June 13, 1939. W. E. SOMERVILLE 2,162,131

HIGH SPEED STRANDING OR WIRE ROPE MACHINE

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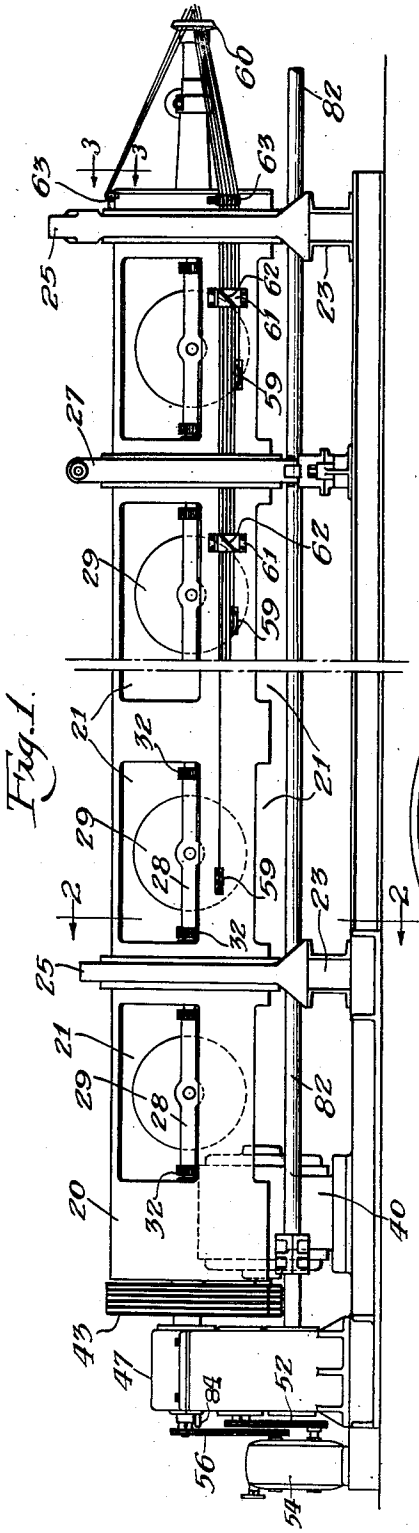


Fig. 1.

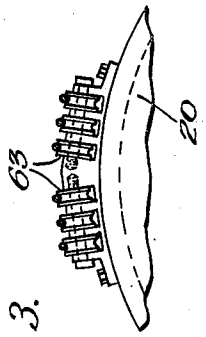


Fig. 3.

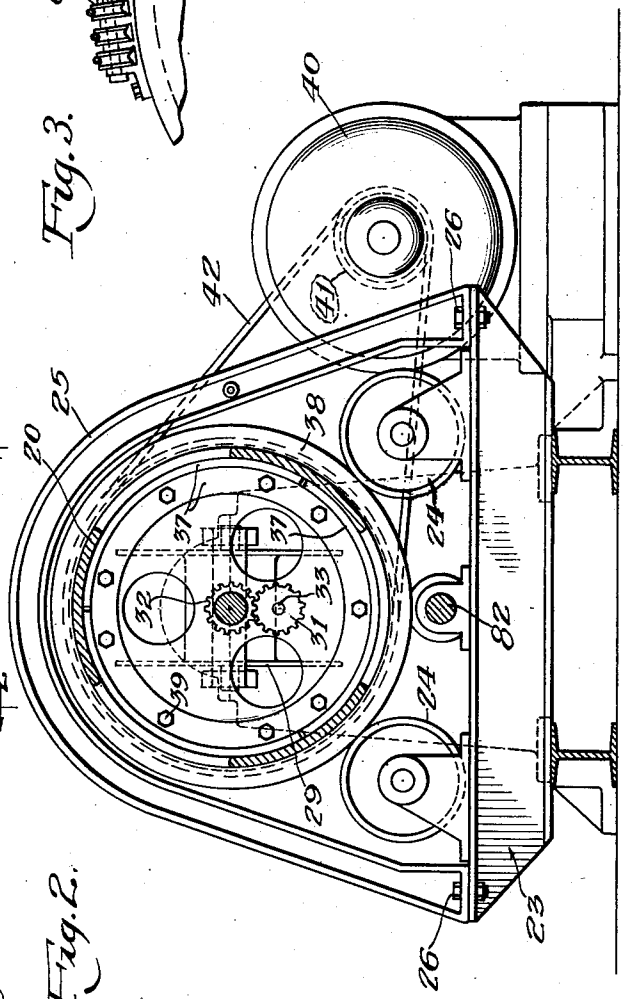


Fig. 2.

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June 13, 1939. W. E. SOMERVILLE 2,162,131

HIGH SPEED STRANDING OR WIRE ROPE MACHINE

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Fig. 4.

