

G. L. BALLARD.
DRIVING MECHANISM FOR KNITTING MACHINES.
APPLICATION FILED APR. 25, 1911.

1,050,787.

Patented Jan. 21, 1913.

3 SHEETS-SHEET 1.

Fig. 1.

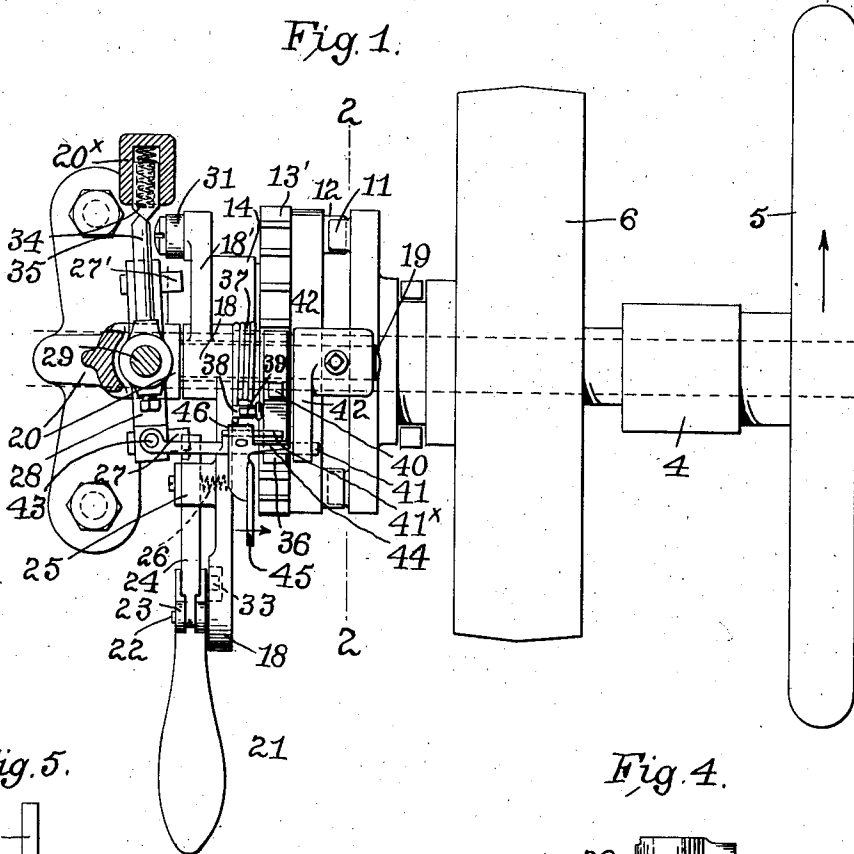


Fig. 5.

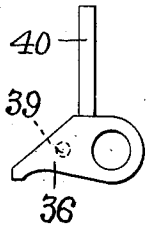


Fig. 4.

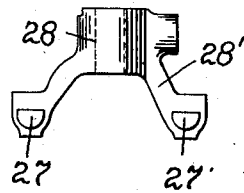


Fig. 8.

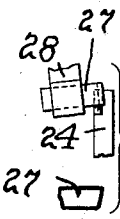


Fig. 6.

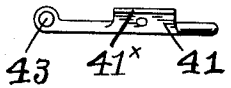
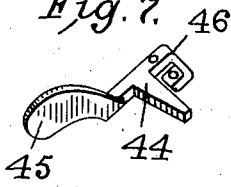


Fig. 7.



