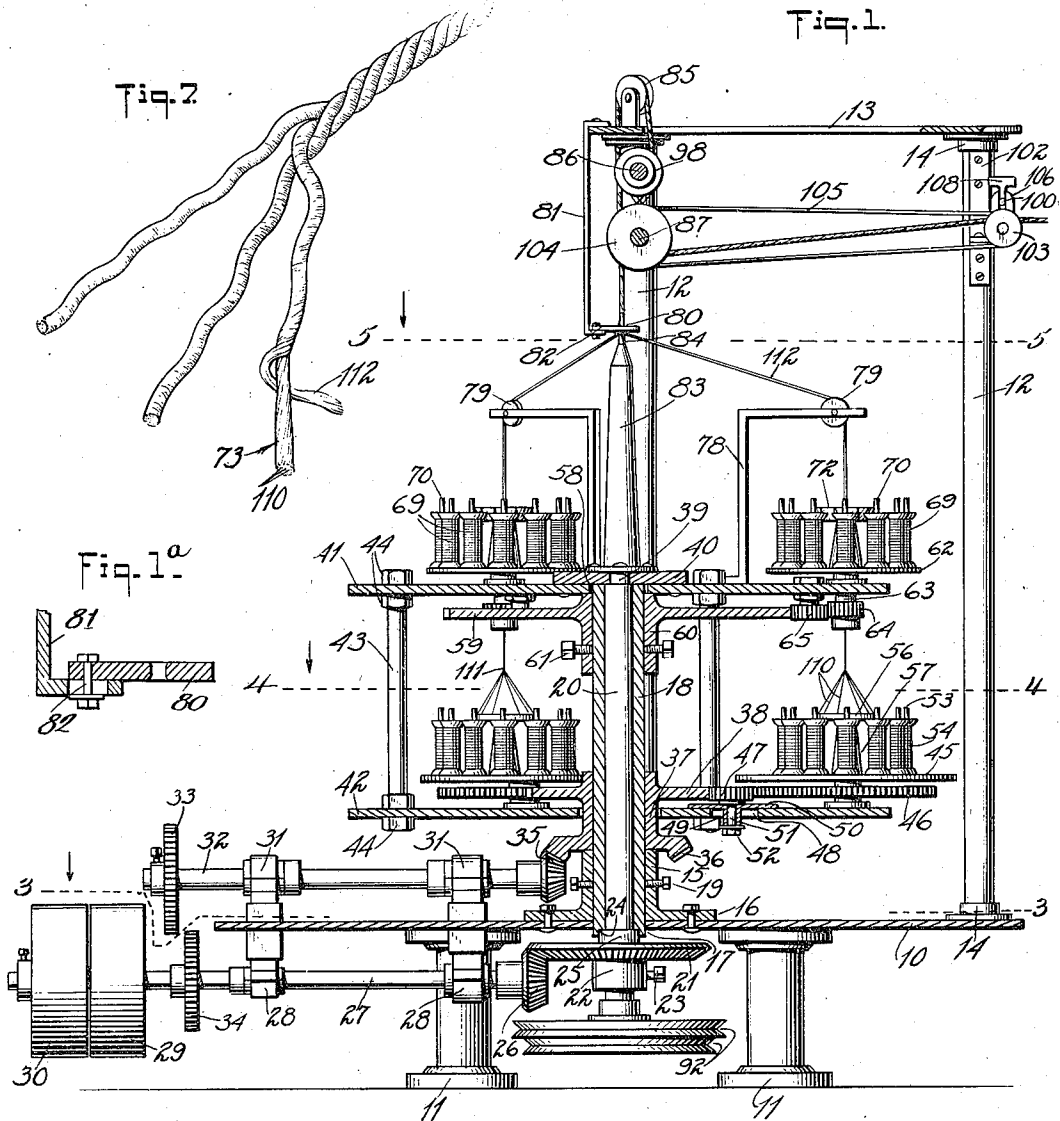


J. G. SMITH & H. SWARTING.
GIMP OR PLAITED CORD MACHINE.
APPLICATION FILED JULY 10, 1914.

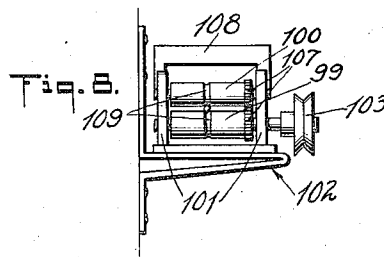
1,159,286.

Patented Nov. 2, 1915.