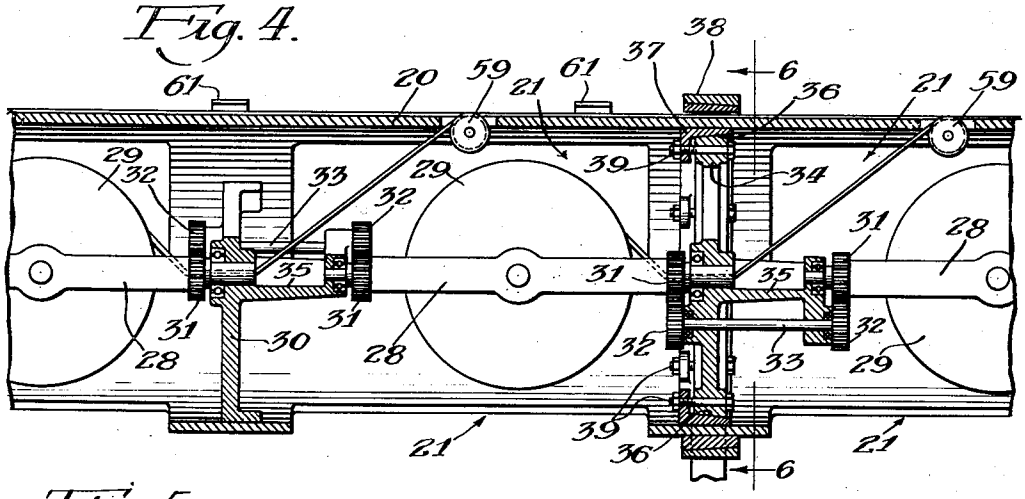


Fig. 5.

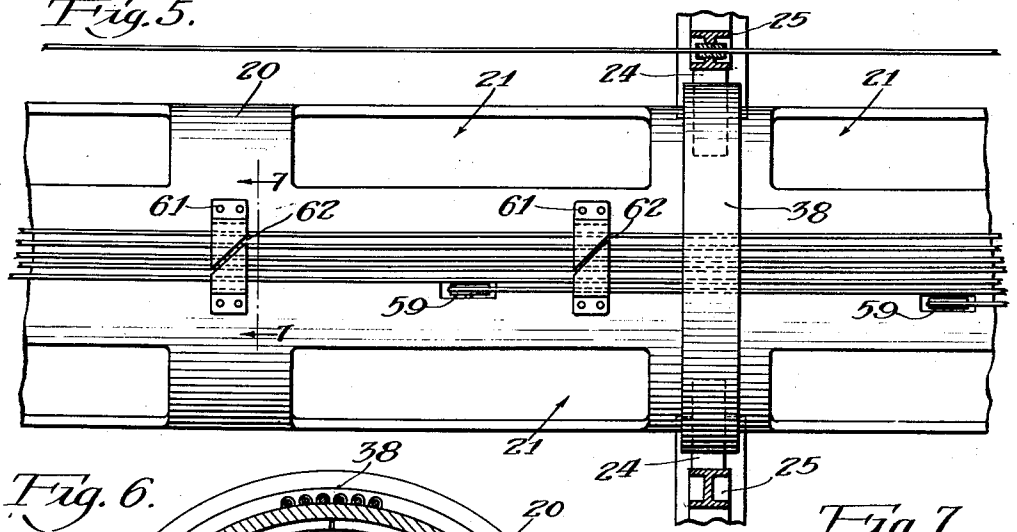


Fig. 6.

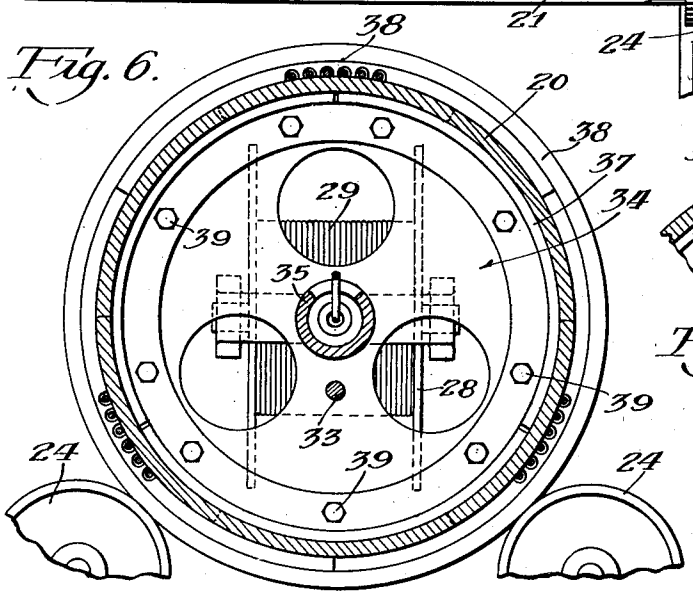


Fig. 7.

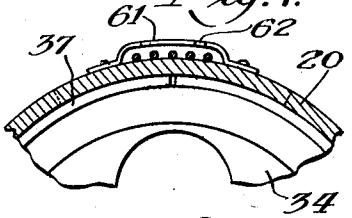
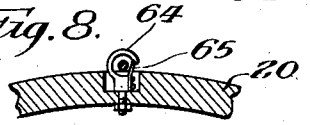


Fig. 8.



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HIGH SPEED STRANDING OR WIRE ROPE MACHINE

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Fig. 9.