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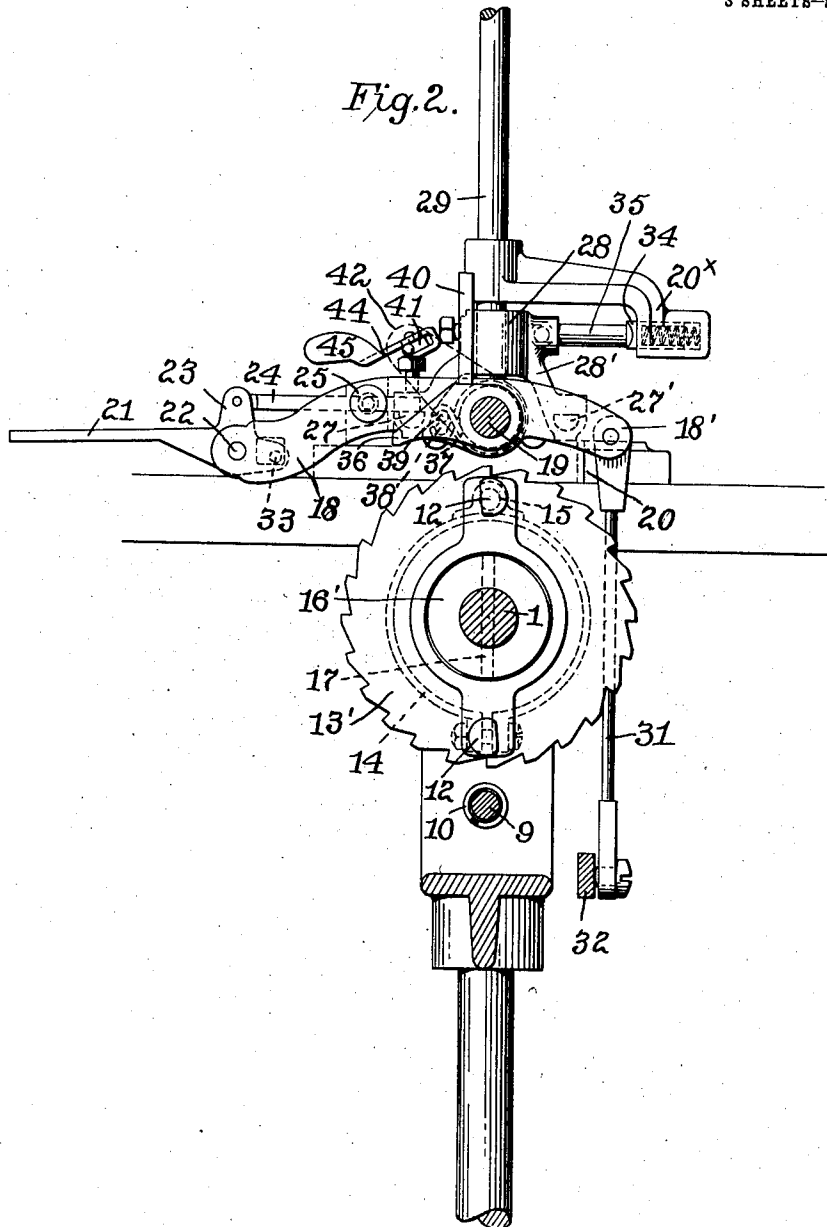
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1,050,787.