4 SHEETS—SHEET 1.



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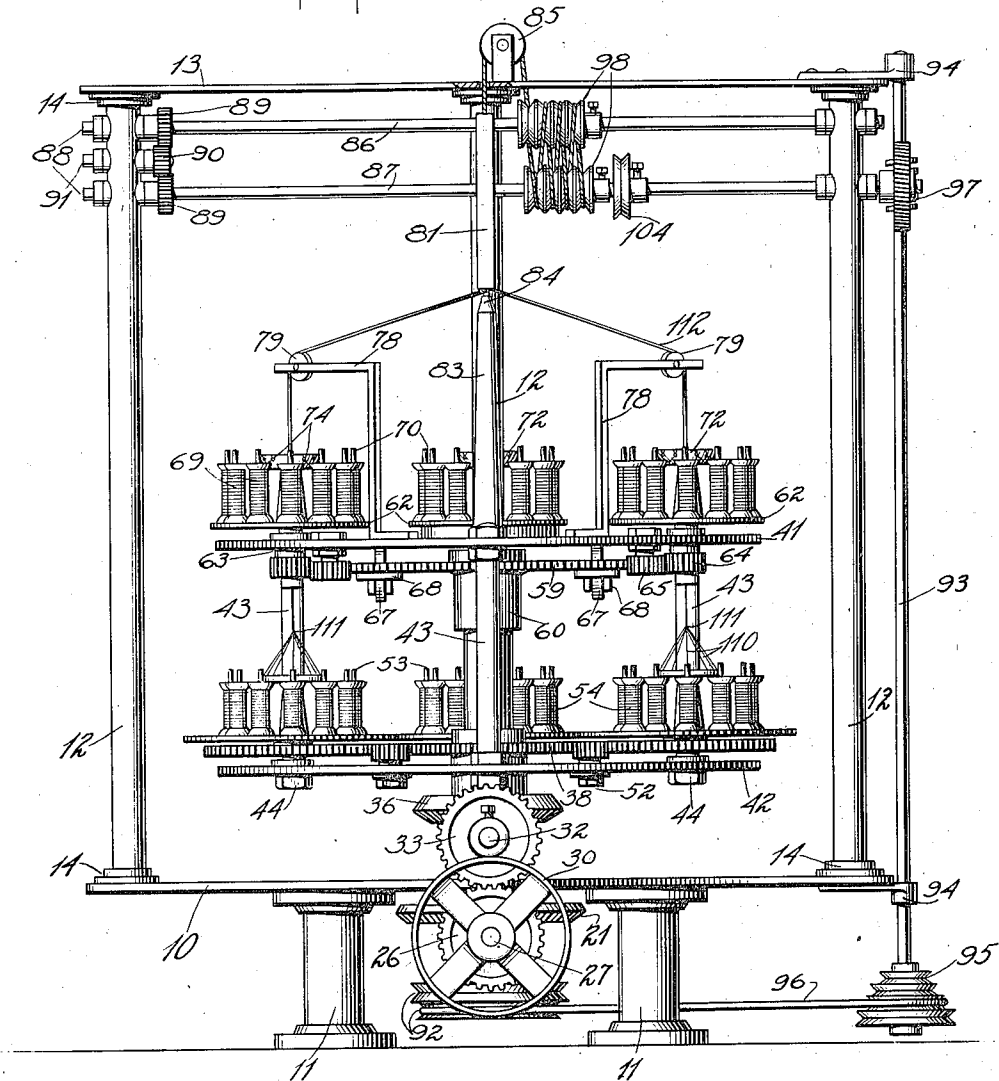
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4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

Fig. 3.

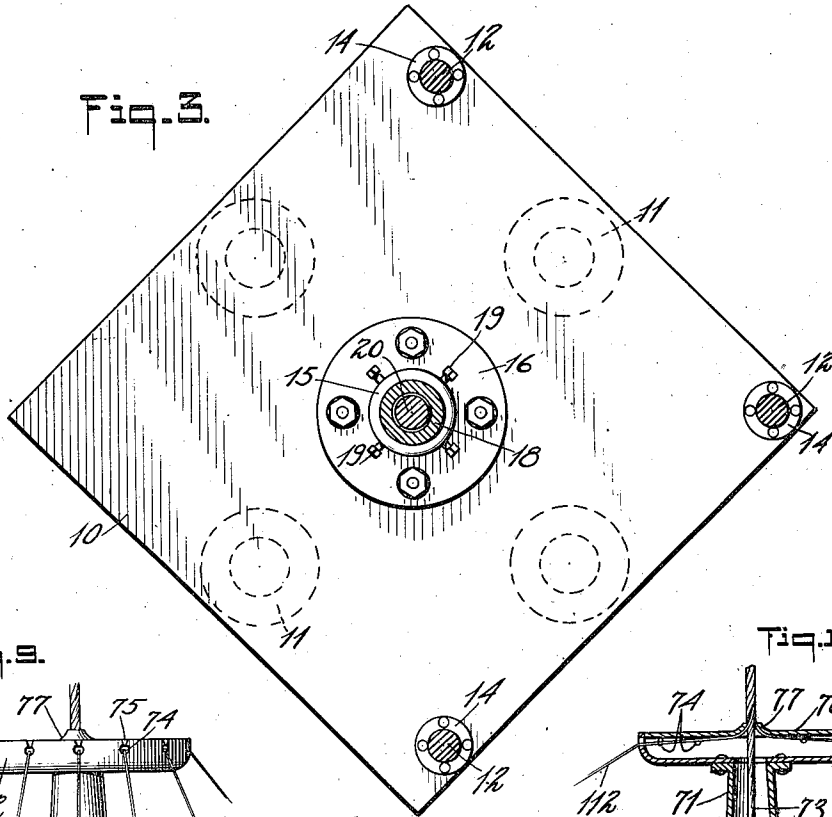


Fig. 9.

