive the strip after it leaves the tension member, said tension member being adjustable to regulate the tension of the strip passing therethrough.

12. In combination in a machine of the

character described, a rotatable head having means to receive a plurality of rolls of strip material, means for holding said rolls in said head with the axes of said rolls at right angles to the axis of rotation of the head, said head also having a tension member for each roll and a guide member for each roll adapted to receive the strip after it leaves the tension member, said tension member being adjustable to regulate the tension of the strip passing therethrough, and including two members pivotally connected together and held from each other with regulable resilient pressure.

13. A machine of the character described including, in combination, a frame, stationary core guiding means associated with said frame, a rotary shaft, means for driving the same, a head connected to rotate with said shaft, said head having a plurality of plates on each side of and parallel to the axis of the rotary shaft and spaced apart to receive rolls of strip material therebetween, means for locking said rolls of strip material in position.

14. A machine of the character described including, in combination, a frame, stationary core guiding means associated with said frame, a rotary shaft, means for driving the same, a head connected to rotate with said shaft, said head having a plurality of plates on each side of and parallel to the axis of the rotary shaft and spaced apart to receive rolls of strip material therebetween, means for locking said rolls of strip material in position, said locking means including selective means for releasing any one of said rolls of strip material without releasing the others.

15. A machine of the character described including, in combination, a frame, stationary core guiding means associated with said frame, a rotary shaft, means for driving the same, a head connected to rotate with said shaft, said head having a plurality of plates on each side of and parallel to the axis of the rotary shaft and spaced apart to receive rolls of strip material therebetween, means for locking said rolls of strip material in position, said head having a tension device for each roll and having guiding means for each roll whereby said strips of material from said rolls may be applied to a moving core in the form of a plurality of spiral non-registering layers.

16. A machine of the character described including, in combination, a frame, stationary core guiding means associated with said frame, a rotary shaft, means for driving the same, a head connected to rotate with said shaft, said head having a plurality of plates parallel to the axis of the rotary shaft and spaced apart to receive rolls of strip material therebetween, means for locking said rolls of strip material in position, said head

having a tension device for each roll and having guiding means for each roll whereby said strips of material from said rolls may be applied to a moving core in the form of a plurality of spiral non-registering layers, said guiding means being adjustable longitudinally with reference to said head.

17. A machine of the character described including, in combination, a frame, stationary core guiding means associated with said frame, a rotary shaft, means for driving the same, a head connected to rotate with said shaft, said head having a plurality of plates parallel to the axis of the rotary shaft and spaced apart to receive rolls of strip material therebetween, means for locking said rolls of strip material in position, said head having a tension device for each roll and having guiding means for each roll whereby said strips of material from said rolls may be applied to a moving core in the form of a plurality of spiral non-registering layers, said tension means being adjustable to regulate the tension.

18. In combination in a machine of the character described, a rotary head, means for mounting a plurality of large rolls of strip material one above the other on each side of said head with the axes of said rolls at right angles to the axis of rotation of said head.

19. In combination in a machine of the character described, a rotary head, means for mounting a plurality of large rolls of strip material one above the other in said head with the axes of said rolls at right angles to the axis of rotation of said head, and a common means for locking said rolls in position in said head, said locking means including selective releasing mechanism whereby one roll may be released without releasing any others.

20. In combination in a machine of the character described, a rotary head, means for mounting a plurality of large rolls of strip material one above the other in said head with the axes of said rolls at right angles to the axis of rotation of said head, and means for locking said rolls in position in said head, said locking means including selective releasing mechanism whereby one roll may be released without releasing any others, said holding and releasing mechanism including a core member adapted to fit within said rolls, a ring adapted to fit within the hub portion of each of said rolls, engaging means in said core adapted to be projected to engage said rings and selective means for projecting said engaging means, said core being movable as a whole so as to move the engaged ring.

