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2,270,237

ROPE MACHINE

Filed July 31, 1941

2 Sheets-Sheet 1

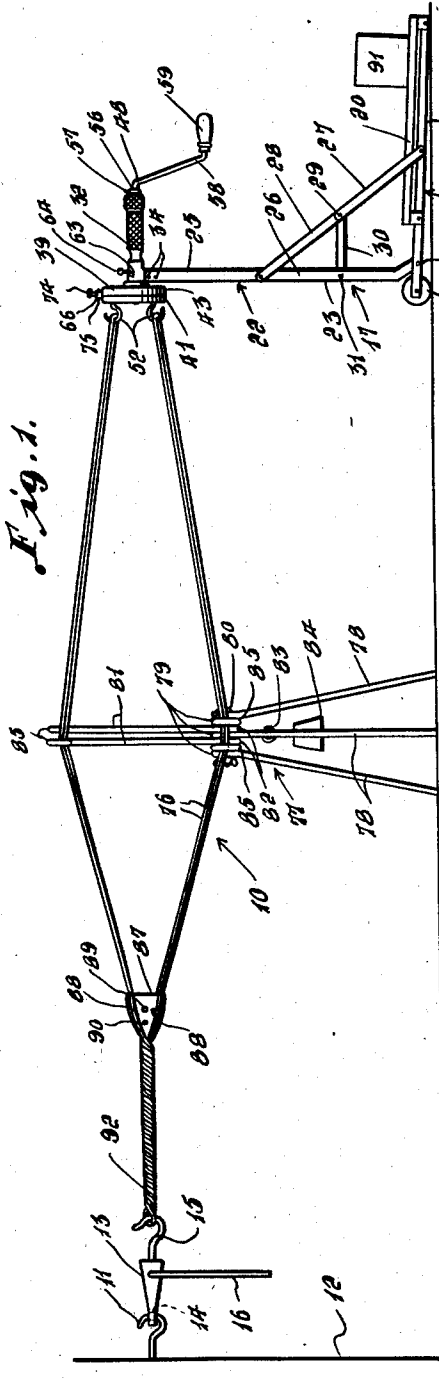


Fig. 6.

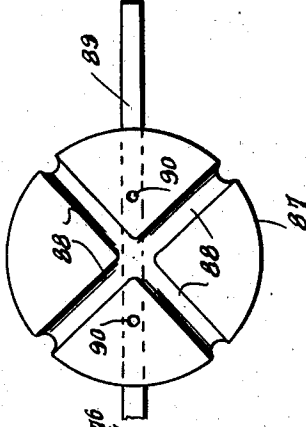


Fig. 7.

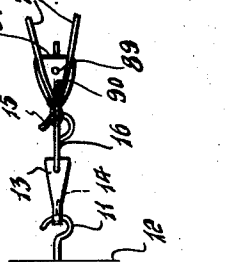
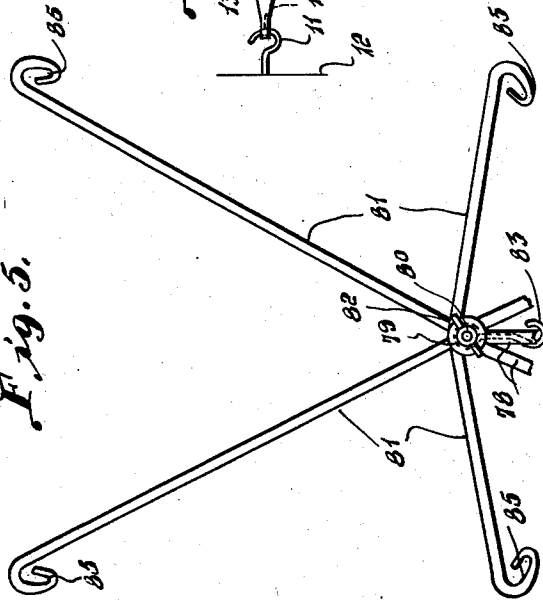


Fig. 5.



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Fig. 2.