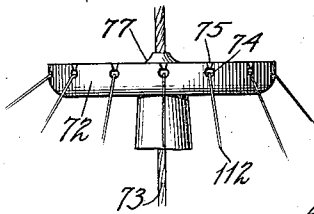


Fig. 10.

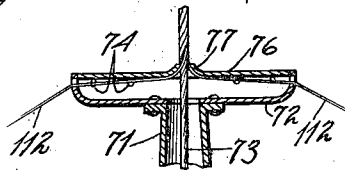
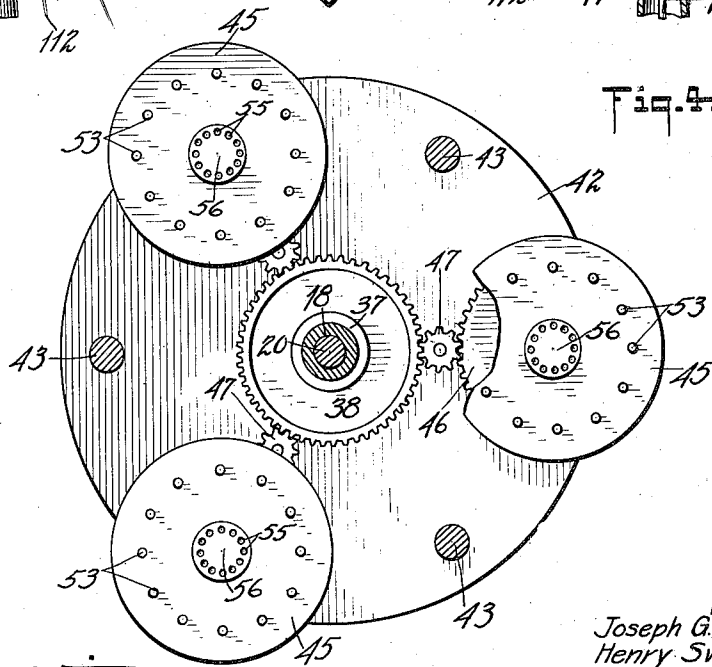


Fig. 4.



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4 SHEETS—SHEET 4.

Fig. 5.

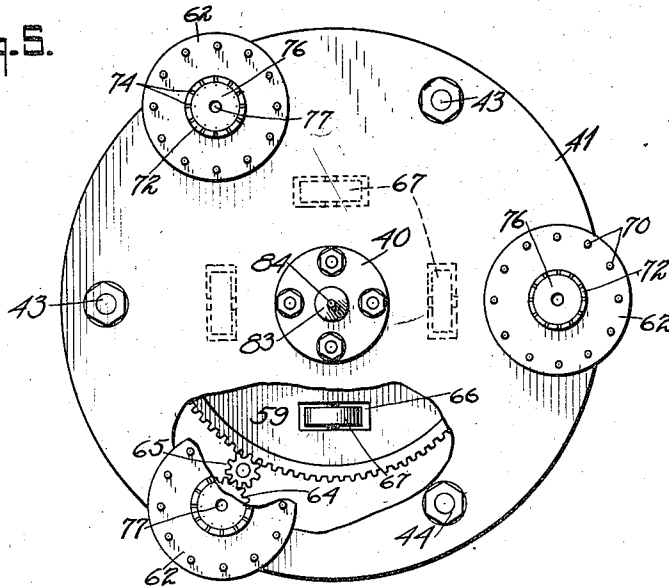
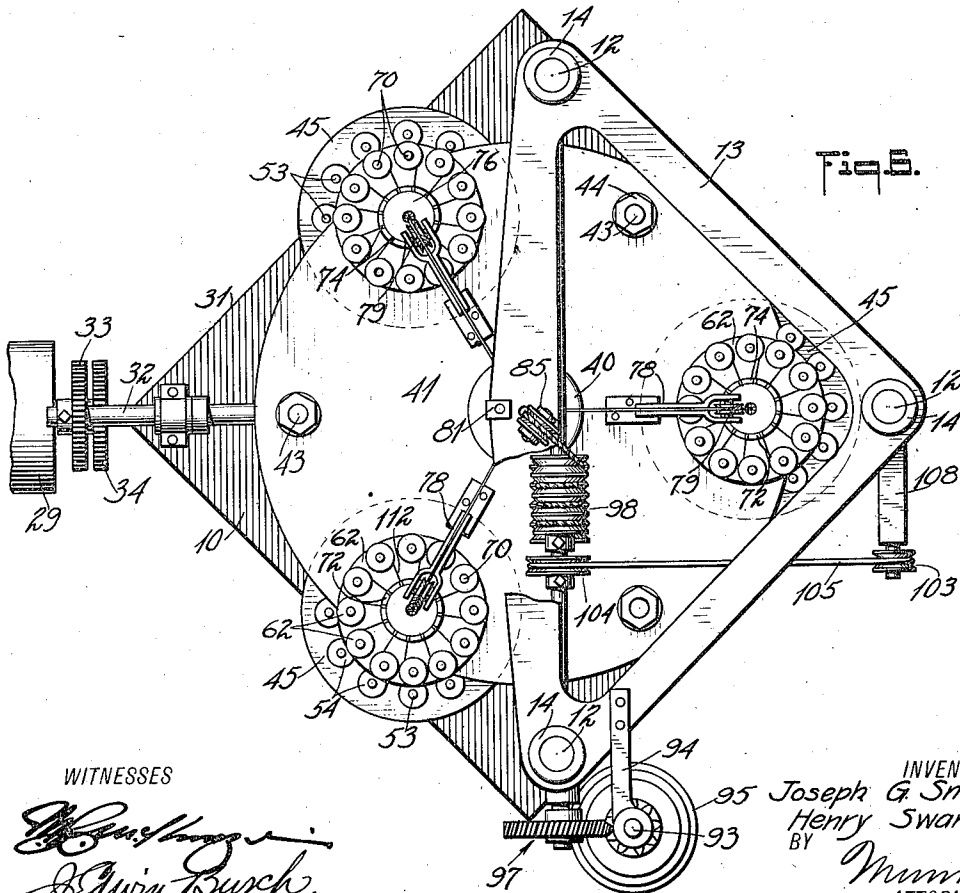


