Nov. 7, 1939. W. E. SOMERVILLE 2,179,304

CLOSER FOR WIRE ROPE OR STRANDING MACHINES

Filed Feb. 27, 1939 4 Sheets-Sheet 1

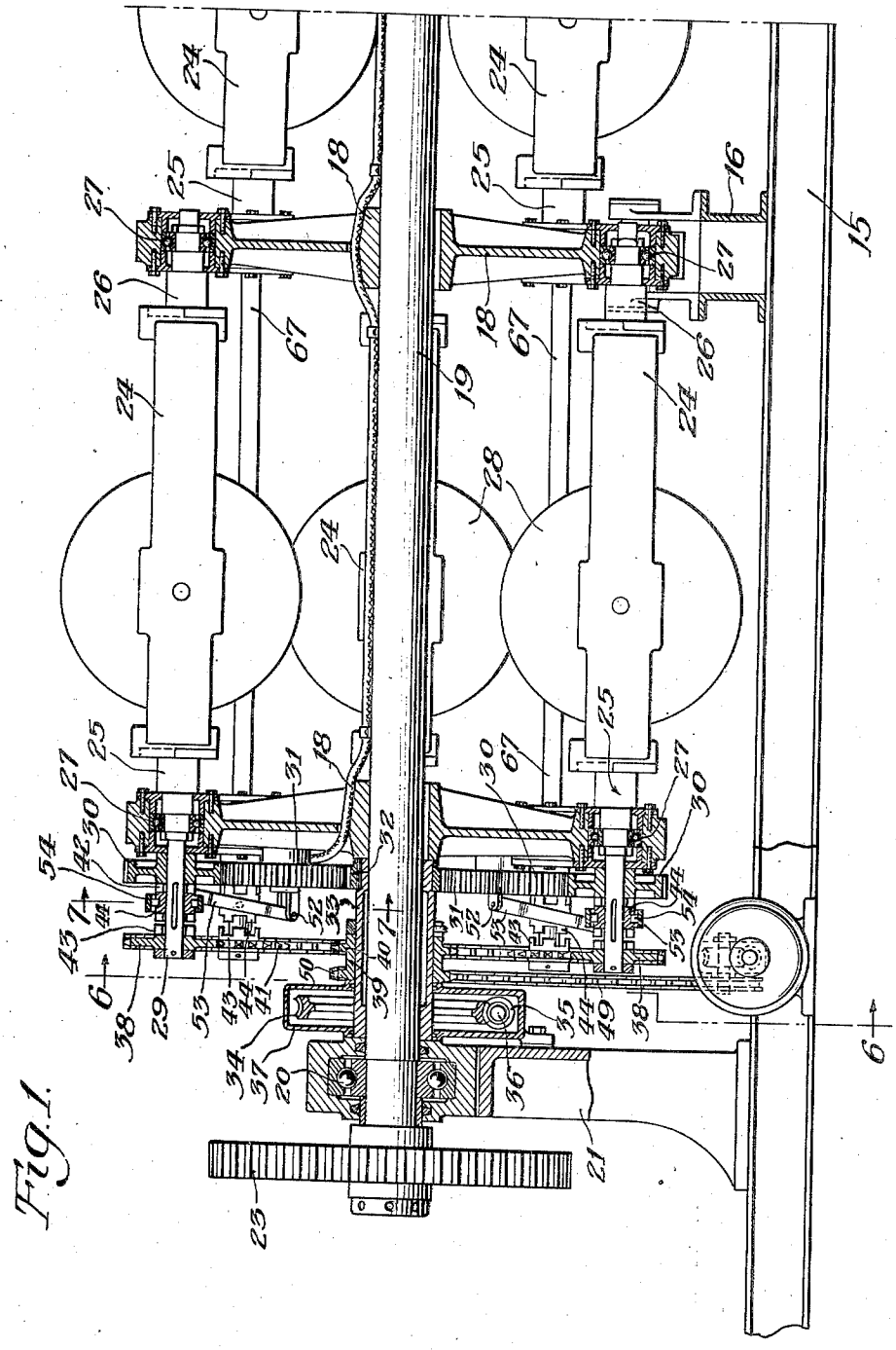


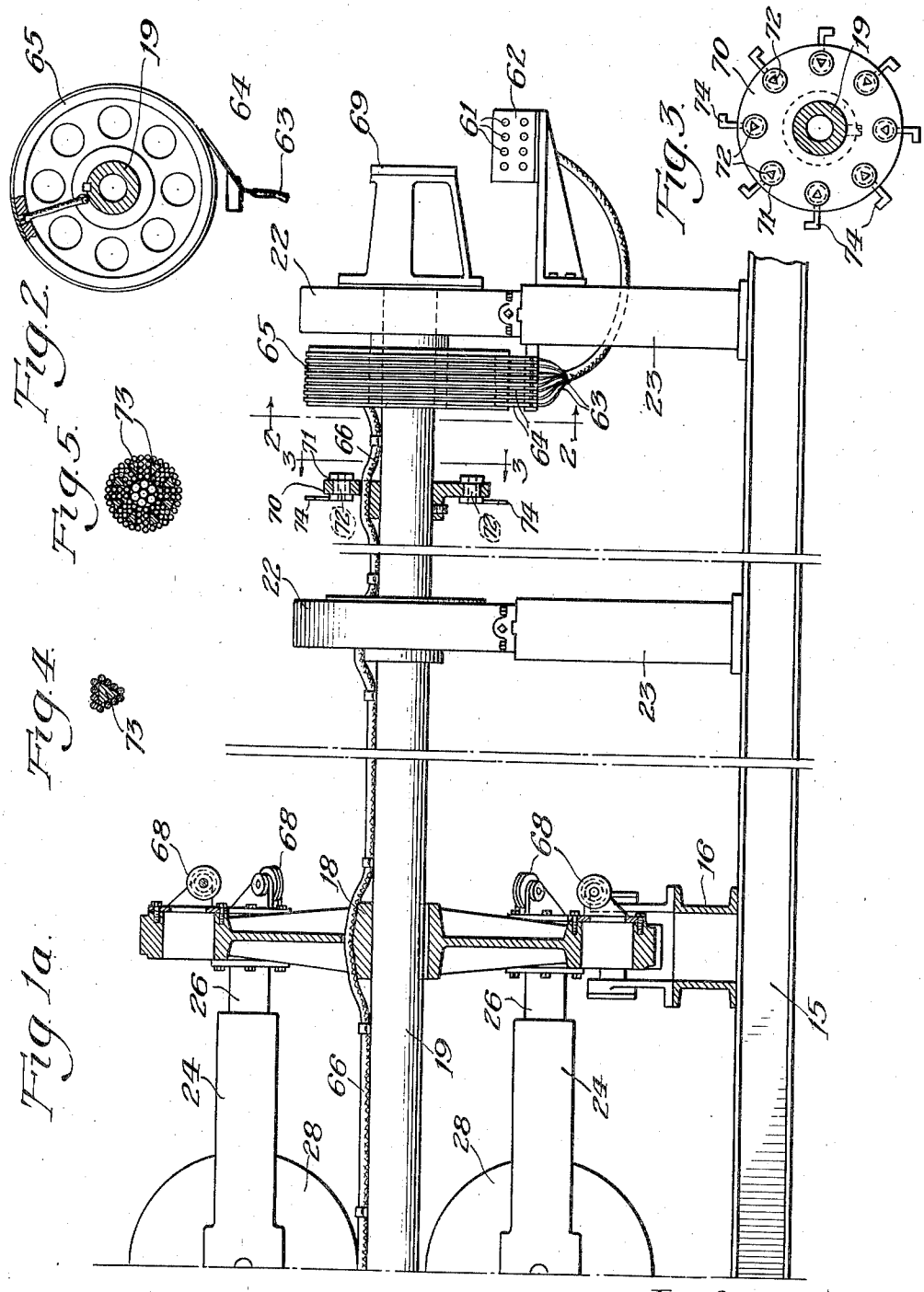
Fig. 1.