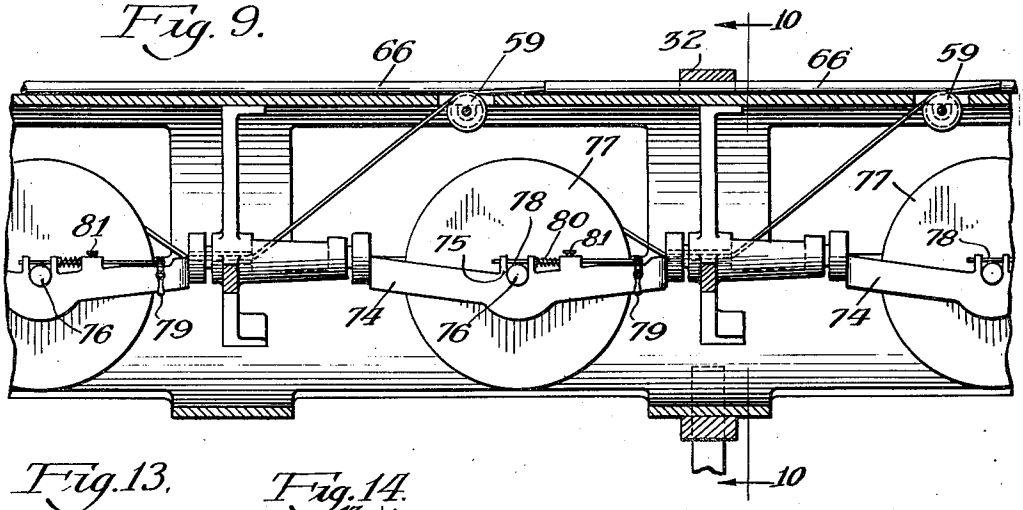


Fig. 13.

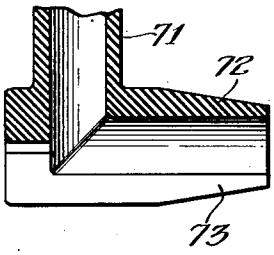


Fig. 14.

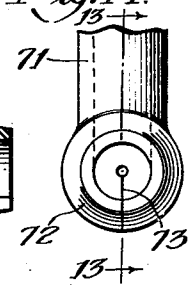


Fig. 10

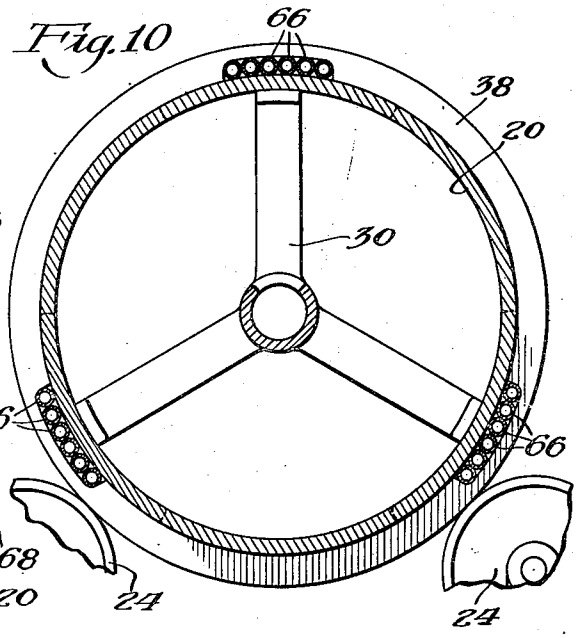


Fig. 11.

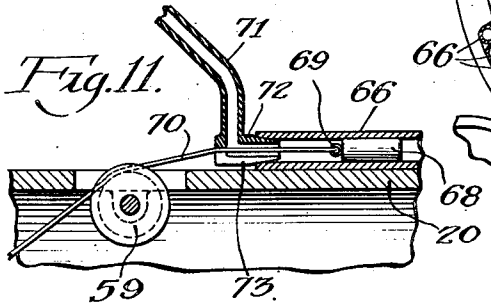


Fig. 12.

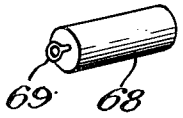
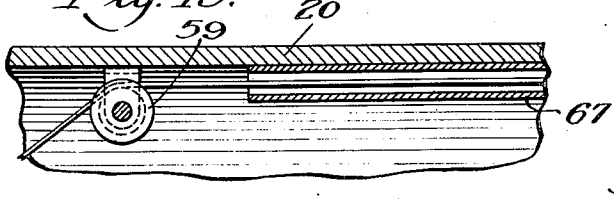


Fig. 15.



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June 13, 1939. W. E. SOMERVILLE 2,162,131