Fig. 6.



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UNITED STATES PATENT OFFICE.

JOSEPH G. SMITH AND HENRY SWARTING, OF NEW YORK, N. Y.

GIMP OR PLAITED CORD MACHINE.

1,159,286.

Specification of Letter's Patent.

Patented Nov. 2, 1915.

Application filed July 10, 1914. Serial No. 850,151.

To all whom it may concern:

Be it known that we, JOSEPH G. SMITH, a citizen of the United States, and HENRY SWARTING, a subject of the Emperor of Germany, both residents of the city of New York, borough of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Gimp or Plaited Cord Machine, of which the following is a full, clear, and exact description.

This invention relates to improvements in gimp or plaited cord machines.

The primary object of the invention is the provision of a machine for making gimp or plaited cord in which instead of covering the strands of the cord separately and then twisting them together upon a separate machine subsequent thereto, the strands, depending upon the number of plies, are covered simultaneously and twisted so that as the cord is taken off of the machine it is completely made without requiring the additional twisting operation.

A further object of the invention is to provide an improved machine of the character described in which a pair of rotatable tables are employed, one of which carries a plurality of bobbin holders for cotton to produce the fillers of the strands while the other carries silk or other material forming the coverings of the strands, so that as the fillers or cores are fed from the first-named bobbins they will pass centrally within the area of the other bobbins so that the coverings will be wound directly thereon, and by means of a take-off device carried by the frame of the machine, the strands will be brought together and drawn taut while being taken off to be wound on a reel or otherwise collected.

A still further object of the invention is to provide a machine of the last-named design in which the bobbin holders can be driven at various speeds so as to vary the degree of tightness to which the fillers are twisted or by which said filler-carrying bobbins can be held from rotation so that the ends or threads of the filler can be drawn off without being twisted, while the winding bobbins are driven at increased speed relative to the speed of rotation of the filler-holding bobbins so as to cover the strands tightly with the covering ends extending substantially at right angles to the axes of the strands or at right angles to the length thereof, so that the fillers will be thoroughly

and completely covered and so twisted as not to unwind or unravel, although by varying the speeds of rotation of the bobbin holders for the fillers and covering threads, the degree of tightness at which the cord is wound can be considerably varied.

A still further object of the invention is to provide improved means for causing the covering thread to uniformly feed around the fillers when wound thereon to insure covering of the latter in the manner specified.

With the above and other objects in view, the invention resides in the peculiar combination and arrangement of parts to be hereinafter fully illustrated, described and claimed, it being also an object to provide a device which is simple in construction, durable and efficient in operation and not likely to get out of working order.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views, and in which—

Figure 1 is a vertical sectional view of our improved gimp cord machine; Fig. 1^a is a detail view indicating the means for adjusting the finished cord guide; Fig. 2 is a front elevation thereof; Fig. 3 is a horizontal sectional view taken on the line 3—3 of Fig. 1; Fig. 4 is a horizontal sectional view taken on the line 4—4 of Fig. 1; Fig. 5 is a plan view of the bobbin-carrying tables with the upper table partly broken away; Fig. 6 is a plan view of the machine; Fig. 7 is a detail perspective view of a fragmentary portion of the product of the machine; Fig. 8 is a detail elevation of a pair of feeding rollers constituting a portion of the take-off device; Fig. 9 is a detail side elevation of one of the feeding and guiding members for the silk or other covering threads or ends; Fig. 10 is a vertical sectional view thereof.

As illustrated in the drawings, the improved machine comprises a frame structure consisting of a base plate 10 preferably supported in spaced relation to the foundation or floor as by means of a plurality of pillars 11. The base is of rectangular form in plan and carries a triangular frame structure there-above including uprights 12, one of which is mounted at the rear corner of the base and the other two of which are mounted near the side corners but slightly rearwardly thereof so that a connecting line be-

tween the two will be disposed rearwardly of the center of the plate. These uprights are braced at the top by a triangular top frame 13, the parts being suitably secured or bolted together, as shown at 14.