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CLOSER FOR WIRE ROPE OR STRANDING MACHINES

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Fig. 6.

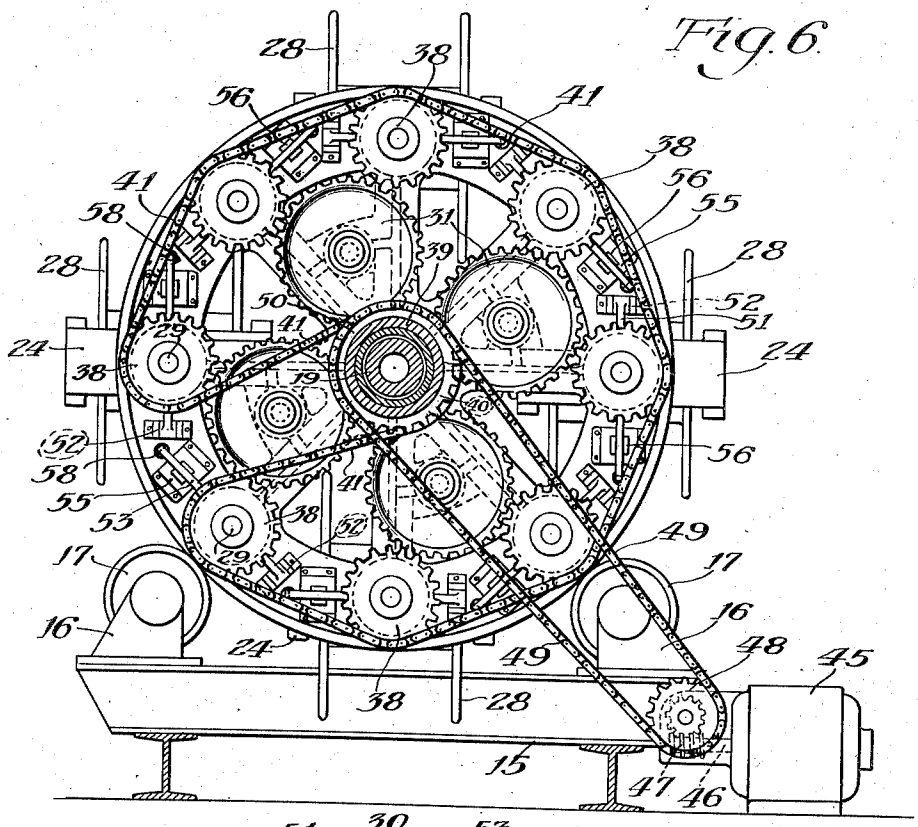
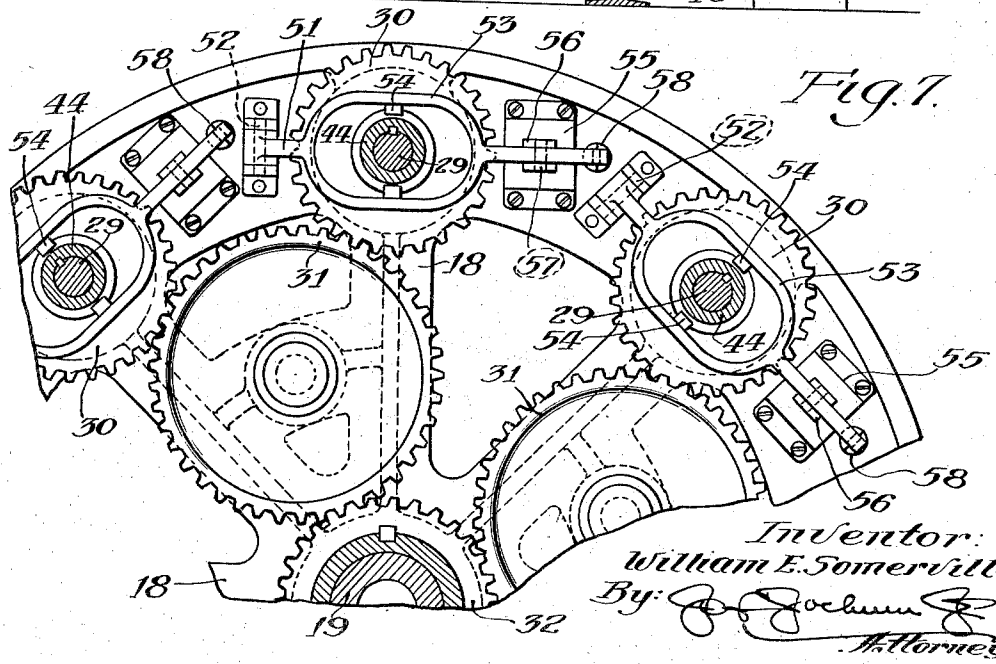