HIGH SPEED STRANDING OR WIRE ROPE MACHINE

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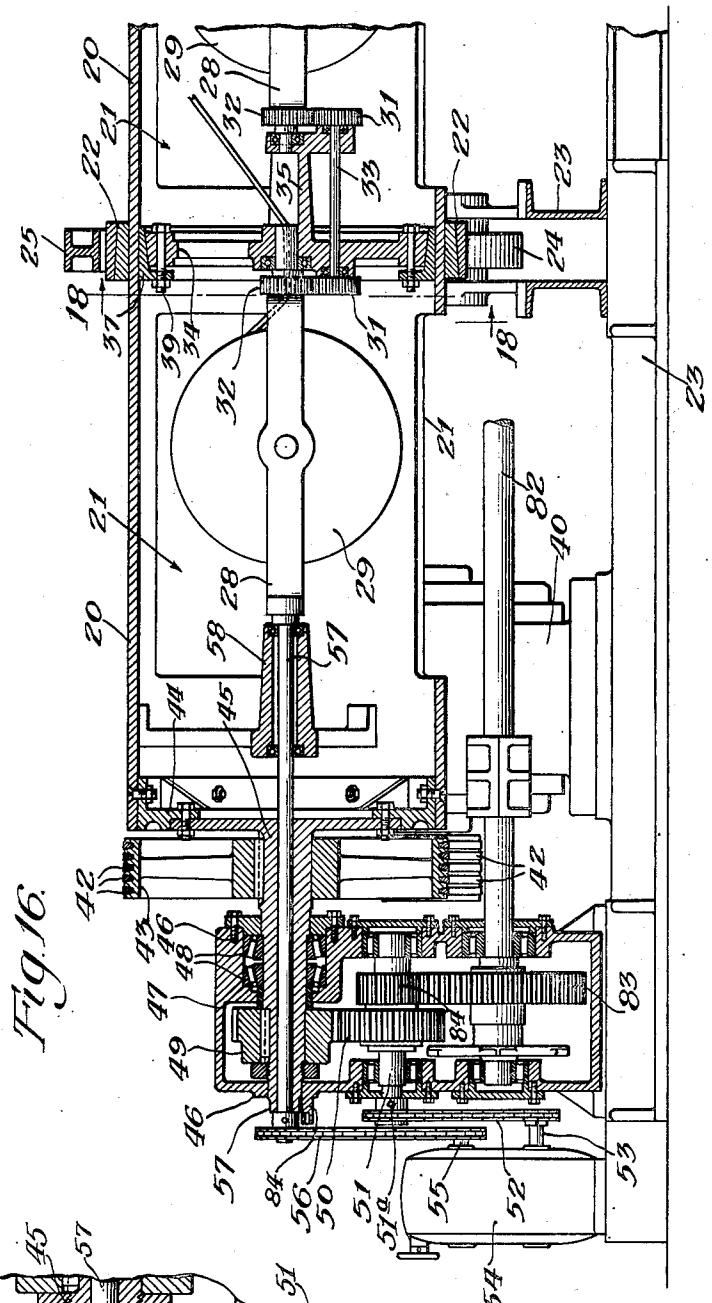


Fig. 16.

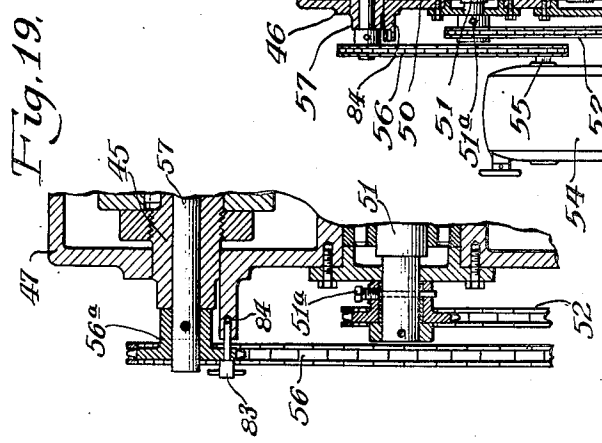


Fig. 19.

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June 13, 1939. W. E. SOMERVILLE 2,162,131

HIGH SPEED STRANDING OR WIRE ROPE MACHINE

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Fig 17.

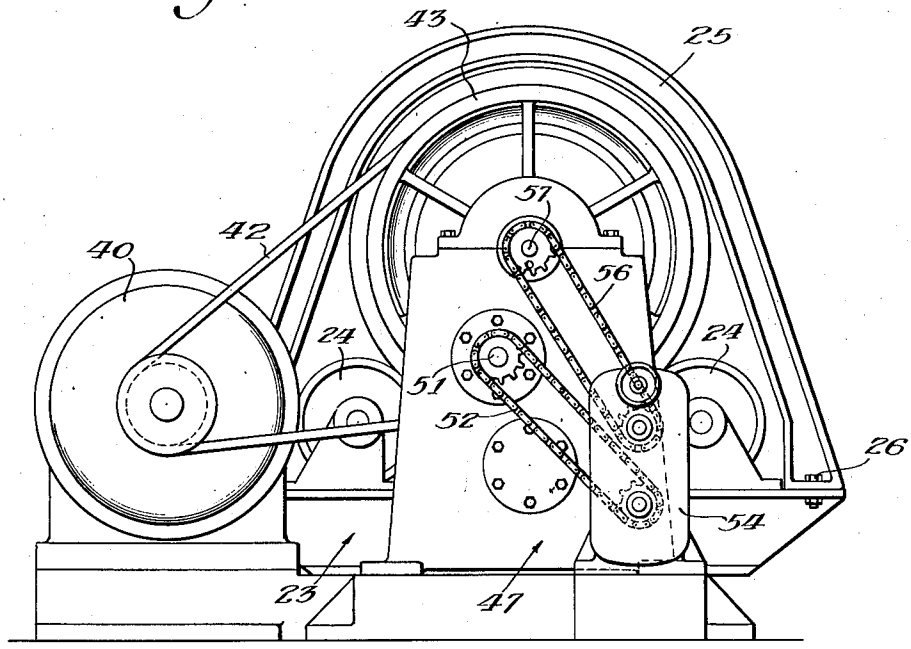
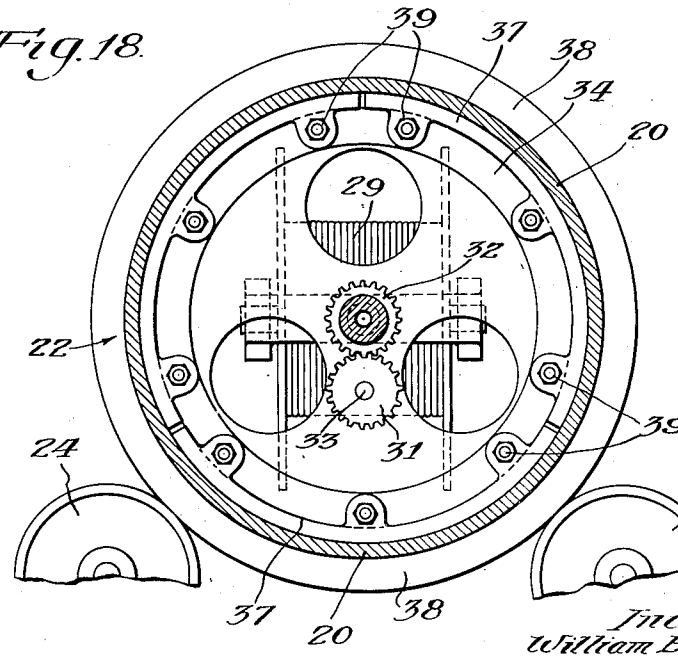