Mounted centrally on the base is a tubular support 15 having a bottom flange 16 bolted to the base while the bore of the bearing is located over a central opening 17 in the base so as to receive a vertical bearing sleeve 18 therethrough, said sleeve also extending through the opening 17 in the base and being held against rotation as by means of set screws 19 extending through the tubular support 15 and engaging its peripheral face. Journaled vertically in the bearing sleeve 18 is a driven shaft 20 which carries a beveled gear 21 below the base, said gear by means of its sleeve portion 22 being fixed to the shaft through the instrumentality of a set screw 23 engaged through said sleeve portion and with the outer face of the shaft. The lower end of the bearing sleeve 18 is interiorly rabbeted or recessed, as shown at 24, to provide an interior shoulder adapted for engagement by an upwardly extending sleeve portion 25 of the gear 21 and of reduced diameter relative to the sleeve 22. These parts are supported by the engagement of the gear 21 upon the gear 26 fixed to the inner end of a drive shaft 27 horizontally journaled in bearings 28 suspended from the base 10, and in this manner a positive intermeshing and drive connection between the gears 21 and 26 is insured. The shaft 27 carries a loose pulley 29 and a tight pulley 30 by means of which the shaft 27 may be driven or caused to remain stationary by the engagement of a suitably shifted endless belt well known in the arts, although any other drive means for starting and stopping the machine may be employed without departing from the spirit of the invention.

The base 10 supports a pair of bearings 31 thereover above the bearings 28, said bearings 31 having a shaft 32 horizontally journaled therein and carrying a shiftable pinion 33 designed to be moved into and out of mesh with a pinion or gear 34 fixed to the shaft 27 there-beneath. The inner end of the shaft 32 carries a beveled pinion or gear 35 disposed normally in mesh with a beveled gear 36 journaled on the sleeve 18 and rotatably supported by the tubular support 15 at the upper edge of the latter, the gear 36 being formed with a bearing sleeve 37 which is journaled on the sleeve 18 and is formed with or carries a spur gear 38 located in spaced relation above the gear 36.

Fixed to the upper end of the shaft 20 and supported upon a shoulder produced by a reduced portion 39 thereof is an attaching plate 40 which in turn is bolted or otherwise secured thereto, and thus caused to rotate therewith and with the shaft 20 and upper

table 41, said table being of circular form in plan and having a lower table 42 rigidly suspended therefrom as by means of hangers in the form of bolts 43 shown in the present instance as clamped to opposite faces of the tables as by means of binding nuts 44 engaged on the bolts near their upper and lower ends.

Rotatably journaled on the lower table are a plurality of bobbin holders or twisting heads in the form of disks 45, each having a spur gear 46 fixed there-beneath to its shaft or pivot and disposed in mesh with pinions 47, which in turn mesh with the spur gear 38, geared, for instance, so that each bobbin holder will rotate once for each revolution of the table with the shaft 20. However, to adapt the bobbin holders or disks 45 to be driven at varying speeds, the gears 46 may be replaced by smaller ones and the pinions 47 may also be replaced by larger ones to mesh in the same manner. For this purpose the table 42 is provided with radial slots 48 adapted to adjustably receive the sleeve portions 49 of bearing plates 50, said sleeve portions depending from the slots and thus adapting the plates for radial adjustment to permit similar adjustment of pinions which, through the medium of their shafts 51, are journaled in the sleeves 49 and removably secured in position as by means of nuts 52 engaged on the lower ends of the shafts. Thus, when the larger pinion is used the plate is adjusted so as to bring the pinion in mesh with the spur gear 38 and the smaller gear or pinion substituted for each gear 46.

Mounted on the holders 45 are a plurality of strand holders comprising spaced vertical pegs 53 adapted to rotatably receive bobbins or spools 54 carrying threads or ends to form the fillers and which is preferably and usually of cotton. These bobbins or spools are usually held in position by weights slipped over the pegs so as to exert tension and insure uniform feeding of the ends which may be wrapped singly or plurally on the bobbins and which are fed through apertures 55 of corresponding number and location in guide plates 56 carried by the upper ends of the supports or standards 57 mounted centrally on the holders and then covered in a manner to be hereinafter more fully explained.

Fixed to the bearing sleeve 18 directly beneath the upper table 41 which loosely encircles said sleeve as shown at 58, is a spur gear 59 which is of larger diameter than the spur gear 38 and which has a sleeve portion 60 forming a hub anchored to the sleeve 18, as by means of set screws 61. As the sleeve 18 remains stationary and serves to steady the part, by reason of the engagement of the sleeve portion 25 of the gear 21 at its lower end, and the engagement of the plate 40

with its upper end while the table 41 rotates there-around, said spur gear 59, which is fixed to the sleeve 18, also remains stationary. Rotatably journaled in the upper table 41 are a plurality of holders or twisting heads 62, their shafts 63 being journaled in the table and removably carrying pinions 64 beneath the table, while intermediate pinions 65 disposed in mesh with the spur gear 59 and the pinions 64 are rotatably journaled and adjustably suspended beneath the table 41 in any preferred manner, so that as the table revolves the holders are driven at a relatively high speed depending upon the relative sizes of the gears or pinions, and in the present instance such as to rotate the holders eleven turns for each complete rotation of the table in an arc of 360°. By interchanging the pinions, as heretofore described, the velocity or speed of rotation of the holders may be varied.