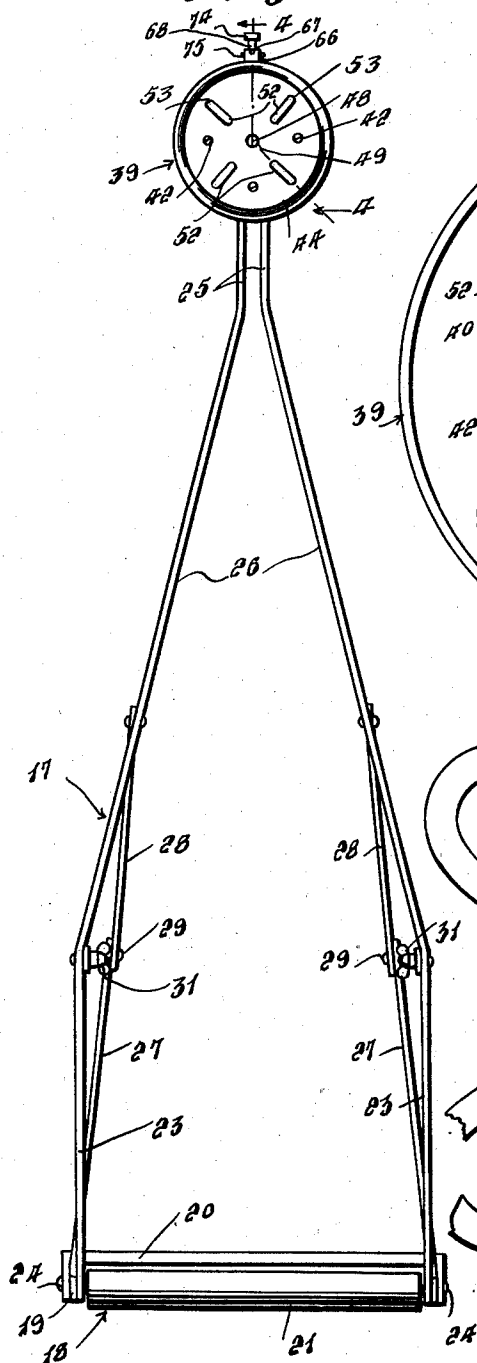


Fig. 3.

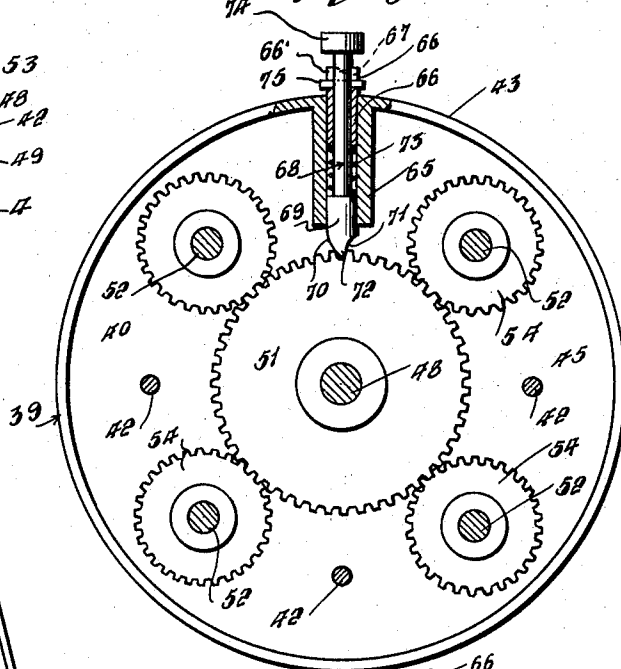
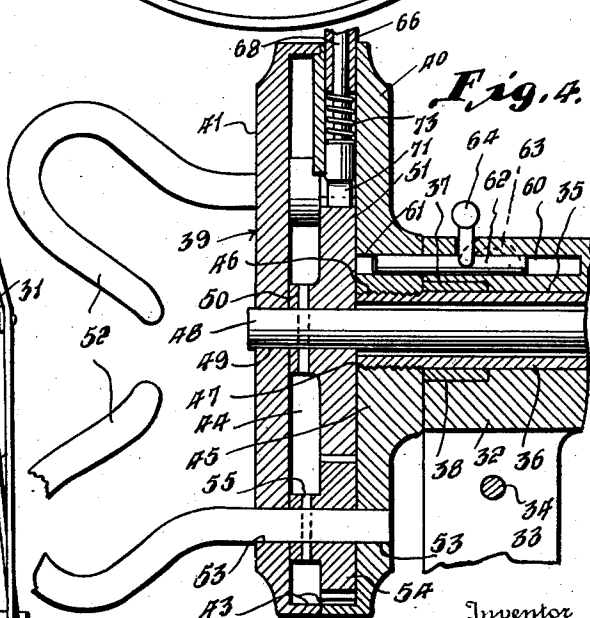