Fig. 18.



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Patented June 13, 1939 2,162,131

UNITED STATES PATENT OFFICE

2,162,131

HIGH SPEED STRANDING OR WIRE ROPE MACHINE

William E. Somerville, Coal City, Ill.

Application July 1, 1938, Serial No. 217,098

16 Claims. (Cl. 57—59)

This invention relates to improvements in high speed stranding or wire rope machines of the floating cradle type either of a built up or tubular construction, and one of the objects of the invention is to provide in a machine of this character improved means for causing the machine to rotate in one direction and the cradle to rotate in the opposite direction and at a slower rate of speed, whereby the opposite twist or back turn may be taken out of or created in the rope or cable.

A further object is to provide improved means for guiding the wires and improved means for threading the wires into the machine.

To the attainment of these ends and the accomplishment of other new and useful objects as will appear, the invention consists in the features of novelty in substantially the construction, combination and arrangement of the several parts hereinafter more fully described and claimed and shown in the accompanying drawings illustrating this invention, and in which

Figure 1 is a view in side elevation, partly broken away, of an improved machine of this character constructed in accordance with the principles of this invention.

Figure 2 is a detail sectional view, on an enlarged scale, as taken on line 2—2, Figure 1.

Figure 3 is a detail sectional view, on an enlarged scale, as taken on line 3—3, Figure 1.

Figure 4 is a view partly in section, partly broken away, and with parts omitted, showing some of the wire reel cradles.

Figure 5 is a top plan view of Figure 4.

Figure 6 is a detail sectional view on an enlarged scale taken on line 6—6, Figure 4.

Figure 7 is a detail sectional view taken on line 7—7, Figure 5.

Figure 8 is a detail sectional view partly in section and partly in elevation showing another form of wire guide.

Figure 9 is a view partly in elevation and partly in section and with parts omitted, similar to Figure 4, of another form of the invention.

Figure 10 is a detail sectional view taken on line 10—10, Figure 9, on an enlarged scale.

Figure 11 is a detail view partly in elevation and partly in section showing the manner of threading the wire into the machine.

Figure 12 is a detail perspective view of a portion of the threading mechanism.

Figure 13 is a detail sectional view on line 13—13, Figure 14.

Figure 14 is a right hand end elevation of Figure 13 of the nozzle for threading the wire into the machine.

Figure 15 is a detail sectional view of a portion of the body and of one of the tubes for guiding the wire.

Figure 16 is a vertical sectional view of the right hand end of Figure 1, on an enlarged scale.

Figure 17 is a left hand end elevation of Figure 16.

Figure 18 is a detail sectional view on an enlarged scale taken on line 18—18, Figure 16.

Figure 19 is an enlarged detail sectional view of a portion of the driving mechanism.

Referring more particularly to the drawings, the numeral 20 designates generally a tubular body which may be of any desired length and diameter and is provided throughout its length with cut away portions 21 to permit access to the interior of the body and to the mechanism contained therein.

Encompassing the body at predetermined points throughout its length are rim members 22 which constitute means for rotatively supporting the body and to that end there is provided a supporting base 23 suitably mounted and upon which base is arranged supporting rollers 24, forming a cradle in which the rim members rest. The rim members are of an internal diameter greater than the external diameter of the portion of the body surrounded thereby, so as to provide a space therebetween into which a wedged fastening element is forced to anchor the rim to the body as shown more clearly in Figure 16. Anchor members 25 of substantially U-shape formation may be provided for holding the body portion against displacement during the rotation thereof.

These anchor members pass over the rim members 22 and may be secured in any suitable manner by their ends, by means of fastening devices 26 which also engage the supporting base 23.

If desired, a brake member 27 may be provided for controlling the rotation of the body member.

Within the body 20 is arranged a series of cradles 28 in which the wire reels 29 are mounted. These cradles are spaced from each other in directions lengthwise of the body and the proximate ends of adjacent cradles are disposed in proximity to each other.