As the upper table sustains the weight of the lower table and the parts carried by the latter, it is desirable to provide anti-friction means between the upper table and the spur gear 59 so as to permit rotation of the parts without undue friction, and as an illustration thereof the spur gear 59 is shown provided with a plurality of slots 66 through which project anti-friction members or rollers 67 rotatably carried by the spur gear and in the present instance shown vertically beneath the same in bearings 68. The strand holders comprising the bobbins or spools 69 carrying the covering strands, and each being wound with a plurality of ends preferably of silk, are rotatably supported on pegs 70, there being preferably twelve of the pegs on each of the holders 45 and 62, as is shown in Figs. 4 and 5. The fillers or cores which are formed by the strands feeding from the bobbins 54 pass upwardly through the shafts 63 and openings in the central portions of the holders or twisting heads 62, and then through hollow standards 71 fixed centrally to the last-named holders and concentric relative to the bobbins positioned there-around, as described in connection with the supports or standards 57. The standards 71 have cup-shaped heads 72 secured thereto and centrally apertured to permit the passage of the fillers or cores 73 vertically therethrough and the strands leading from the bobbins 69 are held in spaced relation and guided uniformly around the filler by extending through notches 74 in the upper edges of the head, said notches being preferably circular and provided with flared portions 75 communicating with their edges to provide restricted throats preventing accidental displacement of the strands. The strands, as is clearly shown in Fig. 10 of the drawings, extend substantially horizontally inward and are held in this position by guide plates 76 which are of circular contour and

fit in the heads 72 and hold the strands downward by their weight. These plates, however, are comparatively light so as not to injure the strands and are further provided with central apertures produced by frusto-conical extensions 77 extending upwardly and tapering in the same direction so as to bring the silk threads of the covering or wrapping together as the same approach and are wound around the cores or fillers. Also carried upon the table 41 are a plurality of angular brackets or supports 78 which project over each of the holders or twisting heads 62 and have bifurcated free ends to rotatably support the grooved pulleys 79 over which the covered fillers in the form of complete strands of the gimp pass, these strands then extending toward the center of the machine and through an apertured guide plate 80 adjustably carried at the lower end of a hanger 81 which is suspended from the cross member of the top frame connecting the uprights disposed at the side corners of the base and thus the frame of the machine. The apertured guide 80 is capable of adjustment inwardly and outwardly with respect to the hanger 81 as by means of a slot and bolt connection 82 so as to accurately dispose the aperture over the center of the machine when the covered strands are brought together and caused to intertwist due to the twist imparted thereto as the strands are drawn from the bobbins through the rotation of the holders while the tables comprising a support therefor revolve with the shaft 20. The guidance of the covered strands in this manner and the exertion of unnecessary strain upon the hanger 81 in such a manner as to cause undue tension upon the bobbins of any one or more of the holders or twisting heads and thus to prevent one strand from being covered tighter than another and thereby made of larger diameter, is further obviated by a centering standard 83 which is fastened to the plate 40 so as to move with the tables or supports. This centering standard tapers toward its upper end and carries a pin 84 which projects through the aperture of the guide plate 80 so that the covered strands in the aperture twist around this pin prior to passing upwardly and over a guide pulley 85 rotatably supported adjacent to an aperture in the cross member of the frame 13.

As aforesaid, this cross member as well as a line connecting the uprights at the end thereof, are disposed off-center rearwardly so that the cord formed by the covered strands which are twisted as the upper table rotates around the pin where the cord is relatively held from rotation, passes upwardly in a line of the center of the machine so as to clear a pair of shafts 86 and 87 which are horizontally journaled in the opposed uprights, as shown at 88, and in

spaced parallel relation vertically. Each of these shafts carries a pinion 89 which pinions are intermeshed through the medium of a pinion 90 carried by a sub-shaft 91 horizontally journaled through one upright between the shafts 86 and 87, and in order to rotate these shafts and to vary the speed of rotation thereof pulleys 92 are fixed to the lower end of the shaft 20 to rotate therewith. The shaft 93 is vertically journaled in the frame adjacent to the opposite upright relative to the one carrying the sub-shaft 91, and in the present instance this shaft 93 is shown journaled outwardly of the frame and upright in bearings 94 carried by the top and bottom portions of the frame constituted by the parts 13 and 10, respectively, so that the shaft 93 is disposed rearwardly of the shafts 86 and 87. Grooved pulleys 95 are fixed to the shaft 93 near its lower end and cooperate with the pulleys 92 to interchangeably receive an endless drive member or belt 96 for rotating the shaft 93 in the same direction that the shaft 20 rotates, motion being transmitted to the shaft 87 by a worm gear 97 cooperative upon the shafts 87 and 93 with the worm carried by the shaft 93 and the gear carried by the shaft 87 so that the latter is driven at a relatively slow speed. Rotation is thus imparted to the shaft 86 through the intermeshed pinions 89 and 90 so that the shafts 86 and 87 are driven in the same direction.