Fig. 7.



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CLOSER FOR WIRE ROPE OR STRANDING MACHINES

Filed Feb. 27, 1939 4 Sheets-Sheet 4

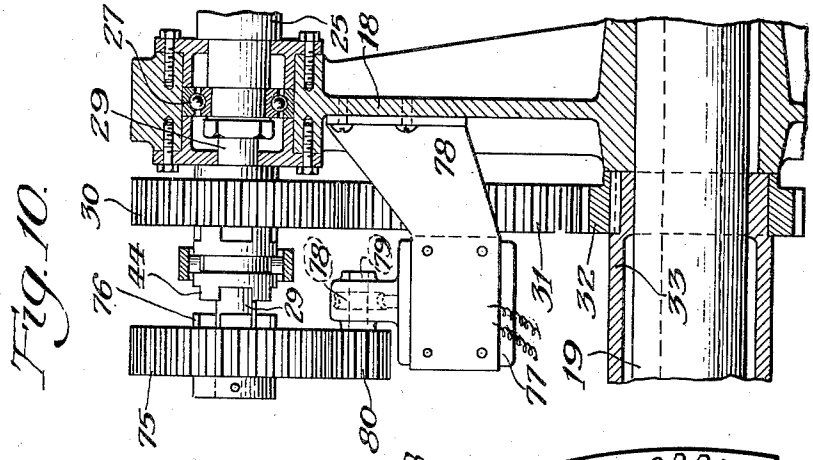


Fig. 10.