Fig. 4.



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ROPE MACHINE

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5 Claims. (Cl. 57-27)

This invention relates to a novel construction of rope making machine, and more particularly to a machine of simple construction which may be readily operated for twisting a plurality of strands of rope material and for thereafter twisting the individual strands together to form a rope.

Another aim of the invention is to provide a machine having a removable and adjustable spreader for engaging the individual strands of the rope material, intermediate of their ends, so that where a rope is to be formed from frayed rope material the individual strands will be held sufficiently far apart so that there will be no danger of the frayed portions of the different strands from becoming tangled with similar portions of the other strands.

Still a further aim of the invention is to provide a machine for rotating the individual strands or for revolving the strands around one another, said machine being provided with a portable support constructed and arranged so that it can be moved by the tension of the strands for maintaining an equal pressure on the individual strands as they are twisted and reduced in length thereby.

Other objects and advantages of the invention will hereinafter become more fully apparent from the following description of the drawings, which illustrate a preferred embodiment of the invention, and wherein:

Figure 1 is a side elevational view showing the rope making machine in operation and showing a rope partly formed thereby,

Figure 2 is an enlarged front elevational view of the strand twisting machine and its supporting strand,

Figure 3 is an enlarged front elevational view, partly in vertical section of the gear housing of the rope twisting machine with the front cover thereof removed,

Figure 4 is an enlarged sectional view taken substantially along the plane of the line 4-4 of Figure 2,

Figure 5 is an enlarged fragmentary side elevational view of the upper portion of the spreader,

Figure 6 is an enlarged rear elevational view of the guide block, and

Figure 7 is a fragmentary side elevational view showing the guide block in its initial position and in which it is disposed while the individual strands are being twisted.

Referring more particularly to the drawings, wherein like reference characters designate like

or corresponding parts throughout the different views, 10 designates generally the rope making machine in its entirety, and which includes a conventional hook 11 which is adapted to be anchored in a perpendicular surface such as a wall, indicated at 12. A frame 13 is provided with an eyelet 14 in one end thereof which is adapted to detachably engage the hook 11. A hook 15 has its shank end swivelly connected to the opposite end of the frame 13. A U-shaped rod 16 has its intermediate portion pivotally mounted in the frame 13, and said U-shaped rod 16 is provided with corresponding elongated ends for a purpose which will hereinafter be described.

Referring to Figures 1 and 2, 17 designates generally a stand having a base, designated generally 18 including a frame 19 and a platform or floor 20 which is attached to the frame 19 and disposed thereabove. A roller 21 is journaled in the forward end of the frame 19 for supporting the forward end of the base 18 in an elevated position. As seen in Figure 1, the rear end of the base 18 is supported by the rear end of the frame 19 resting on a suitable supporting surface. The stand 17 is provided with a standard portion 22 including a pair of corresponding upright bars 23 which are pivotally connected at their lower ends by fastenings 24 to the base 18, adjacent the forward end of the frame 19. The upper ends 25 of the bars 23 are offset inwardly relatively to the lower ends thereof by means of the inwardly converging intermediate portions 26. A pair of braces 27 are pivotally connected at corresponding ends thereof to the sides of the frame 19, intermediate of the ends of the base 18. A pair of braces 28 are pivotally connected at corresponding ends thereof to the portions 26, intermediate of the ends thereof. The opposite, adjacent and complementary ends of the braces 27 and 28 are pivotally connected to one another by fastenings 29 and a brace 30 is also pivotally mounted at one end thereof on each of the fastenings 29. The opposite ends of the braces 30 are detachably connected to the lower ends of the portions 26 by means of fastenings 31. It will thus be readily apparent that by disconnecting the braces 30 from the fastenings 31, that the braces 27 and 28 may be folded to permit the standard 22 to be folded onto the base 18.