Arranged within the tubular body are bearing members 30 in which one end of adjacent cradles is pivotally mounted, and carried by the end of each of these cradles adjacent said bearing is a gear 31. These gears in turn mesh with gears 32 carried by a shaft 33 which latter is journaled in the bearing and is laterally offset with respect to the axis of the gears 31 and the pivots of the cradles 28. One of the gears 31 is provided with an opening therethrough so as to permit the wire from one of the reels to be threaded therethrough.

Also arranged within the body 20 is a supporting member 34 which encompasses a bearing 35 in which adjacent ends of cradles 28 are also

pivotally mounted. The supporting member 34 is of a diameter somewhat less than the internal diameter of the body portion 20 so as to form a space between the periphery of the member 34 and the wall of the body.

The peripheral edge of the support 34 is preferably inclined or beveled as at 36.

Segmental wedge shaped members 37 are adapted to be forced into the space between the periphery of the member 34 and the wall of the body and serve as a means not only to secure the member 34 in position but also as a reinforcing means for the adjacent portion of the wall of the body.

The wedge shaped members 37 may be held in position in any desired or suitable manner, such as by means of fastening bolts 39 and the entire structure embodying the member 36 and the wedge shaped member 37 may be secured against longitudinal displacement in any suitable manner.

Any number of these structures may be provided throughout the length of the body and any number of supporting bearings 30 may also be provided.

These structures are provided within and adjacent the encompassing band or rim 38 and cooperate therewith for maintaining the body against distortion and for bracing the same.

As will be seen from Figure 4, the rim 38 is of an internal diameter substantially greater than the external diameter of the adjacent portion of the body and are held in position by a wedge shaped element forced into the space between the body and said rim.

The body is adapted to be driven from any suitable source of power with a pulley 41 on its shaft. Over this pulley 41 passes a driving belt 42 which in turn passes over a pulley 43 secured to the body 20 for rotation therewith. The end of the body 20 is preferably provided with a closure or end member 44 of any suitable construction and carried by this end member 44 is a trunnion 45 which is journaled in suitable bearings 46 in a housing 47.

Secured to the trunnion 45 and between the end member 44 and the housing 47 is a pulley 48 and this trunnion is preferably journaled in roller bearings 48.

Secured also to the trunnion 45 for rotation therewith, and within the housing 47 is a gear 49 which in turn meshes with a gear 50 carried by a shaft 51.

A sprocket chain 52 passes over a sprocket wheel on the shaft 51 and also over a sprocket wheel on the shaft 53 of a speed reduction mechanism diagrammatically indicated as at 54. This speed reduction mechanism also embodies a shaft 55 which carries a sprocket wheel over which a sprocket chain 56 passes.

This sprocket chain 56 also passes over a sprocket wheel on a shaft 57 which passes through the trunnion 45 and has a bearing therein. This shaft 57 also passes through a bearing 58 arranged within the body 20 and one end of the shaft is connected to one of the cradles 28.

Thus it will be seen that when the pulley 43 is rotated the body 20 will also be rotated and the mechanism is such that it will be rotated at a high rate of speed. The shaft 57 is driven from the body portion 20 by means of an intermediate driving connection which is such as to rotate the cradle to which the shaft 57 is connected in a direction opposite to the direction of the rotation of the body 20 and at a slower rate of speed.

The intermediate gear and shaft connections 31, 32 and 33 between the cradles will also cause them to rotate in the same direction and at the same rate of speed as the direction and speed of rotation of the cradle to which the shaft 57 is directly connected.

The wires as they pass from the reels and through the pivots of the reels, also pass over guide pulleys 59, and in the form of the invention shown in Figures 1 and 4 also pass through the rim members 38 and are brought together at the opposite end of the machine so as to pass through a die or nose plate 60 and from there they are led to the drum or draw off mechanism.

If desired, additional guide members 61 may be provided on the outside of the body through which the wires may pass. These guides 61 may be of any desired configuration but are preferably in the form of loops having a slot 62 therethrough arranged at an angle to the longitudinal axis of the body portion so that in order to insert the wires into the guides and loop, the wires must be twisted and held at an angle. This will prevent accidental displacement of the wires.

Suitable guide pulleys 63 may also be provided adjacent the end of the body where the wires are directed to the die or nose piece 60.

Another form of guide for the wire is shown in Figure 8 at 64 and comprises a hook shaped body having a spring tongue or member 65 forming a closure therefor.

As shown in Figure 9 of the drawings tubular members 66 may be arranged along the outer periphery of the body 20 which pass through the rim or flanged members 22 and through which tubular members the wires from the reels are guided.

In Figure 15 similar tubular members 67 are provided but these members 67 are arranged on the inside of the tubular body 20.

The wires may be initially threaded through these tubular members in any desired manner such as by means of a piston member 68 of a size to fit within the tubular member 66. The piston is provided with an eye 69 to which one end of a wire 70 is connected.

This piston 68 is adapted to be inserted in the tubular member 66 and a blast of air is directed into the tubular member 66 against the piston 68 from a tube 71 on one end of which is provided a nozzle 72. This nozzle is split as at 73 so that the wire will enter thereinto when the nozzle is inserted in the end of the tube 66.

Thus when a blast of air is forced through the nozzle 72 it will strike the piston 68 and force it through the tubular member 66, carrying therewith the end of the wire 70.

