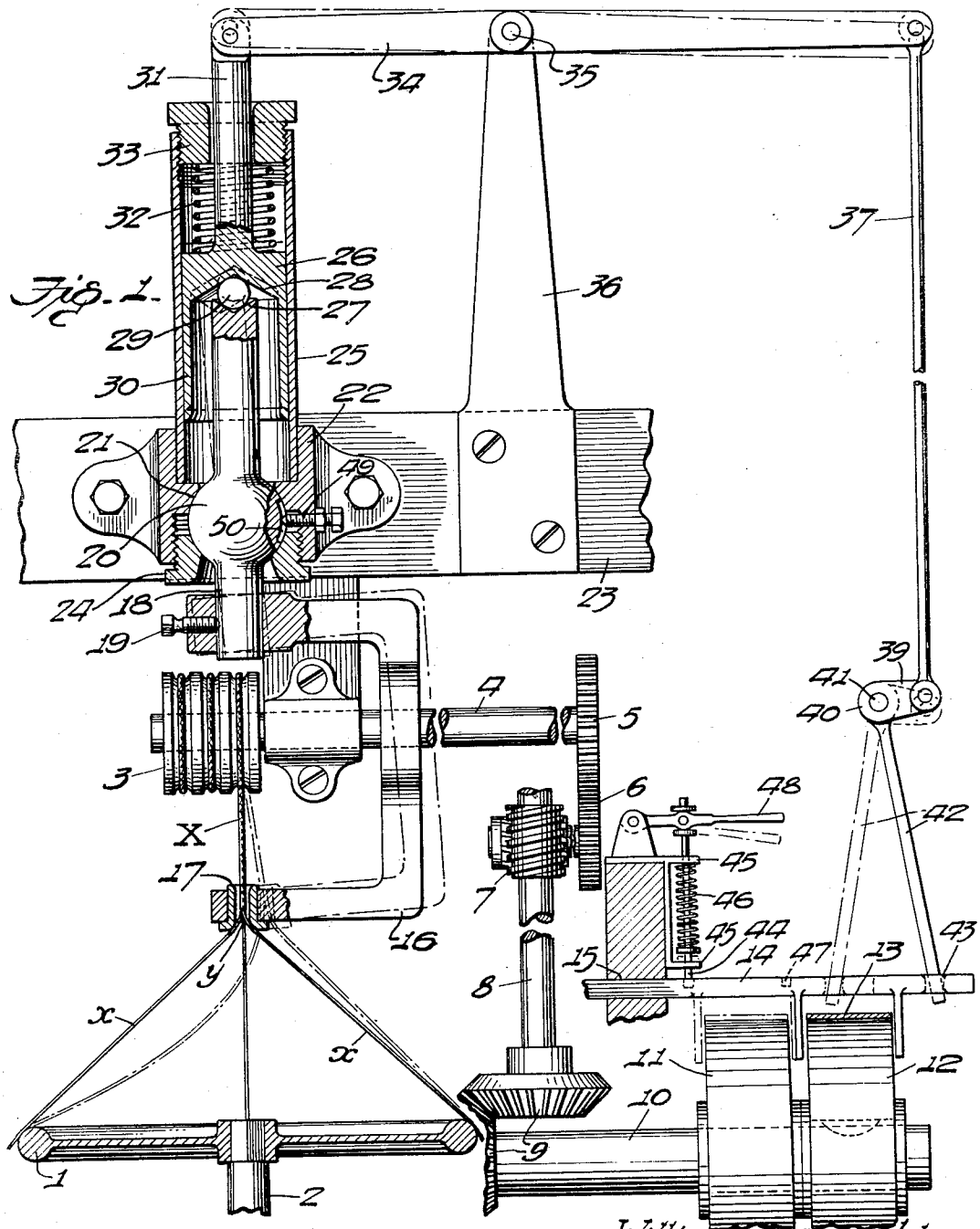
Sept. 12, 1933. W. C. WRIGHT 1,926,963

STOP MOTION FOR BRAIDING OR TWISTING MACHINES

Filed Sept. 30, 1932 2 Sheets-Sheet 1



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Fig. 2.