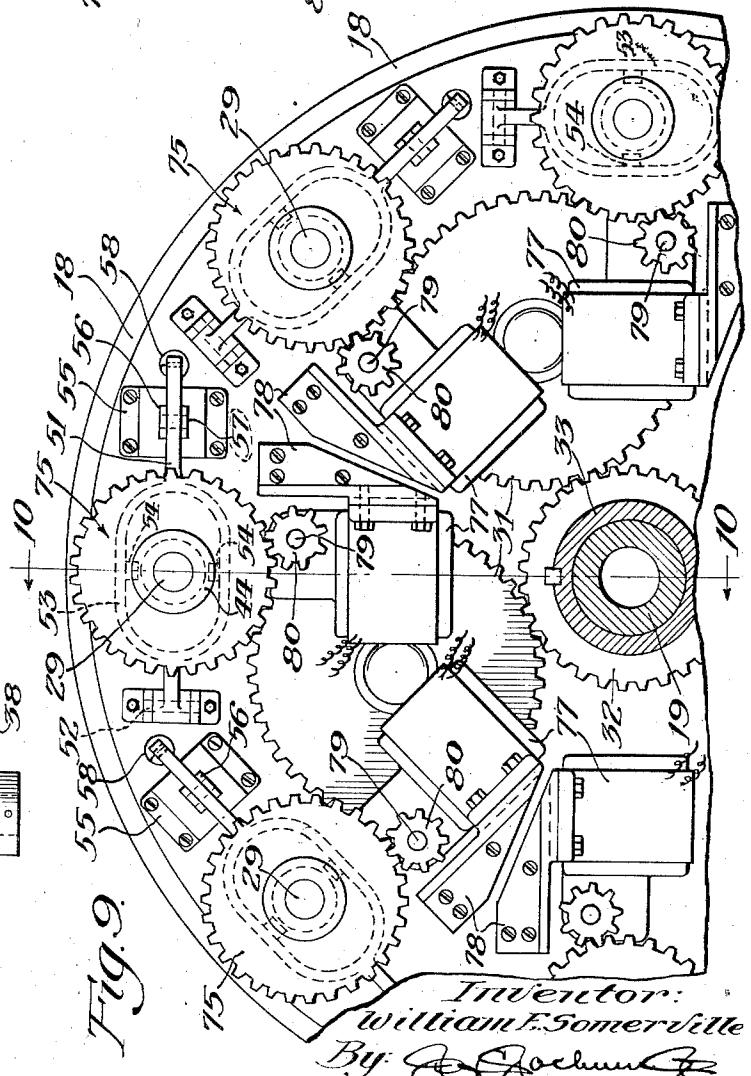


Fig. 9.

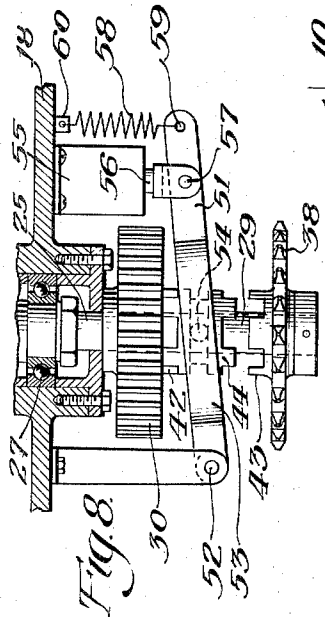


Fig. 8.

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Patented Nov. 7, 1939 2,179,304

UNITED STATES PATENT OFFICE

2,179,304

CLOSER FOR WIRE ROPE OR STRANDING MACHINES

William E. Somerville, Coal City, Ill.

Application February 27, 1939, Serial No. 258,614

5 Claims. (Cl. 57—65)

This invention relates in general to wire rope or stranding machines, and more particularly to the closing mechanism for closing and for causing the proper position or the placing of the shaped strands in the finished rope or cable.

In machines of this character it is customary to provide a closer embodying a carrier for the reels from which the strands are fed or paid out, and in order to indicate whether or not the machine is operating properly and the strands are being properly fed, signals commonly known or designated in the art or industry as "flags" are employed, one being provided for each strand, the position of these flags being controlled by the individual strands.

Should any of the strands get out of synchronism, the signal or flag will indicate the same.

Heretofore, the operation of synchronizing the strands when they got out of synchronism was a tedious and time consuming operation as it was first necessary to stop the machine, release the clutch of the particular cradle, and then rotate the cradle by hand until the strand was placed in the proper position with respect to the remaining strands.

It is one of the objects of the present invention to overcome these difficulties and objections and to provide improved means, preferably electrically controlled clutch mechanism, whereby the operator is enabled to render any one or more of the clutches inoperative and render it possible to connect the respective reel carrying cradle with a suitable auxiliary driving mechanism, preferably gearing suitably operated, to rotate the cradle either forwardly or backwardly to place the particular strand in the position it should be placed with respect to the other strands so that they will all be in synchronism.

This may be readily accomplished by slowing down the machine, and the clutch mechanism may be controlled by push buttons, and while the machine continues in operation.

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 vertical, longitudinal sectional view of one end of a machine of this character constructed in accordance with the principles of this invention.