In the form of the invention shown in Figure 9 the cradles 74 are mounted for free swinging movement and the axes of the trunnions 76 are disposed between the axes of the pivots of the ends of the cradles and the cradles are provided with open bearings 75 to receive the trunnion or axle 76 of wire reel 77. A locking member 78 passes through the walls of the bearing above the trunnion 76 for locking the wire reel into the cradle. This member 78 is adapted to be operated by means of a handle 79 and withdrawn against the stress of a spring 80 to permit removal or insertion of the reel 77. If desired, a locking screw or bolt 81 may be provided for maintaining the locking member 78 against accidental displacement.

Motion may be imparted to the draw off drum or mechanism by means of a shaft 82 journaled in suitable bearings extending lengthwise of the

machine and which shaft 82 receives its motion by means of a gear 83 meshing with a gear 84 that is carried by the shaft 51.

With this machine and when it is desired to manufacture an ordinary rope or cable, the cradles should be held against rotation and in order to accomplish this a clutch or releasing device such as a screw 51—A may be employed whereby the turn back mechanism such as the sprocket chain connection 52 may be released with respect to the shaft 51, and a locking device may also be provided for holding the shaft 57 against rotation. Any suitable locking device may be provided such as a pin 83 adapted to be inserted through an opening in the sprocket wheel 56—A and into a socket 84.

With this improved construction it will be manifest that there is provided a high speed machine in which the body portion of the machine will be rotated at a high speed and the cradles will be rotated in the opposite direction and at a slower rate of speed.

The pivots or supporting ends of the cradles are spaced from each other so as to permit the wires to be threaded through certain of the pivots and this is accomplished by offsetting the shafts 33 so as to provide a gear connection around the pivots of the adjacent ends of the cradle members.

While the preferred forms of the invention have been herein shown and described, it is to be understood that various changes may be made in the details of the construction and in the combination and arrangement of the several parts, within the scope of the claims, without departing from the spirit of this invention.

What is claimed as new is:

1. In a machine of the character described, a tubular body, means mounting the body for rotation on a horizontal axis, said means embodying a trunnion, a plurality of cradles mounted in said body and spaced from each other in directions lengthwise of the body, a gear connection between the proximate ends of the cradles and extending across the space therebetween, a shaft connected to one of the cradles for supporting one end thereof, said shaft extending through said trunnion, a gear connected with said trunnion and meshing with another gear, an operative connection between the last said gear and said shaft and embodying speed reduction mechanism, and means for rotating said body and said trunnion.

2. In a mechanism of the character described, a tubular body rotatable on a horizontal axis, a cradle in said body, a bearing for one end of the cradle, means for supporting said bearing, said means embodying a member of a diameter less than the internal diameter of said body and with its periphery in proximity to but spaced from the wall of said body, sectional wedge shaped members, means for forcing said wedge shaped members between the periphery of the first said member and the wall of said body for re-inforcing the body, means for securing the parts together, a supporting rim adjacent said members and encompassing the periphery of the said body, and means forming a support upon which said rim rotates.

3. In a mechanism of the character described, a tubular body rotatable on a horizontal axis, a cradle in said body, a bearing for one end of the cradle, means for supporting said bearing, said means embodying a member of a diameter less than the internal diameter of said body and with its periphery in proximity to but spaced from the wall of said body, sectional wedge shaped members, means for forcing said wedge shaped members between the periphery of the first said member and the wall of said body for re-inforcing the body, means for securing the parts together, a supporting rim adjacent said members and encompassing the periphery of the said body, and means forming a support upon which said rim rotates, there being an opening in the wall of said body through which the wire from said reel passes, there also being an opening through said rim through which said wire passes.

4. In a mechanism of the character described, a tubular body rotatable on a horizontal axis, a cradle in said body, a bearing for one end of the cradle, means for supporting said bearing, said means embodying a member of a diameter less than the internal diameter of said body and with its periphery in proximity to but spaced from the wall of said body, sectional wedge shaped members, means for forcing said wedge shaped members between the periphery of the first said member and the wall of said body for re-inforcing the body, means for securing the parts together, a supporting rim adjacent said members and encompassing the periphery of the said body, means forming a support upon which said rim rotates, there being an opening in the wall of said body through which the wire from said reel passes, there also being an opening through said rim through which said wire passes, and supplemental guiding means carried by the periphery of said body through which a wire from said reels passes.

5. In a machine of the character described a horizontally disposed rotatable tubular body, a cradle mounted in said body to swing on a horizontal pivot, a wire reel carried by the cradle, means for rotating the body, a tubular member of substantial length carried by said body and extending lengthwise thereof, and fluid actuated means for initially threading the wire from said reel through the said tubular member.

6. In a high speed machine of the character described a horizontally disposed tubular body, a plurality of wire reel cradles mounted in said body, the proximate pivots of adjacent cradles being spaced from each other, means operatively connecting adjacent cradles, said means embodying a shaft extend across the space between adjacent cradles and laterally spaced from the pivots of the cradles, one of the said pivots having an opening therethrough for the passage of the wire from the reel, means for rotating said body at a high rate of speed, an operative connection between said body and one of said cradles for rotating the cradles in the tubular body, said connections embodying speed reduction mechanism, said cradle rotating in the opposite direction from the direction of rotation of said tubular body and at a slower rate of speed, a plurality of rims encompassing said tubular body for assisting in rotatably supporting the body, and re-inforcing means within the body in proximity to said rims.