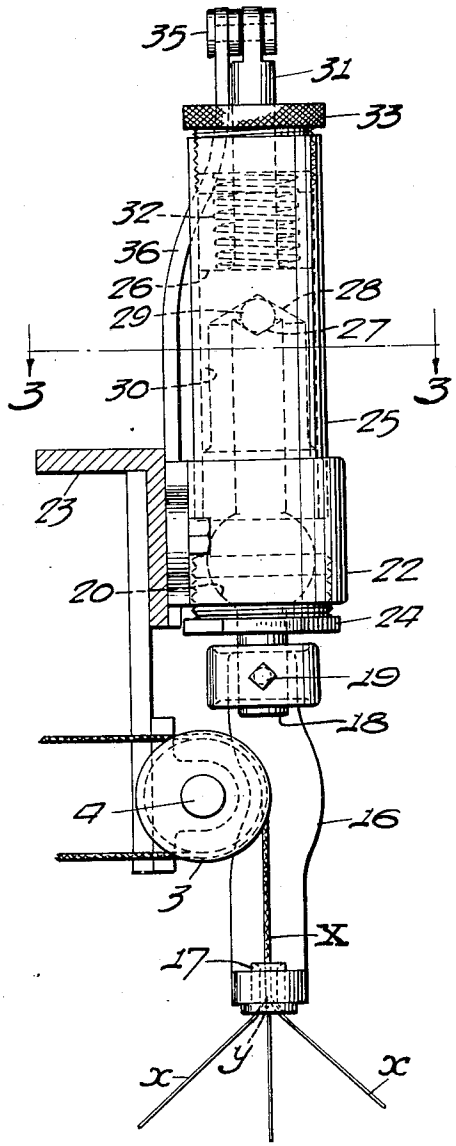
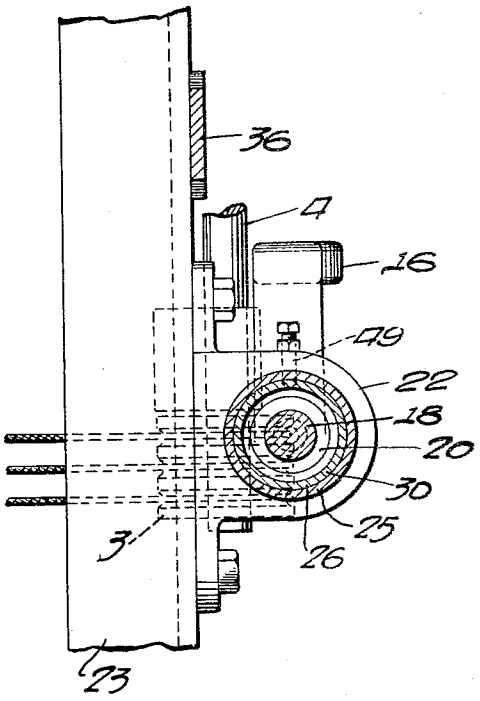


Fig. 3.



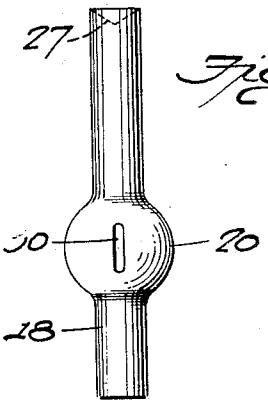


Fig. 4.

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STOP MOTION FOR BRAIDING OR TWISTING MACHINES

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Application September 30, 1932
Serial No. 635,662

9 Claims. (Cl. 96—19)

The present invention relates to improvements in rope braiding and twisting machines of the general class wherein the strands or threads to form the rope converge to a braiding point or former guide where they are laid together to form the rope, and the object of the invention is to provide a simple and efficient stop motion or knock-off device which will act immediately and with certainty to stop the operation of the machine in the event of irregular or unequal relative tension on the strands or threads, especially if a strand or thread at any side of the braiding point or former guide becomes tighter or more slack than a strand or thread at the opposite side thereof.

More particularly the invention provides a gyratory member which carries the former guide at the braiding point to which the strands to form the rope converge and through which the strands pass to the take-off sheave of the machine, and which is capable of swinging in any direction in response to inequality in the tension of the strands at any side of the braiding point or guide, in conjunction with a plunger actuated by such swing of the gyratory member and controlling the main driving means of the machine so as to interrupt the driving thereof and thereby stop its operation and thus avoid imperfections in the rope in course of production.

To these and other ends, the invention consists in certain improvements and combinations and arrangements of parts all as will be hereinafter more fully described, the features of novelty being pointed out particularly in the claims at the end of this specification.