21. In combination in a machine of the character described, a rotary head, means for mounting a plurality of large rolls of strip material one above the other in said

head with the axes of said rolls at right angles to the axis of rotation of said head, and means for locking said rolls in position in said head, said locking means including selective releasing mechanism whereby one roll may be released without releasing any others, said holding and releasing mechanism including a core member adapted to fit within said rolls, a ring adapted to fit within the hub portion of each of said rolls, engaging means in said core adapted to be projected to engage said rings and selective means for projecting said engaging means, said core being movable as a whole so as to move the engaged ring, and means for locking the core in this engaging position.

22. In combination in a machine of the character described, a rotary head having means for mounting a plurality of sets of large rolls of strip material in said head with the axes of said rolls at right angles to the axis of rotation of said head, each set including a plurality of rolls of strip material mounted one above the other in edge to edge relation.

23. In combination in a machine of the character described, a rotary head having two sets of plates arranged on opposite sides of said head, said plates being spaced apart to provide receiving means on each side of said head for a plurality of rolls of strip material, means for holding the rolls of strip material between said plates with the axes of said rolls at right angles to the axis of rotation of said head.

24. In combination in a machine of the character described, a rotary head having two sets of plates arranged on opposite sides of said head, said plates being spaced apart to provide receiving means on each side of said head for a plurality of rolls of strip material, means for holding the rolls of strip material between said plates with the axes of said rolls at right angles to the axis of rotation of said head, a tension means on the end of the head for each of said rolls, said tension means having a roller to receive strip material from the roll without twisting and a roller to discharge the strip material without twisting, with a serpentine path between said rollers.

25. In combination in a machine of the character described, a rotary head having two sets of plates arranged on opposite sides of said head, said plates being spaced apart to provide receiving means on each side of said head for a plurality of rolls of strip material, means for holding the rolls of strip material between said plates with the axes of said rolls at right angles to the axis of rotation of said head, a tension means on the end of the head for each of said rolls, said tension means having a roller to receive strip material from the roll without twisting and a roller to discharge the strip material without twisting,

with a serpentine path between said rollers, said tension means being located substantially in line with the spaces between said plates.

26. In combination in a machine of the character described, a rotary head having two sets of plates arranged on opposite sides of said head, said plates being spaced apart to provide receiving means on each side of said head for a plurality of rolls of strip material, means for holding the rolls of strip material between said plates with the axes of said rolls at right angles to the axis of rotation of said head, a tension means on said head for each of said rolls of strip material, said tension means being composed of two parts against which the strip material bears in its passage therethrough, and having means for regulating the pressure of the two parts toward each other.

27. In combination in a machine of the character described, a rotary head having two sets of plates arranged on opposite sides of said head, said plates being spaced apart to provide receiving means on each side of said head for a plurality of rolls of strip material, means for holding the rolls of strip material between said plates with the axes of said rolls at right angles to the axis of rotation of said head, a tension means on said head for each of said rolls of strip material, said tension means being composed of two parts against which the strip material bears in its passage therethrough, and having means for regulating the pressure of the two parts toward each other, and a guiding means for each roll of strip material adapted to receive the strip from the tension means and to twist it so that it may be applied to a core.

28. In combination in a machine of the character described, a rotary head having two sets of plates arranged on opposite sides of said head, said plates being spaced apart to provide receiving means on each side of said head for a plurality of rolls of strip material, means for holding the rolls of strip material between said plates with the axes of said rolls at right angles to the axis of rotation of said head, a tension means on said head for each of said rolls of strip material, said tension means being composed of two parts against which the strip material bears in its passage therethrough, and having means for regulating the pressure of the two parts toward each other, and a guiding means for each roll of strip material adapted to receive the strip from the tension means and to twist it so that it may be applied to a core, said guiding means being arranged at varying distances from the head, the guiding means for the strip from the lowermost roll being located nearest the head and the guiding means for the outer rolls being positioned further away from the head whereby the strip material is

subjected to substantially the same amount of twist per unit of length.