3 SHEETS--SHEET 2.



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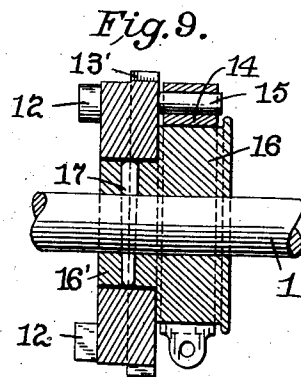
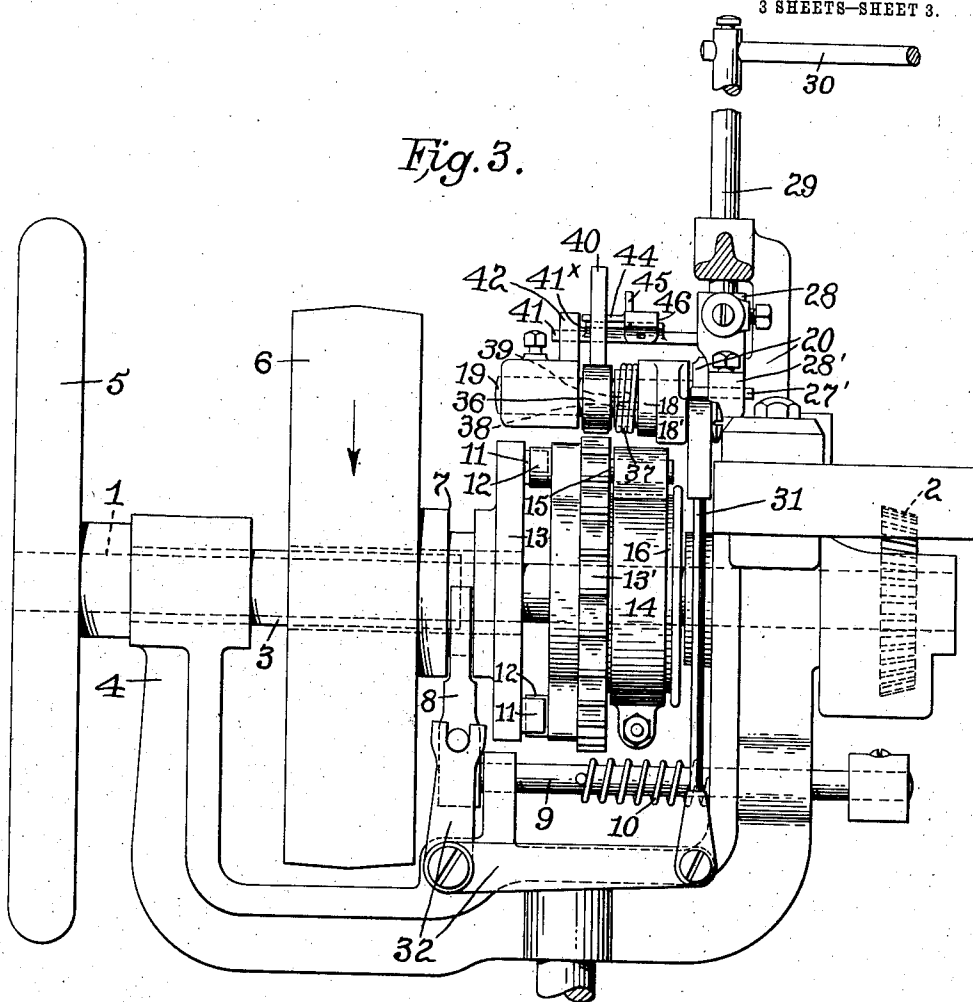
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3 SHEETS—SHEET 3.



Attest:

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UNITED STATES PATENT OFFICE.

GEORGE LAWSON BALLARD, OF NORRISTOWN, PENNSYLVANIA, ASSIGNOR TO WILDMAN MFG. CO., OF NORRISTOWN, PENNSYLVANIA.

DRIVING MECHANISM FOR KNITTING-MACHINES.

1,050,787.

Specification of Letters Patent.

Patented Jan. 21, 1913.

Application filed April 25, 1911. Serial No. 623,259.

To all whom it may concern:

Be it known that I, GEORGE LAWSON BALLARD, subject of the King of Great Britain, residing at Norristown, Pennsylvania, have invented certain new and useful Improvements in Driving Mechanism for Knitting-Machines, of which the following is a specification.

The invention consists in the features and combination and arrangement of parts hereinafter described and particularly pointed out in the claims.

In the drawings Figure 1 is a plan view of a let off and drive mechanism embodying my invention; Fig. 2 is a sectional view across the drive shaft substantially on the line 2-2 of Fig. 1, parts being shown in dotted lines; Fig. 3 is a rear view of the invention; Figs. 4, 5, 6, 7, 8 and 9 are views of details.

In these drawings, 1 is the drive shaft of the knitting machine having a gear 2 thereon for driving the machine. This shaft has a bearing in the machine frame at its inner end and at its outer end it bears in a sleeve 3 fixed in a bracket 4. This shaft has fixed thereto a hand wheel 5, while the belt pulley 6 is loosely and slidably mounted on the said sleeve. This pulley has a grooved hub 7 receiving the let off fork 8, which is mounted upon a rod 9 guided in the bracket, and pressed by a spring 10 to move the pulley to the left, Fig. 3, to withdraw the clutch blocks 11 from engagement with the clutch blocks 12 to stop driving. The clutch blocks 11 are carried by a flange or ring 13 fixed to or formed with the pulley hub. When the blocks are in engagement, as shown in Fig. 3, the power from the pulley is transmitted through these blocks, the carrier of the blocks 12 consisting of the ratchet wheel 13', which is loose on the shaft, but which carries around with it a friction band 14 by means of the pin 15 on said ratchet wheel, the said friction band engaging a drum 16 the hub 16' of which is pinned to the shaft 1 at 17, Figs. 2 and 9. The shaft 1 is thus driven through the friction band and drum from the belt pulley when the clutch pins are in engagement, as shown in the drawings.