In the accompanying drawings:—

Fig. 1 is an elevation, partly in section, of a portion of a braiding machine to which the present invention is shown applied;

Fig. 2 is an elevation of a portion of the structure shown in Fig. 1 as viewed from the left in that figure;

Fig. 3 is a horizontal section taken on the line 3—3 in Fig. 2; and

Fig. 4 is a detail view of the shaft forming part of the stop motion or throw-off device.

Similar parts are designated by the same reference characters in the different figures.

Stop motion or knock-off means according to the present invention is applicable generally to braiding or twisting machines of the general class in which the strands to form the rope or other product are supplied in convergent relation to a braiding point or former guide. The preferred embodiment of the invention is shown in the present instance and will be hereinafter described in detail, but it is to be understood that the invention is not restricted to the precise construction shown since equivalent constructions are contemplated and such will be included within the scope of the claims.

In the present instance, the improved stop motion or knock-off means is shown applied to a braiding machine of the construction fully shown and described in Letters Patent No. 1,765,117 granted June 17, 1930, 1 representing the circular guide ring of the machine which is rotatable on the central vertical stationary pedestal 2 thereof about which the sets of strand supply bobbins and fliers rotate and braid the strands together, as for example is shown and described in said patent, the strands x passing over the guide ring and converging to a braiding point y at which they are assembled or laid together in the well known manner to form the rope or other braid X. The rope or braid is received by feeding means which serves to draw the same from the machine as it is formed, such feeding means comprising a take-off sheave 3 which may be grooved as shown and about which the rope or braid may be passed a suitable number of times so that it will be advanced thereby, this sheave being driven continuously during the operation of the machine by a shaft 4 which is driven in timed relation to the braiding mechanism of the machine, as by gears 5 and 6, worm gearing 7 driving the gear 6, and vertical shaft 8 and bevel gears 9 which connect said shaft to the main drive shaft 10 of the machine, substantially as shown in said patent, the take-off sheave serving to withdraw the rope or other braided product at such a speed as to maintain the normal tension upon the strands passing to the braiding point from the strand supply bobbins, it being understood that the braiding mechanism is also driven from the main shaft 10 as in said patent. The main drive shaft 10 is provided with loose and tight pulleys 11 and 12 respectively thereon to receive a main driving belt 13, the latter being shiftable from one of these pulleys to the other to drive the machine or to permit the same to be idle, and the belt is provided with a belt shifter 14 which is slidable in a guide 15 and serves to shift the belt from the tight pulley to the loose pulley and thereby interrupt the operation of the machine. Obviously, however, a clutch or other suitable means may be employed for connecting and disconnecting the machine with respect to its source of power.

The stop motion or knock-off device provided by the present invention comprises an arm 16 which carries a former guide or eye 17 which is