7. In a high speed machine of the character described a horizontally disposed tubular body, a plurality of wire reel cradles mounted in said body, the proximate pivots of adjacent cradles being spaced from each other, means operatively connecting adjacent cradles, said means embodying a shaft extending across the space between adjacent cradles and laterally spaced from the pivots of the cradles, one of the said pivots having an opening therethrough for the passage of

the wire from the reel, means for rotating said body at a high rate of speed, an operative connection between said body and one of said cradles for rotating the cradles in the tubular body, said connections embodying speed reduction mechanism, said cradle rotating in the opposite direction from the direction of rotation of said tubular body and at a slower rate of speed, a plurality of rims encompassing said tubular body for assisting in rotatably supporting the body, and re-inforcing means within the body in proximity to said rims, said re-inforcing means embodying a member extending across said tubuluar body and encompassing a pivot of the cradle and terminating short of but in proximity to the wall of said body, and means adapted to be forced into the space between the periphery of said member and the wall of said body.

8. In a machine of the character described, a horizontally disposed rotatable tubular body, cradles mounted in said body to swing on a horizontal pivot, a wire reel carried by each of the cradles, means for rotating said body, and wire guiding means adjacent and supported by the outer periphery of the said body, there being openings in the body through which the wires pass from said reels and through the said guiding means, said guiding means embodying tubular members of substantial length extending lengthwise of said body and substantially parallel with the axis of the body, one end of the respective tubes being adjacent the respective openings in said body.

9. In a machine of the character described, a horizontally disposed rotatable tubular body, cradles mounted in said body to swing on a horizontal pivot, a wire reel carried by each of the cradles, means for rotating said body, and wire guiding means adjacent and supported by the outer periphery of the said body, there being openings in the body through which the wires pass from said reels and through the said guiding means, said guiding means having openings through their body portions whereby the wires may be positioned thereinto at any point intermediate the ends of the wire.

10. A machine of the character described embodying a tubular body rotatable on a horizontal axis, a cradle in the body, means for supporting and means for rotating said body, said supporting means embodying an annular rim encompassing the body and of an internal diameter greater than the external diameter of said body, and wedge shaped means disposed between said body and said annular rim for securing the latter in position, said supporting means embodying means forming a support upon which said rim and body rotates.

11. A machine of the character described embodying a tubular body rotatable on a horizontal axis, reel carrying cradles in the body, and means for supporting said body, the last said supporting means embodying a rim encompassing the body adjacent its periphery and being of a substantial width radially, there being openings through said rim in directions lengthwise of the axis of the said body through which the wires from the reels pass, the said body being provided with openings in its wall through which the wires from the reel pass to the openings in said rim.

12. A machine of the character described embodying a tubular body rotatable on a horizontal axis, reel carrying cradles in the body, and means for supporting said body, the last said supporting means embodying a rim encompassing the body adjacent its periphery and being of a substantial width radially, there being openings through said rim in directions lengthwise of the axis of the said body through which the wires from the reels pass, the said body being provided with openings in its wall through which the wires from the reel pass to the openings in said rim, the said openings through said rim being disposed in close proximity to the periphery of said body, and additional guiding means for the wires.

13. A machine of the character described embodying a tubular body rotatable on a horizontal axis, reel carrying cradles in the body, a rim encompassing said body and being of substantial width radially, there being openings through said rim in directions lengthwise of the axis of the body, the said body being provided with openings through its wall and through which openings in the wall and rim the wires from the reels pass, and a supporting cradle in which said rim rests, said cradle embodying rollers engaged by the periphery of said rim.

14. A machine of the character described embodying a tubular body rotatable on a horizontal axis, a reel carrying cradle in said body, a bearing for one end of the cradle, means for supporting said bearing, said means embodying a member of a diameter less than the internal diameter of said body and with its periphery in proximity to but spaced from the wall of the said body, wedge shaped means forced into the said member and the wall of said body for reinforcing the body, a rim encompassing the body adjacent said member, said rim being of an internal diameter greater than the external diameter of said body to form a space therebetween, wedge shaped means forced into the last said space to secure the rim in position, said rim being of a substantial width radially, and a supporting bearing in which said rim rests.

15. A machine of the character described embodying a tubular body rotatable on a horizontal axis, a reel carrying cradle in said body, a bearing for one end of the cradle, means for supporting said bearing, said means embodying a member of a diameter less than the internal diameter of said body and with its periphery in proximity to but spaced from the wall of the said body, wedge shaped means forced into the space between said member and the wall of said body for reinforcing the body, a rim encompassing the body adjacent said member, said rim being of an internal diameter greater than the external diameter of said body to form a space therebetween, wedge shaped means forced into the last said space to secure the rim in position, said rim being of a substantial width radially, and a supporting bearing in which said rim rests, there being an opening in the wall of said body through which the wire from the reel passes and there also being an opening through said rim through which the wire from the reel passes.

16. A machine of the character described embodying a body supported for rotation on a horizontal axis, a reel carrying cradle mounted upon the body, a rim encompassing the body and being of a substantial width radially, and a bearing in which said rim rests for supporting said body, said rim being provided with an opening through which the wire from said reel passes in a direction lengthwise of the axis of said body.

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