A take-off device is provided to hold the gimp or plaited cord under tension as the latter is formed so as to remove and collect or assemble the same, and as illustrated this take-off device embodies a pair of grooved pulleys 98 which are keyed or fixed to the shafts 86 and 87. These pulleys are provided with a plurality of grooves and the cord, after passing over the guide pulley 85, extends downwardly and in crossed relation under and over the pulleys so as to be held under tension, the cord finally passing rearwardly and between a pair of take-off rollers 99 and 100 and thence to be collected by wrapping, winding or folding in any preferred manner well known in the art. These rollers are journaled in spaced vertical bearings 101 carried upon a bracket 102 secured to the rear upright, and the shaft of the roller 99 is extended to carry a grooved pulley 103 which is fixed to rotate therewith and which is driven from a pulley 104 fixed to the shaft 87 by an endless drive member or belt 105 engaged around both pulleys. The roller 99 is permanently journaled in the bearings 101 and the upper portions of the bearings are slotted, as shown at 106, to removably receive the ends of the shaft carrying the roller 100, and these rollers have intermeshed pinions 107 which are held frictionally in mesh as by means of a head 108

operating in the slots of the bearings and exerting downward pressure on the shaft of the roller 100. The rollers 99 and 100 are provided with peripheral grooves, as shown at 109, co-acting to conform to and receive the cord which is fed between the rollers as the latter are driven in opposite directions tending to draw the cord, by rotation imparted to the roller 100 in the manner already explained. The take-off rollers 99 and 100 serve to produce a certain draft or tension upon the finished cord to deliver the same to the place of deposit or reel, and while the pulleys 98 act in a certain sense as tension devices to draw the work through and from the machine, they constitute means for shaping the cord and delivering it in a perfectly true and smooth form to and through the rollers 99 and 100.

In the operation of the machine as above described, with the bobbins filled or wound, rotation is imparted to the shaft 20 from the drive shaft 27, thus to impart rotation to the support or tables 41 and 42 composing the same. With the gear 33 out of mesh with the gear 34, the spur gear 38 will be held against rotation by the friction or resistance offered by the parts geared thereto, and the gears 46 will rotate as they revolve around the spur gear 38 in mesh with the intermediate pinions 47 so as to impart rotation to the holders or twisting heads 45 once for each rotation of the support. In this manner the ends or strands 110 which may be wound singly or in plural upon the bobbins or spools 54, will be twisted slightly as the cord is drawn from the machine under tension, as shown at 111, where the strands join above the guide plates 56 to produce the core or filler 73. The holders 45 are driven when it is desired to twist the filler and produce a tight and hard or relatively stiff cord, but should it be desired to produce a soft cord like ordinary plaited cord, the pinions 47 are omitted and the holders or twisting heads 45 are not driven independently of the rotation of the support or table 42 forming a portion thereof. As the fillers or cores, of which there are preferably three in number but the number of which may vary, pass upwardly through the standards 71, they are covered or wrapped by the ends or strands fed from the bobbins 69 due to the rapid rotation of the latter with the holders or twisting heads 62 as the upper table revolves with the support around the spur gear 59 with the pinions 64 and 65 intermeshing and the latter meshing with the pinion 64 and the spur gear 59 while the latter is held stationary. It is immaterial as to the direction of the twist of the independent strands or ends which are wound on the bobbins if the fillers or cores are twisted or not as the latter are wrapped by the ends or strands 112 fed through the

notches 74 and beneath the plate 76 so as to be wound on the fillers transversely or at right angles to the length thereof and are twisted by the rotation of the support and the wrapped fillers and are twisted together at the point where they pass through the guide plate 80. If the fillers are not twisted prior to the covering or wrapping thereof, the twisting of the same after being covered or wrapped is wholly depended upon in order to twist the wrapped fillers and cause the cord to assume its final form, and in this case the cord will be relatively loose and soft; but if the fillers are twisted and wrapped in the same direction due to the tables being driven in the same direction as parts of the support, as well as the holders or twisting heads carried by said tables, the covered fillers will naturally tend to inter-twist in addition to the twisting thereof as the covered fillers or strands passing from the guide pulleys 79 are twisted around the pin 84. As the cord is formed or made it is fed over the guide pulley 85 and fed along by the take-off device heretofore described due to the tension exerted thereby, and if it is desired to make the cord tighter the gears 33 and 34 are disposed in mesh to drive the holders 45 at increased speed so that the fillers will be more severely twisted prior to being wrapped or covered.

From the foregoing description in connection with the accompanying drawings it will be seen that the machine embodying our invention forms the fillers and wraps the same with or without being twisted prior to the wrapping and then twists the wrapped fillers together to produce the complete cord in a single continuous operation, and the cord is so covered and twisted as to be of uniform size due to equal tension being exerted upon the strands forming the fillers and coverings. In this manner the necessity of providing separate means for making the separate covered or wrapped fillers, then twisting the same at the expense of an additional operation, is obviated and the cost of production materially reduced.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:—

1. In a device of the character set forth, the combination of twisting heads arranged one above another, means connected with the lower head to support a plurality of individual strands, means to guide the strands together forming a core and direct the same through the center of the upper head, means carried by the upper head to support a plurality of covering strands, a cup-shaped guide having edge notches receiving the latter mentioned strands horizontally therethrough, and a disk having a central hole carried within the cup-shaped guide serving to retain the latter mentioned

strands within the guide while they are wrapped around the core, substantially as set forth.