adapted to be normally positioned substantially at or adjacent to the braiding point and centrally of the braiding mechanism. This arm is substantially yoke-shaped so that its lower end will support the former guide 17 below the take-off sheave 3, and its upper end, which overlies or is above said sheave, is supported by the lower end of a vertical shaft 18 which may be fixed to said arm by a set screw 19, as shown, or in any other suitable manner. The shaft 18 is formed, at a point between its ends, with a spherical portion 20 which is mounted to rock universally or in all directions in a hemispherical seat 21 formed in a bracket 22, the latter being bolted or otherwise fixed to the cross member 23 of the stationary frame of the machine which overlies the braiding mechanism, substantially as shown in said patent, the portion 20 on said shaft being retained in said seat by a nut 24 which is threaded in the lower portion of the bracket 22 and has a complemental hemispherical seat to rockably engage the under side of the spherical portion 20 on said shaft. The shaft 18 extends above the spherical portion 20 thereon and into a tubular casing 25 the lower end of which is fixed in the bracket 22, and this casing contains a plunger 26 which is reciprocable vertically therein. The upper end of the shaft 18 is formed with a conical or other suitable concavity 27 the axis of which is preferably concentric with the center of the shaft 18, and the lower portion of the plunger 26 is formed with a reversely arranged or complemental concavity 28 which is conical as shown and is concentric with the center of the plunger 27. A ball or other spherical body 29 is interposed between the concavities of the shaft 18 and plunger 26, it being free to roll on the relatively inclined walls or surfaces of the concavities when the shaft 18 is rocked laterally in any direction about the spherical portion 20 thereof as a center or fulcrum. The lower end of the plunger 26 is preferably formed with a sleeve-like extension 30 to surround the upper end of the shaft 18 and thereby prevent contact between the upper end of said shaft and the surrounding casing 25. The upper end of the plunger 26 is reduced in diameter to form a stem 31, a coiled compression spring 32 surrounds this stem and bears on the upper end of the plunger 26 to force the latter downwardly or toward the shaft 18, and an adjusting nut 33 is screw threaded into the upper end of the casing 25 and bears on the spring 32, adjustment of this nut in the casing adjusting the power of the spring 32. The stem 31 on the plunger is pivotally connected to one arm of a lever 34, the latter being pivoted at 35 to a bracket 36 which may be fixed to the cross member 23 of the frame of the machine, the other end of the lever 34 being operatively connected by a rod or link 37 to an arm 39 of a lever 40, the latter being mounted to rock on a relatively fixed pivot 41 and having an arm 42 which engages an aperture 43 in the belt shifter 14 so that it will reciprocate the latter when the lever 40 is rocked on its pivot. A detent 44 may be mounted to reciprocate in guides 45 attached to the bracket 15, this detent being forced toward the belt shifter 14 by a spring 46 so that it will ride thereon, and the belt shifter having a notch or recess 47 therein to receive the detent 44 when the belt shifter has been operated to transfer the driving belt 13 from the fixed pulley 12 to the loose pulley 11 thereby maintaining the machine in idle condition after it has been stopped by the shifting of the driving belt to the loose pulley. A handle 48 may be pivoted on the bracket 15 and connected to the detent 44 for manually releasing the latter and thereby permitting restarting of the machine. Although the shaft 18 and the arm 16 fixed thereto may rock laterally in any direction about the spherical portion 20 of said shaft as a center, a set screw 49 is preferably provided in the bracket 22 to engage a groove 50 in the spherical portion 20 so as to prevent rotation of the shaft 18 about its longitudinal center, this set screw thus serving to hold the arm 16 in proper position to clear the shaft 4.

The operation of the stop motion or knock-off device provided by the present invention is as follows:—

The strands or threads x leading from the bobbins and fliers comprising the braiding mechanism of the machine pass over the guide ring 1 and, during the normal operation of the machine, will be under substantially equal tension around this ring so that they will be evenly laid together or assembled at the braiding point to form the rope or other braided product. The rope or braided product passes through the former guide 17 which, according to the present invention, is carried by the arm 16. Although the former guide may swing laterally in any direction, it will be normally maintained in central position with respect to the braiding mechanism of the machine by the substantially equal tension on the strands or threads x converging to the braiding point. However, should a strand or thread at one side of the former guide become slack, due to breaking of the strand, exhaustion of its bobbin, or any other cause, as for example, is represented by the dotted lines at the left in Fig. 1, the greater tension then existing on the strand or strands at the opposite or right hand side of the former guide will act to pull the latter and the arm 16 which carries it laterally, thus causing the arm 16 and shaft 18 to rock laterally about the spherical portion 20 of said shaft as a center, as represented by the dotted lines in Fig. 1, and the consequent lateral displacement of the upper end of the shaft 18 will cause the ball 29 to ride on the inclined surfaces of the concavities 27 and 28 in the adjacent ends of the shaft 18 and the plunger 26, in consequence of which the plunger 26 will be forced upwardly, rocking the lever 34 to force the rod or link 37 downwardly and the latter rocking the lever 40 from the full line position to the dotted line position shown in Fig. 1, thereby causing the arm 42 of the lever 40 to act on the belt shifter 14 to slide it in a direction to remove the driving belt 13 from the fixed or driving pulley 12 on the main drive shaft 10 of the machine and to place it on the loose pulley 11, thereby automatically interrupting the operation of the machine, and the detent 44 will engage the notch or recess 47 in the belt shifter 14 when the latter is moved into position to place the driving belt on the loose pulley 11 and will thereby hold the machine in idle condition until the machine is restored to proper working condition. The arm 16 and shaft 18 will be thus swung laterally to interrupt the drive of the machine also in the event that undue tension is imposed upon a strand at any side of the former guide, as might result from tangling of a strand or strands or from other causes. The ball and socket mounting for the former guide and its supporting shaft enables this guide to swing laterally in any direction with respect to its axis in response to any unevenness or inequality in the tension of the strands converging toward the braiding point, the former

guide remaining in its normal central position while the strands or threads are under equal tension but swinging laterally to interrupt the operation of the machine should any inequality in the tension of the strands at any side of the former guide develop.