Figure 1—A is a view of the other end of the machine partly in vertical section and partly in elevation.

Figure 2 is a detail sectional view taken on line 2—2, Figure 1—A.

Figure 3 is a detail sectional view taken on line 3—3, Figure 1—A.

Figure 4 is an enlarged detail sectional view of one of the strands of the rope or cable.

Figure 5 is a transverse sectional view of a finished rope or cable.

Figure 6 is a detail sectional view taken on line 6—6, Figure 1.

Figure 7 is an enlarged detail sectional view taken on line 7—7, Figure 1.

Figure 8 is a top plan view partly in elevation, partly in section, partly broken away and with parts omitted showing one form of driving and clutch mechanism.

Figure 9 is a detail view partly in elevation, partly in section, partly broken away, and with parts omitted, similar to Figure 7, of a modified form of the invention.

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

Referring more particularly to the drawings, the machine consists essentially of a base 15 mounted upon which are supports 16 and in the supports 16 are arranged rollers 17 to form a supporting cradle. Any number of these supports or cradles may be provided.

The frame of the machine may consist of a series of spiders or members 18, any number of which may be employed according to the size of the machine, and these spiders or members 18 are secured to a shaft 19 at spaced intervals throughout its length so as to rotate therewith, and the shaft may be supported at one end by means of a bearing 20 in an upright or standard 21 mounted upon the base 15. The other end of the shaft may be supported by means of bearings 22 mounted upon uprights 23.

Rotation is given to the shaft 19 from any suitable source of power through the medium of a gear wheel 23.

In the present form of the invention three of the members or spiders 18 are provided, and supported between adjacent members 18 are a series of cradles 24, any number of which may be provided, and these cradles are provided at their ends with trunnions 25—25 journaled in bearings 27 in the respective members 18.

Rotatably supported by each of the cradles 24 is a wire or strand carrying reel 28.

The trunnions 25 of the cradles 24 at one end of the machine are each provided with an ex-

tension 29 and rotatably mounted upon this extension to one side of the adjacent member 18 and for free rotation upon the extension is a gear 30, each of which meshes with a gear 31, and these gears 31 in turn mesh with a gear 32 that is secured to a sleeve or bearing 33 for rotation therewith and which bearing or sleeve 33 encompasses the shaft 19. To the sleeve 33 and for rotation therewith is secured a drive gear 34 which may be of the worm type. Meshing with this gear 34 is a worm 35 on a shaft 36 which latter receives its power from any suitable source. The gear 34 and worm 35 are preferably encased within the housing 37 which latter is preferably disposed adjacent the upright or standard 21.

Thus when the gear 34 and the sleeve 33 are rotated and when the gears 30 are locked to the extension 29 of the trunnion 25, in a manner to be described, the cradles 24 will be given a rotary motion with respect to the members 18.

Loosely mounted upon the extension 29 of the trunnions 25 and laterally spaced from the respective gears 30 is another gear 38 and is preferably of the sprocket type.

Rotatably supported by the sleeve 33 is another sleeve 39 provided with sprocket teeth 40 and the teeth 40 together with the sprocket gears 38 are arranged in alinement, and a sprocket chain 41 (see particularly Figure 6) passes over all of the gears 38 and also around the gear or teeth 40 on the sleeve 39, so that when the sleeve 39 is rotated, all of the gears 38 will be correspondingly rotated. The gears 30 and 38 are respectively provided with clutch faces or teeth 42—43 and a clutch member 44 slidably mounted upon the extension 29 is movable into and out of engagement with relation to the clutch faces or teeth 42—43 to lock either of the gears 30—38 for rotation with the extension shaft 29 and release the other of the gears with respect to such extension. This will cause the cradles 25 to be rotated in one direction or the other according to the direction of rotation of the gears 30—38.

Rotary motion is imparted to the sleeve 39 from any suitable source, such as from a motor 45 which is of a reversible type so as to drive the sprocket chain in one direction or the other.