2. In a cord machine of the class described, the combination with a rotatable support comprising spaced members; of a plurality of bobbin holders journaled on each member to rotate about a fixed center with the support, certain of the holders carrying strands to produce a filler as said strands are drawn from the bobbins, means for rotating said holders to cause the strands drawn from the bobbins thereof to be twisted together, a plurality of bobbins carried by each of the other holders, guide means carried by the first-named holders tending to center the twisted strands drawn from the bobbins thereof, means for rotating the first-named bobbins or permitting the same to remain stationary on the support as the latter rotates, means centrally of the second-named holders for rotatably supporting the same and guiding the fillers between the bobbins thereof, means for independently rotating the second-named holders as the support revolves, the bobbins of the second-named holders carrying covering strands such as silk, means for guiding said strands toward the fillers to cause the latter to be wrapped thereby, and means for centering the wrapped fillers to cause them to be twisted together, said fillers being wrapped in the same direction that the fillers are twisted when the first-named holders are rotated, whereby the wrapped fillers also tend to twist together independent of the twisting thereof due to the rotation of the support.

3. A machine for making cord such as gimp cord composed of twisted covered fillers, comprising a plurality of twisting heads rotatably supported, a plurality of strand holders carried by said heads and each carrying one or more ends of strands such as cotton to produce fillers, apertured disks carried centrally by the holders for guiding the strands together, a plurality of twisting heads rotatably supported in vertical alignment with the first-named twisting heads, a plurality of strand holders carried by said second-named heads and each adapted to carry one or more ends of covering strands such as silk, means rotatably supporting each head centrally thereof and acting to receive the fillers therethrough, standards carried centrally of said heads and each having an enlarged cup-shaped head with edge notches receiving the strands horizontally therethrough, whereby the covering strands will be wrapped around the fillers as the second-named twisting heads are rotated therearound, guide plates fitted in said cup-shaped heads to bear down on the strands and centrally apertured to receive the fillers therethrough after the same are covered beneath the plates, and means for guiding and

removing from the machine, the cord thus made.

4. A gimp cord machine comprising a base suitably supported, a frame mounted on the
5 base, a vertical shaft rotatably journaled through the base at its lower end, a drive shaft rotatably carried by the base beneath the same for imparting rotation to the first
10 named shaft, a sleeve surrounding the vertical shaft, a support mounted upon the base and to which said sleeve is fixed, a table supported upon the upper end of the shaft to rotate therewith around the sleeve, a table
15 suspended from the first named table and adapted to rotate therewith, a spur gear mounted upon the sleeve and around which the second named table revolves and supported upon the upper end of said support, twisting heads journaled on the second
20 named table and having gears therebeneath, pinions intermeshing with the spur gear and the gears beneath the twisting heads, said twisting heads being designed to support a plurality of bobbins, and means to form and
25 deliver fillers to be acted upon by said twisting heads through the gear and pinions aforesaid.

5. A gimp cord machine comprising a base suitably supported, a frame mounted on the
30 base, a vertical shaft rotatably journaled through the base at its lower end, a drive shaft rotatably carried by the base beneath the same for imparting rotation to the first named shaft, a sleeve surrounding the vertical
35 shaft, a support mounted upon the base and to which said sleeve is fixed, a table supported upon the upper end of the shaft to rotate therewith around the sleeve, a table suspended from the first named table and
40 adapted to rotate therewith, a spur gear mounted upon the sleeve and around which the second named table revolves, twisting heads journaled on the second named table

and having gears therebeneath, pinions intermeshing with the spur gear and the gears
45 beneath the twisting heads, said twisting heads being designed to support a plurality of bobbins, means upon the twisting heads for guiding the strands to produce fillers as the twisting heads revolve during the
50 rotation of the second named table, means for imparting rotation to the spur gear to increase the speed of rotation of the twisting heads, said pinions being radially adjustable and removable to permit further
55 variation in the speed of rotation of the twisting heads, means for wrapping covering strands about the fillers, and means for twisting the covered strands together.

6. A gimp cord machine comprising a base 60 suitably supported, a frame mounted on the base, a vertical shaft rotatably journaled through the base at its lower end, a drive shaft rotatably carried by the base beneath the same for imparting rotation to the first 65 named shaft, a sleeve surrounding the vertical shaft, a support mounted upon the base and to which said sleeve is fixed, a table carrying twisting heads for fillers, a table fixed to the upper end of the vertical shaft and 70 carrying twisting heads for wrapping covering strands about the fillers, gearing for revolving the filler twisting heads relative to the first table, a shaft for driving said gearing, and means whereby said shaft may be 75 connected to the main drive shaft.

In testimony whereof we JOSEPH G. SMITH and HENRY SWARTING have signed our names to this specification in the presence of two subscribing witnesses.

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HENRY SWARTING.

Witnesses:

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G. H. EMSLIE.