29. A guiding mechanism for a machine of the character described including a bracket member adapted to be attached to the machine, said bracket member being provided with a plurality of curved slots, a plurality of angle members each having adjustable connection with said bracket member by means of a bolt passing through one of said curved slots, whereby said angle member may be angularly adjusted with reference to said bracket and said machine, and a guiding member on each of said angle members.

30. A guiding mechanism for a machine of the character described including a bracket member adapted to be attached to the machine, said bracket member being provided with a plurality of curved slots, a plurality of angle members each having adjustable connection with said bracket member by means of a bolt passing through one of said curved slots, whereby said angle member may be angularly adjusted with reference to said bracket and said machine, and a guiding member on each of said angle members, each guiding member having a longitudinal adjustment on its angle member.

31. Means for holding and locking a plurality of rolls or reels of material in a frame, including a ring adapted to be positioned within the center of each roll of material, said rings being of increasing diameter, a core member adapted to be inserted through the centers of said rolls of material and within said rings, said core member having a plurality of surfaces corresponding in circumference to the circumference of the inner surface of the rings, means within said core adapted to be moved into engagement with each of said rings and means for selectively moving said engaging means into engagement with any one of said rings, whereby on the withdrawal of the core the engaged ring will be withdrawn without disturbing the other rings.

32. A frame composed of a plurality of plates spaced apart to receive a plurality of rolls or reels of material therebetween, a ring adapted to be positioned within the center of each roll or reel, said rings being of increasing diameter from one side of the frame to the other, a core member adapted to be inserted through the centers of said rolls or reels and within said rings and having surfaces corresponding in circumference to the circumference of the inner surfaces of the rings, means for locking said core in position, engaging means in said core adapted to be projected independently of each other into engagement with said rings and means in the core for causing the selective projection of said engaging means whereby when the core is unlocked and moved outwardly the en-

gaged ring will be moved so as to permit the replacement of a roll or reel of material.

33. In combination, in a machine of the character described, a rotary head, means for mounting a plurality of rolls of strip material in sets on opposite sides of the axis of rotation of said head each set including a plurality of rolls in edge to edge relation one above the other with the axes of said rolls at right angles to the axis of rotation of said head.

34. In combination, in a machine of the character described, a rotary head, means for mounting a plurality of rolls of strip material in sets on opposite sides of the axis of rotation of said head, each set including a plurality of rolls in edge to edge relation, one above the other, and means for locking said sets of rolls in position in said head, said locking means including selective releasing mechanisms whereby any roll of any set may be released without releasing any other rolls.

35. In combination, in a machine of the character described, a rotary head, means for mounting a plurality of rolls of strip material in sets on opposite sides of the axis of rotation of said head, and means for locking said sets of rolls in position in said head, said locking means including selective releasing mechanisms whereby any roll of any set may be released without releasing any other rolls, said means including elements of different sizes positioned within the hub portion of each of said rolls and an operative member adapted to selectively engage said elements for purposes of separate removal.

36. In combination, in a machine of the character described, a rotary head, means for mounting a plurality of rolls of strip material in sets on opposite sides of the axis of rotation of said head, and means for locking said sets of rolls in position in said head, said locking means including selective releasing mechanisms whereby any roll of any set may be released without releasing any other rolls, said means including annular elements of different diameters, one being positioned within the hub portion of each of said rolls, and an operative member adapted to selectively engage said annular elements at the will of the operator for purposes of separate removal.

37. In combination, in a machine of the character described, a rotary head having means for mounting a plurality of sets of rolls of strip material in said head on opposite sides of the axis of rotation of said head with the axes of said rolls at right angles to the axis of rotation of said head, each set having a plurality of rolls of strip material mounted in parallel, adjacent and edge to edge relation, said head being provided with a tension means for each roll and a guiding means for each roll.

38. In combination, in a machine of the character described, a rotary head having means for mounting a plurality of sets of rolls of strip material in said head on opposite sides of the axis of rotation of said head with the axes of said rolls at right angles to the axis of rotation of said head, each set having a plurality of rolls of strip material mounted in edge to edge relation, said head being provided with a tension means for each roll and a guiding means for each roll, said guiding means being longitudinally and angularly adjustable, whereby all of the strip material from the separate rolls receives substantially the same amount of twist or turn per unit of length between the point of departure from the tension means and the point of application to the core.