An elongated handle 32 is provided, adjacent its lower end, with a depending lug 33, as seen in Figure 4, which is adapted to be disposed between the portions 25 of the bars 23, and to be detachably secured thereto by fastenings 34 for mounting the handle 32 in substantially a hori-

zontal position on the upper end of the standard 22. As seen in Figure 4, handle 32 is provided with a bore 35 which extends longitudinally therethrough and through which extends a sleeve 36 which is turnably mounted therein. The bore 35 is preferably provided with bushings 37 at the ends thereof, one of which is seen in Figure 4 and which seat in enlarged portions 38 at the ends of the bore 35 to provide means for journaling the sleeve 36.

A gear housing, designated generally 39 includes a rear section 40 and a forward section 41 which sections are detachably connected by means of a plurality of detachable fastenings 42. The sections 40 and 41 are provided with annular flanges 43 which abut, when the sections are connected, for spacing the sections from one another to form a chamber 44 therein. The rear section 40 is provided with a thickened central portion 45, which is thickened on the outer side thereof and which is adapted to bear against the forward end of the handle 32. Portion 45 is provided with a centrally disposed threaded opening 46, which extends therethrough, and which is adapted to engage the forward threaded end 47 of the sleeve 36.

A shaft 48 extends loosely through sleeve 36 and through an opening 49 in the front section 41 by means of which the forward end of the shaft 48 is journaled in the gear housing 39. The shaft 48 extends through and is keyed at 50 to a gear 51 which is disposed in the chamber 44. A plurality of hooks 52 project outwardly from the front of the gear housing 39. Hooks 52 each have a shank end which is journaled in aligned openings 53 in the sections 40 and 41. A pinion 54 is keyed at 55 to each of the shanks of the hooks 52. Pinions 54 are likewise disposed in the chamber 44 and each mesh with the gear 51, as best seen in Figure 3.

Referring to Figure 1, a collar 56 is secured by means of a set screw 57 to the opposite end, not shown, of the sleeve 36 which projects from the rear end of the handle 32. The collar 56 bears against the rear end of the handle 32 to combine with the gear housing 39 to prevent sliding movement of the sleeve 36 relatively to the handle. The shaft 48 projects from the rear end of the sleeve 36 and is provided, therebeyond, with a crank 58 on which is rotatably mounted a handle 59 for revolving the shaft 48 in the handle 32 for turning the gear 51 and the pinions 54.

As seen in Figure 4, the handle 32 is provided with a recess 60 which opens outwardly of its forward end and which is adapted to register with an opening 61 in the portion 45 of the section 40. A bolt 62 is slidably mounted in the recess 60 and is adapted to have its forward end disposed in the opening 61, when in a projected position, for keying the gear housing 39 to the handle 32. Handle 32 is provided with a slot 63 which opens into the recess 60 and which is disposed obliquely to the longitudinal axis of the handle. A pin 64 is attached at its inner end to the bolt 62 and projects outwardly through the slot 63 and is slidably mounted relatively thereto to form an operator whereby the movement of the pin 64, relatively to the slot 63 will move the bolt 62 from a projected position, as seen in Figure 4, to a retracted position, within the recess 60, or conversely, by moving the pin 64 from one end to the opposite end of the slot 63.