On the motor shaft 46 is secured a worm 47 which meshes with a gear 48 over which a sprocket 49 passes, and the sprocket also passes over a sprocket or teeth 50 that are secured to the sleeve 39 for rotation therewith.

Thus by driving the motor 45 in a forward or backward direction, (by mechanism well known in this art and therefore not disclosed) the sprocket chain 41 will cause the gears 38 to rotate in the same, or in the opposite direction with respect to the direction of rotation of the gears 30.

The clutch members 44 may be controlled in any desired or suitable manner such as by means of a lever 51 (see particularly Figure 7) pivotally mounted at one end, as at 52, and which lever is provided with a yoke 53 that encompasses the shaft extension 29 and is provided with lugs 54 that enter grooves in the clutch member 44.

Connected to the other end of the lever is an electroresponsive device designated generally by the reference numeral 55 and which electroresponsive device may be of any ordinary and well known construction, the core 56 of which has a pivotal connection as at 57 with the lever (see particularly Figure 8). A spring 58 connected at one end as at 59, to the lever and anchored at its other end, as at 60, to the member 18 serves as a means for moving the clutch member 44 in one direction, while the action of the electroresponsive device moves the clutch member 44 in the opposite direction and against the stress of the spring 58. These electroresponsive devices may be controlled in any desired or suitable manner. A simple and efficient manner embodies a series of push buttons 61 controlling switches in a box designated generally by the reference numeral 62 and preferably located at the opposite end of the machine.

Connectors 63 lead from the switch box to brushes or contacts 64 that co-operate with collector or distributor rings 65 and leading from the latter are conductors designated generally by the reference numeral 66 which in turn are connected to the respective electroresponsive devices 55. Thus by operating one or the other of the push buttons 61 the respective clutch device 44 may be controlled and the respective cradles 24 may be locked for rotation with either the gear 30 or the gear 38.

The forward cradles 24 are also controlled in their rotation in a similar manner and in order that the clutch devices for the forward cradles may be located in proximity to the clutch devices for controlling the rear cradles 24, the shafts or extensions 67 leading from the trunnions 25 of the foremost cradles extend through the adjacent member 18 and have connected therewith similar gears 30 and 38, similar clutch devices 44 and clutch faces 42—43 being provided for co-operation with the faces 42—43 and are operated and controlled in the same manner as the clutches 44 for the rearmost cradles 24 are controlled.

Thus it will be seen that by operating the desired push button 61, one of which is provided for each of the cradles, any one or more of the cradles may be selectively connected to a predetermined driving mechanism.

The strands as they pass from the reels may pass over suitable guide pulleys 68 and are brought together by passing through a suitable die 69 at the forward end of the machine.

A signal device shown more clearly in Figures 1—A and 3 may be provided for indicating the operation of the respective strands and may comprise a member 70 preferably in the form of a disc which encompasses and is secured to the shaft 19 for rotation therewith in any desired or suitable manner. Rotatably mounted upon this member 70 are bearings 71 which are provided with openings 72 therethrough that may be of any desired configuration and cross-section, preferably irregular to conform to the configuration of a strand 73.

Connected to each of these bearings 72 is a signal preferably in the form of a "flag" 74 that indicates the position of the bearing or the strand as it is passing through the machine. These flags, as is usual in machines of this character indicate to the operator whether or not the strands are operating in synchronism, and by watching the signals the operator is enabled to determine whether any adjustment is necessary.

In the form of the invention shown in Figures 9 and 10 the cradles are provided with individual driving mechanism and for that purpose the sprocket gear 38 is dispensed with and in lieu thereof a gear 75 is secured to each of the extensions 29 and 67 of the respective cradles. These gears 75 are provided with clutch faces 76 which co-operate with clutch faces of the clutches 44.

In all other respects the operation of this form

of the invention is the same as with the form of the invention shown in Figures 1 and 1—A.