39. In combination, in a machine of the character described, a rotary head having two sets of plates arranged on opposite sides of said head, said plates being spaced apart to provide receiving means on each side of said head for a plurality of rolls of strip material, means for holding the rolls of strip material between said plates with the axes of said rolls at right angles to the axis of rotation of said head, and selective releasing mechanism for releasing any roll of any set without releasing any other rolls.

40. In combination, in a machine of the character described, a rotary head having two sets of plates arranged on opposite sides of said head, said plates being spaced apart to provide receiving means on each side of said head for a plurality of rolls of strip material, means for holding the rolls of strip material between said plates with the axes of said rolls at right angles to the axis of rotation of said head, and selective releasing mechanism for releasing any roll of any set without releasing any other rolls, said selective mechanism including an annular member adapted to be positioned within the hub of each roll, and an operative element adapted to selectively engage any of said annular members for purposes of selective removal.

41. In combination, in a machine of the character described, a rotary head having two sets of plates arranged on opposite sides of said head, said plates being spaced apart to provide receiving means on each side of said head for a plurality of rolls of strip material, means for holding the rolls of strip material between said plates with the axes of said rolls at right angles to the axis of rotation of said head, said head having a plurality of tension means one for each roll and a plurality of guiding means one for each roll.

42. In combination, in a machine of the character described, a rotary head having two sets of plates arranged on opposite sides of said head, said plates being spaced apart to provide receiving means on each side of said head for a plurality of rolls of strip material,

means for holding the rolls of strip material between said plates with the axes of said rolls at right angles to the axis of rotation of said head, said head having a plurality of tension means one for each roll and a plurality of guiding means one for each roll, said guiding means being longitudinally and angularly adjustable, whereby all of the strip material from the separate rolls receives substantially the same amount of twist or turn per unit of length between the point of departure from the tension means and the point of application to the core.

43. In combination, in a machine of the character described, a rotary head, a plurality of sets of rolls of strip material in said head, each set of rolls including a plurality of rolls arranged one above the other in said head with the axes of said rolls at right angles to the axis of rotation of said head and common means for mounting each set.

44. In combination, in a machine of the character described, a rotary head, means for mounting a plurality of sets of rolls of strip material in said head, each set of rolls including a plurality of rolls arranged one above the other on each side of the axis of said head and in coaxial relation with respect to the other rolls of the set.

45. In combination, in a machine of the character described, a rotary head mounted on a horizontal axis, means for mounting a plurality of sets of rolls of strip material on each side of the axis of said head, each set of rolls including a plurality of rolls arranged one above the other in said head, with the axes of said rolls extending transversely with respect to the horizontal axis of rotation of said head.

46. In combination, in a machine of the character described, a rotary head, means for mounting a plurality of sets of rolls of strip material in said head in parallel and edge to edge relation, said head having a plurality of tension members mounted on one end and a plurality of guiding members mounted on the same end, a separate tension member and guide member being provided for each roll of strip material.

47. In combination, in a machine of the character described, a rotary head including a plurality of sets of spaced plates arranged on opposite sides of the axis of rotation of said head, a plurality of sets of rolls of strip material mounted in said spaces between said plates, said head having a plurality of tension members and a plurality of guide members operatively connected to the one end thereof, there being a tension member and a guide member for each of said rolls of strip material.

48. In combination, in a machine of the character described, a rotary head including a plurality of sets of spaced plates arranged on opposite sides of the axis of rotation of

said head, a plurality of sets of rolls of strip material mounted in said spaces between said plates, said head having a plurality of tension members and a plurality of guide members operatively connected to the one end thereof, there being a tension member and a guide member for each of said rolls of strip material, said guide members being angularly and longitudinally adjustable, whereby all of the strip material from the separate rolls receives substantially the same amount of twist or turn per unit of length between the point of departure from the tension means and the point of application to the core.