A barrel 65, as best seen in Figure 3, is formed integral with the flange 43 of the section 40 and extends inwardly therefrom in a direction

radially of the gear housing 39. As seen in Figure 3, the outer end of the barrel 65 opens outwardly of the gear housing 39 and its inner end opens into the chamber 44. A sleeve 66 is secured in the outer end of the bore of the barrel 65 and has an outer end which projects outwardly therefrom and which is provided with diametrically opposed elongated notches 66' and shorter, diametrically opposed notches 67, which are disposed at right angles to the notches 66'. A plunger, designated generally 68 is slidably mounted in the sleeve 66 and is provided at its inner end with an enlarged head 69 which is slidably mounted in the inner end of the bore of the barrel 65. Head 69 is provided with an inner, free end having an outwardly bowed inwardly tapered side 70 and an inwardly bowed inwardly tapered side 71, which sides combine to form a tooth 72 which is rounded on one side thereof and which is adapted to engage between adjacent teeth of the gear 51, as seen in Figure 3. An expansion coil spring 73 is mounted on the plunger 68, between the inner end of the sleeve 66 and the opposite end of the head 69 for urging the plunger 68 inwardly of the gear housing 39 for holding the tooth 72 in the position, as seen in Figure 3. The opposite end of the plunger 68 projects outwardly from the outer end of the sleeve 66 and is provided with a head or knob 74 by means of which the plunger can be manually retracted against the action of the spring 73. A pin 75 extends transversely through the plunger 68, near the knob 74 and is adapted to engage either of the pair of notches 66' or the pair of notches 67. When the pin 75 is in engagement with the notches 66' it will be obvious that the tooth 72 will be disposed for engaging between the teeth of the gear 51, as in Figure 3, and by retracting the plunger 68 and turning it through an arc of 180 degrees and then allowing the pin 75 to again engage the notches 66', it will be apparent that the tooth 72 can again be positioned in engagement with the teeth of the gear 51 but with its sides 70 and 71 oppositely disposed relatively to the position of Figure 3. It will be readily apparent that with the tooth 72, disposed, as in Figure 3, that the tooth will function to prevent the gear 51 from being turned in a counterclockwise direction but will allow the gear to turn in a clockwise direction as the rounded side 70 can ride over the gear teeth with the plunger 68 being retracted thereby against the action of its spring 73. Likewise, the side 71 will prevent the gear from turning in a counterclockwise direction. If the plunger 68 is turned through an arc of 180 degrees, as previously explained, it will likewise be apparent that the gear 51 could be turned in a counterclockwise direction but that the tooth 72 would prevent it from turning in a clockwise direction. By positioning the ends of the pin 75 in engagement with the notches 67, it will be readily apparent that the plunger 68 will be held in a retracted position with its tooth 72 out of engagement with the teeth of the gear 51 so that said gear may be freely turned in either direction.

As seen in Figure 1, the stand 17 with the twisting mechanism mounted thereon is adapted to be remotely positioned relatively to the swivel hook 15 and a plurality of strands of rope material 76 are arranged therebetween with corresponding ends of the strands 76 connected to the rotatable hooks 52 and the opposite ends of the strands 76 connected to the swivel hook 15. Intermediate

of the ends of the strands 76 is mounted a reader, designated generally 77 which includes a plurality of upwardly converging supporting legs 78 having eyelets 79 at their upper ends which are pivotally connected to one another by means of a bolt 80 which extends therethrough. A plurality of spreader arms 81 are provided with eyelets 82 at corresponding ends thereof, which are likewise pivotally mounted on the bolt 80. A hanger 83 is supported by the bolt 80 and depends therefrom and is disposed between the legs 78. Hanger 83 is provided with a hooked shaped lower end adapted to be detachably connected to a weight 84. The opposite, free ends of the spreader arms 81 are bent to provide hooked shaped portions 85, the bills of which extend away from the bolt 80. A wing nut 86 is carried by the bolt 80 and is adapted to be tightened for frictionally clamping the eyelets 79 and 82 together to hold the supporting legs 78 in adjusted positions relatively to one another, and also to hold the spreader arms 81 in adjusted positions relatively to one another, as seen in Figure 5. Said hooked shaped portions 85 are adapted to each engage a strand 76, intermediate of its ends, as seen in Figure 1, for holding the strands 76, spaced a substantial distance apart, for a purpose which will hereinafter become apparent. It will be readily apparent that the hooked shaped portions 85 are so arranged that the strands 76 will be held in engagement therewith or may be readily disengaged therefrom.