The form shown in Figures 9 and 10, however, shows that the gears 75 are individually driven by individual motor devices 77 supported by means of brackets 78 secured to one of the members or spiders 18.

The shaft of each of the motors 77 carries a gear which meshes with a gear 78 secured to a shaft 79 and secured to each of the shafts 79 is a driving gear 80 that meshes with the respective gears 75. Therefore in order to impart rotation to the cradles by means of the gears 75, the clutch devices 44 are operated in a manner to render this gear 75 active with respect to the extension shafts 29 or 67 of the respective cradles.

The motors 77 are adapted to be operated forwardly or backwardly, in a manner well known and therefore not illustrated, for causing the corresponding rotation of the gears 75.

With this improvement it will be manifest that the machine may be operated to synchronise the strands when they get out of synchronism and it is not necessary to stop the operation of the machine for that purpose. To accomplish this, the push buttons 61 may be selectively actuated according to which strands are out of synchronism.

The operation of these buttons will disconnect the respective cradles with respect to the mechanisms that rotate them in one direction and cause them to be connected to another driving mechanism, which latter will rotate them in the opposite or in the same direction. The cradles remain operatively connected to the second driving mechanism until the strands are again placed in synchronism. This second or additional driving mechanism may be operated at any desired rate of speed, and therefore the readjustment or the synchronizing of the strands may be readily accomplished.

What I claim as new is:—

1. A closer for wire rope or stranding machines embodying a rotatable support, a plurality of reel carrying cradles mounted upon said support for rotation therewith and with respect thereto, a plurality of separate driving means individual to the cradles for rotating them separately with respect to said support in a forward or backward direction with respect to others of the cradles, means for selectively connecting the said driving means with the respective cradles to selectively rotate them in either direction, the second recited means embodying clutch devices individual to the said cradles, electroresponsive devices for controlling said clutches, and means for controlling said electroresponsive devices.

2. A closer for wire rope or stranding machines embodying a rotatable support, a plurality of reel carrying cradles mounted for normally floating movement upon said support and also for rotation therewith, a plurality of separate driving means individual to the cradles for rotating them separately with respect to said support, and means for selectively connecting the said driving means with the respective cradles for rotating them, one of the said driving means operating to rotate the said cradles with respect to the said support in a direction opposite to the direction of rotation of the cradle by the other of the said driving means.

3. A closer for wire rope or stranding machines embodying a rotatable support, a plurality of reel carrying cradles carried by the support for rotation therewith and normally for free floating movement with respect thereto, a plurality of separate driving means individual to the cradles for rotating them separately with respect to the support in the same or opposite directions with respect to each other, means individual to the cradles but common to the said driving means for selectively rendering the driving means active with respect to predetermined cradles, the second recited means embodying clutch devices, and means for controlling the clutch devices.

4. A closer for wire rope or stranding machines embodying a rotatable support, a plurality of reel carrying cradles carried by the support for rotation therewith and normally for free rotation with respect thereto, a plurality of separate driving means for rotating them separately with respect to the support either in a forward or backward direction with respect to each other, means individual to the cradles but common to the said driving means for selectively rendering the driving means active with respect to predetermined cradles, the second recited means embodying clutch devices, electroresponsive means for controlling the said clutches, and means for controlling at will the said electroresponsive devices.

5. A closer for wire rope or stranding machines embodying a rotatable support, a plurality of reel carriers mounted upon said support in a normally floating condition with respect to the support, driving means individual to the reel carriers and also mounted upon said support, actuating means for operating the reel carriers, each of said driving means embodying mechanism for imparting a forward or backward rotation to the respective reel carriers, said driving means also embodying mechanism for selectively connecting the driving means to the said actuating means for imparting a predetermined direction of rotation to predetermined reel carriers with respect to the direction of rotation of others of said reel carriers, means for controlling at will the said connecting mechanism, the said connecting mechanism embodying clutch devices individual to the said reel carriers, and means individual to the clutch devices for controlling them.

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