49. In combination in a machine of the character described, a rotary head provided with a plurality of spaced, parallel plates on opposite sides of the head, the plates on each side of the head being provided with aligned openings which decrease in size toward the center of the head, said spaces between the plates being adapted to receive rolls of strip material, and means received by said openings for selectively engaging any one of the rolls of strip material.

50. In combination in a machine of the character described, a rotary head provided with a plurality of parallel plates on opposite sides of the head, means for spacing said plates, the plates on each side of the head being provided with aligned openings which decrease in size toward the center of the head, said spaces being adapted to receive rolls of strip material, and said openings being adapted to receive a stepped core member for detachably holding the rolls.

51. In combination in a machine of the character described, a rotatable head having means to receive a plurality of rolls of strip material, means for holding said rolls in said head with the axes of said rolls at right angles to the axis of rotation of the head, said head being provided with a tension member for each roll, said tension member being adjustable to regulate the tension of the strip passing therethrough, and including two members pivotally connected together and held from each other with regulable resilient pressure.

52. In combination in a machine of the character described, a rotary head having two sets of plates arranged on opposite sides of said head, said plates being spaced to provide receiving means on each side of said head for a plurality of rolls of strip material, means for holding the rolls of strip material between said plates with the axes of said rolls at right angles to the axis of rotation of said head, a tension means on the end of the head for each of said rolls, said tension means having a roller to receive strip material from the roll without twisting, and also provided with means to provide a serpentine path for the strip material.

53. In combination in a machine of the

character described, a rotary head having two sets of plates arranged on opposite sides of said head, said plates being spaced apart to provide receiving means on each side of said head for a plurality of rolls of strip material, means for holding the rolls of strip material between said plates with the axes of said rolls at right angles to the axis of rotation of said head, a tension means for each of said rolls projecting from one end of the head, said tension means having a roller to receive strip material from the roll without twisting and a roller to discharge the strip material without twisting, with a serpentine path between said rollers.

54. An apparatus for the character described for holding and locking a plurality of rolls or reels of material in a frame, including a ring adapted to be positioned within the center of each roll of material, said rings being of increasing diameter, and a core member adapted to be inserted through the centers of said rolls of material and within said rings, said core member having a plurality of surfaces corresponding in circumference to the circumference of the inner surface of the rings.

55. In combination, in a machine of the character described, a rotatable head mounted on a horizontal axis and constructed to receive on opposite sides of its axis of rotation a plurality of rolls of strip material with the axes of said rolls arranged at right angles to the axis of rotation of said head, the rolls of each side of said head being parallel, adjacent, and in edge to edge relation, and means for holding said rolls in said head in said position.

56. In combination in a machine of the character described, a rotatable head mounted on a horizontal axis, means for mounting a plurality of sets of rolls of strip material on each side of the axis of said head, each set of rolls including a plurality of rolls arranged one above the other in said head, with the axes of said rolls extending transversely with respect to the horizontal axis of rotation of said head, the rolls in each set being parallel, adjacent, and in edge to edge relation.

57. In combination in a machine of the character described, a rotatable head mounted on a horizontal axis and provided with means for receiving and holding on opposite sides of its axis of rotation a plurality of rolls of strip material with the axes of said rolls at right angles to the axis of rotation of said head, the rolls of each side of said head being parallel, adjacent, and in edge to edge relation.

In testimony that I claim the foregoing, I have hereunto set my hand this 17th day of August, 1926.

EDGAR W. McKNIGHT.

CERTIFICATE OF CORRECTION.

Patent No. 1,798,334.

Granted March 31, 1931, to

EDGAR W. McKNIGHT.

It is hereby certified that the name of the assignee in the above numbered patent was erroneously described and specified as "General Cable Company", whereas said name should have been described and specified as General Cable Corporation, as shown by the records of assignments in this office; page 6, line 29, claim 5, strike out the word "the"; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 28th day of April, A. D. 1931.

(Seal)

M. J. Moore,
Acting Commissioner of Patents.