A block 87, as seen in Figures 1, 6 and 7, is tapered from one end to the opposite end thereof and is provided with four equally spaced longitudinally extending grooves 88 in its outer side which converge and join at the rear end of the block 87. Block 87 is provided with a handle 89 which extends transversely therethrough and which is provided with corresponding ends which project outwardly therefrom, between the grooves 88. Block 87 is also provided with longitudinally extending openings 90 which open outwardly of the forward end of the block 87 and which open outwardly of the outer portion of the block adjacent its rear end. A pair of openings or bores 90 are disposed substantially parallel and extend through the handle member 89 and are disposed substantially the same distance from one another as the ends of the U-shaped member 16.

The block 87 is adapted to be disposed, as seen in Figure 7, adjacent the swivel hook 15 and with the strands 76 engaging the grooves 88 for supporting the block 87. The ends of the U-shaped member 16 extend through the openings or bores 90 for preventing the block 87 from rotating. Said block thus supports the U-shaped member 16 in substantially a horizontal position and with the hook 15 disposed between the ends or legs thereof which ends or legs prevent the hook 15 from turning in its swivel support 13. With the strands 76 thus engaging the block 87, with the intermediate portions of the strands engaging the hooked portions 85, and with the bolt 82 in the position, as seen in Figure 4, then the crank is turned for twisting the strands 76 all in the same direction, depending upon the position of the tooth 72, as previously described, by the rotation of the hooks 52 which are all turned in the same direction by the operation of the crank 58. The spreader 77 is employed only if the strands 76 are of material which readily frays so that the frayed portions of the different strands might otherwise become tangled, for

holding the strands 76 well apart. Consequently, if the strands of rope material 76 are such that they do not have shreads or frayed portions projecting therefrom the spreader 77 may be omitted. As the strands 76 are thus twisted they will obviously be reduced in length, and the stand 17 will be moved toward the upright surface 12 by the tension of the strands 76 as they are twisted to maintain an equalized tension thereon. If desired, the operator who is turning the crank 58 may stand on the platform or floor 20 for weighting the stand 17 to cause it to resist the pull exerted thereon or a weight 91, as seen in Figure 1, the weight of which may vary depending upon the thickness of the strands 76, can be placed on the platform 20 for accomplishing the same purpose. After the individual strands 76 have been twisted sufficiently, the second operator who is holding the handle end 89, to prevent the block 87 from sliding away from the hook 15, can move the block 87 away from the hook 15 sufficiently to disengage the U-shaped member 16 from the openings 90 to permit said member to swing downwardly to its position of Figure 1 to thereby allow the portions of the strands 76, between the block 87 and the hook 15 to twist around one another, thus revolving the hook 15 to form the rope 92. The second operator then gradually allows the block 87 to move away from the hook 15, while the first operator continues to revolve the crank 58 for continuing the formation of the rope 92 until the block 87 approaches the spreader 77. The spreader 77 is then detached from the strands 76 and removed and this operation of the movement of the block 87 and the turning of the crank 58 is continued until the block 87 reaches a point adjacent the gear housing 39. At any time during this operation, should the first operator release the crank 58 it will be readily apparent that the plunger 68 will prevent the strands from turning the hooks 52 in the opposite direction to thus allow the strands to unwind. When the block 87 reaches a position adjacent the gear housing 39 it is detached from the strands 76. The U-shaped member 16 is then returned to the position, as seen in Figure 7, and thus held by the second operator to prevent rotation of the swivel hook 15 while the first operator moves the pin 64 to retract the bolt 62 for releasing the gear housing 39. By continuing to turn the crank 58 in the same direction, the tension on the twisted strands 76 will cause the gear casing 39 and the parts carried thereby to turn as a unit to form a uniformly twisted rope 92. With the hooks 52 then disposed so that the bills of the hooks are pointed inwardly, the strand ends can be detached therefrom and the opposite end of the rope can then be detached from the swivel hook 15.

A short soft rope can be made without the use of the support 13 and the parts carried thereby, the spreader 77 or the block 87, by attaching the ends of the strands, that would ordinarily be attached to the hook 15, directly to the hook 11. The forming of the rope can be performed by a single operator holding the parts carried by the handle 32 by grasping the handle 32, thus permitting the stand 17 to be dispensed with. With the bolt 62 in a projected position, as seen in Figure 4, the operator employs the other hand for revolving the crank 58 to twist the individual strands, after which the bolt 62 is retracted so that the housing 39 can be turned by the crank

58 for twisting the strands about one another to form the rope.