I claim as my invention:—

1. In a rope braiding or twisting machine in which the rope forming strands converge to a point, a gyratory member subject to the tension on the convergent strands and supported for movement in different directions in response to relative inequalities in the tension on different strands, and stopping means for the machine controlled by said movement of said member.

2. In a rope braiding or twisting machine in which the rope forming strands converge to a point of assembly, a gyratory member having a former guide cooperative with the strands adjacent to said point and supported for movement in different directions in response to inequalities in the tension on the strands at different sides of said point, and stopping means for the machine controlled by said movement of said member.

3. In a rope braiding or twisting machine having a guide ring rotatable with the strands, a member having a former guide to receive the strands from said guide ring at various angles laterally of its axis, means supporting said member to swing in any direction laterally of the axis of said guide in response to unequal tension on the strands at different sides of the guide, and stopping means for the machine controlled by said lateral swing of said member.

4. In a rope braiding or twisting machine, a member having a former guide to receive the rope forming strands from various sides of its axis, a supporting shaft for said member alined with the axis of said guide, means for supporting said shaft for universal lateral swinging movement, and stopping means for the machine controlled by said lateral swing of said member.

5. In a rope braiding or twisting machine, the combination with a take-off sheave for removing the rope therefrom, of a yoke-shaped arm having one end arranged below said sheave and provided with a former guide to receive the rope forming strands from various sides of its axis and having its other end arranged above said sheave, a supporting shaft connected to the upper end of said arm in alinement with the axis of said guide, means supporting said shaft for universal lateral swinging movement, and stopping means for the machine controlled by said lateral swing of said arm.

6. In a rope braiding or twisting machine, a member having a former guide to receive the rope forming strands from various sides of its axis, a shaft connected to said member and extending in substantial alinement with the axis of said guide, said shaft having a concavity in an end thereof, means supporting said shaft for universal swinging movement laterally of its length, a plunger mounted to reciprocate substantially in the direction of the length of said shaft and having a concavity in its end opposite to the concavity in the end of said shaft, a ball seated in the concavities of said shaft and plunger, and stopping means for the machine controlled by the reciprocation of said plunger.

7. In a rope braiding or twisting machine, a member having a former guide to receive the rope forming strands from different sides of its axis, a shaft fixed to said member in substantial alinement with the axis of said guide and having a spherical portion thereon, a spherical socket cooperative with said spherical portion of the shaft for supporting the latter for universal swinging movement laterally of its length, a plunger mounted to reciprocate beyond an end of said shaft and substantially in the direction of the length thereof, means interposed between the adjacent ends of said shaft and plunger for reciprocating the latter when the shaft is moved laterally, and stopping means for the machine controlled by the reciprocating movement of the plunger.

8. In a rope braiding or twisting machine, a member having a former guide to receive the rope forming strands from different sides of its axis, a supporting shaft for said member extending substantially in alinement with the axis of said guide, means supporting said shaft to swing universally laterally of its length, a plunger mounted to reciprocate toward and from an end of said shaft, said shaft and plunger having opposed ends provided with reversely formed concavities, a ball interposed between the opposed ends of said shaft and plunger and freely rolling in said concavities when the shaft is swung laterally, means yieldingly pressing said shaft and plunger relatively toward one another to hold them in engagement with said ball, and stopping means for the machine controlled by reciprocation of said plunger.

9. In a rope braiding or twisting machine, a member having a former guide to receive the rope forming strands from different sides of its axis, a shaft connected thereto and extending substantially in alinement with the axis of said guide, said shaft having a spherical enlargement thereon between its ends and having a concavity in one of its ends, a supporting casing having a socket therein cooperative with said enlargement on the shaft to support the latter to swing laterally of its length, a plunger mounted in said casing to reciprocate substantially in the direction of the length of said shaft and having a concavity in its end opposite to the concavity in said shaft, a ball movably contained between the concavities of said shaft and plunger, a spring supported by the casing and acting on the plunger to force it yieldingly toward said shaft, and stopping means for the machine connected to said plunger and controlled by the reciprocation thereof.

WILLIAM C. WRIGHT.