Various modifications and changes are contemplated and may obviously be resorted to, provided they fall within the spirit and scope of the invention as hereinafter defined by the appended claims, as only a preferred embodiment of the invention has been disclosed.

I claim as my invention:

1. A rope making machine comprising a swivel hook having a frame in which the hook is swivel-ly mounted, said frame being adapted to be connected to an anchor means, a stand including a base having a roller at one end thereof and a standard pivotally connected to and projecting upwardly from said base adjacent said aforementioned end, brace means for holding said standard in an upright position, a turning implement detachably connected to the upper end of said stand, said turning implement including a crank, a plurality of hooks, and gear means for connecting the crank to said hooks for revolving the hooks when the crank is revolved; said last mentioned hooks and swivel hook being adapted to be connected by strands of rope material, a spreader disposed between said swivel hook and stand, said spreader being provided with a plurality of pivotally connected arms having hooked shaped free ends through which the individual strands loosely extend, a guide block having grooves for engaging said strands, said guide block having openings extending longitudinally therethrough, and a U-shaped member pivotally connected to the frame of said swivel hook, the ends of said U-shaped member being removably mounted in the openings of said guide block to prevent rotation of the guide block, while in engagement with said U-shaped member, to hold the strands, at the ends thereof which are connected to the swivel hook, while the opposite ends of the strands are revolved.

2. A rope making machine as in claim 1, the brace means of said stand being formed of pivotally connected brace members, and said brace members being foldable for folding the standard onto said base.

3. In a rope making machine, a gear housing, a plurality of hooks journaled therein, a turning member journaled in the housing, a gear disposed in the housing and keyed to the turning member, pinions keyed to said hooks and disposed in the housing and enmeshed with said gear, said hooks being adapted to be connected to ends of strands of rope material for twisting the strands when the turning member is revolved, a sleeve portion formed in said gear housing and disposed radially thereof, a bushing mounted in said sleeve and projecting outwardly of the gear housing, a plunger slidably

mounted in said bushing and provided with a head at its inner end, said head being slidably mounted in the inner end of said sleeve and being provided with a curved tooth for engaging between the teeth of said gear for preventing the gear from turning in one direction, spring means for urging said plunger inwardly of the sleeve, means for turning said plunger, when in a retracted position, for positioning the tooth so that its curved side will be facing in either direction relatively to the teeth of the gear for holding the gear against turning movement in either direction and for permitting the gear to be revolved in the other direction, and means for holding said plunger in a retracted position and out of engagement with the gear teeth.

4. A rope making machine comprising an anchored member, a hook swivelly connected thereto, a plurality of rotatably mounted hooks remotely disposed relatively to said swivel hook, said rotatable hooks each being connected to an end of a strand of rope material, said swivel hook being connected to the opposite ends of said strands, a block disposed adjacent said swivel hook and having grooves adapted to engage said strands, said block being provided with longitudinally extending openings, a U-shaped member pivotally connected to said anchored support and having its ends extending through the openings of said block, a spreader disposed between said swivel hook and said rotatable hooks, said spreader being provided with a plurality of pivotally mounted arms, said arms being provided with hooked shaped free ends for loosely engaging said strands for spreading the strands intermediate of their ends, and means for simultaneously revolving said rotatable hooks in corresponding directions for twisting the individual strands.

5. A rope making machine comprising a hook adapted to be connected to an anchor member, a head, a plurality of hooks journaled therein, means for rotating said last mentioned hooks in unison and in the same direction, said last mentioned hooks being adapted to be connected to ends of strands of rope material, the first mentioned hook being adapted to be connected to the opposite ends of the strands, a spreader disposed between the first mentioned hook and the last mentioned hooks, said spreader having spaced portions for loosely engaging said strands, a stand for fixedly supporting the spreader, while in use, a block, disposed between the first mentioned hook and spreader, and having means to engage the strands, and means detachably connected to the block for detachably engaging the first mentioned hook to hold it against rotation.

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