For holding the parts set in their driving positions just mentioned, a hand lever is used composed of a main part 18 mounted on a pin 19 fixed in the frame bracket 20 supported on the bed of the machine, said hand lever having a grip portion 21 to be grasped by the hand pivoted at 22 to the main part of the hand lever. To an upwardly extending arm 23 of this grip or handle is pivoted a latch 24 guided in a bearing 25 of the main part of the hand lever, it being pressed by a spring 26 in said bearing outward away from the main part of the lever. This latch 24 rests upon a catch pin 27 carried by a lever or arm 28 mounted on a vertical rock shaft 29 journaled in the bracket 20, said rock shaft having an arm 30 at its upper end extending to a point to be struck and operated by the stop motion device on the knitting head which acts for instance when any one of the threads breaks, thus turning the rock shaft and horizontal arm 28, withdrawing the catch 27 from the latch 24 and allowing the hand lever to fall. This hand lever, when up in the position shown, holds the driving clutch in position to drive by means of the link 31 connected to the rear arm 18' of the hand lever, and to an arm of a bell crank lever 32, which controls the clutch fork 8 above described. When now the hand lever is released by withdrawing the catch 27, the spring 10 will operate the clutch fork and unclutch the drive mechanism. This will take place when the shaft 29 is turned by the stop motion or detector devices. The let off can also be operated by hand at any time by the operator tipping the grip or handle 21 downwardly, thus drawing the latch bar 24 to the left in Fig. 2 from off the catch pin.

When the let off is operated by the turning of the shaft or rod 29, the arm 28' of the horizontal lever will carry a catch pin 27' under the rear arm 18' of the hand lever at the same time that the catch pin 27 is removed from said hand lever, and this will prevent the clutch from being thrown in until after the stop motion connections have been reset, i. e., the shaft 29 and arm 30, ready to be operated again on the occurrence of a

broken thread or other imperfection in the work. This resetting action will withdraw the rear catch 27' from beneath the hand lever, and set the forward catch 27 in line above the latch 24, but as this latch has a beveled upper surface at its end Figs. 1 and 8, and as the catch pin is beveled on its under side, the latch will ride over the end of the catch pin, its joint at 22 being sufficiently loose to allow slight lateral movement, and then the spring 26 causes the latch to snap over the catch pin to rest thereon, and support the hand lever up with the driving clutch thrown in.

The movement of the hand grip 21 in respect to the main part of the hand lever 18 is limited by a pin 33 on an arm or lug of said grip engaging the walls of a recess in the side face of the main part of the arm.

In order to place a certain degree of restraint upon the horizontal lever 28, 28', with its catches and its rock shaft 29 and arm 30 to hold these parts in either position to which they may be adjusted but yet to allow them to be readily operated when sufficient power is applied, a spring detent pin 34 is spring mounted in the arm 20* of the bracket 20, its inclined end engaging the inclined end of an arm 35 fixed to the lever 28, 28'.

It will be seen from the above that the clutch can be thrown by hand by simply pressing down a forward pivoted portion of the hand lever, thus retracting the latch 24 from off the catch 27 and thus the whole hand lever can fall and allow the spring 10 above mentioned to throw the clutch out. The same thing will occur when the stop motion shaft 29 is operated, for then the horizontal lever 28, 28', will turn and retract the catch pin, freeing the hand lever and allowing the spring 10 to act.

The band or friction member 14 which drives the drum 16 and consequently the shaft 1 also acts as a brake when the let-off is operated and the clutch thrown out. The ratchet 13' is controlled to make this band act as a drive or as a brake as the case may be. As long as this ratchet is rotating, the band will drive through the drum, but if it is arrested then the band will act as a brake. For arresting the ratchet, a detent or pawl 36 is provided pivoted on the pin 19, the said pawl being pressed by a spring 37 tending to force it into the ratchet, but when the machine is running, the pawl is held up by a pin 38 on the hand lever engaging under a pin 39 on the pawl. Should the hand lever be lowered by the attendant so that the clutch is thrown out, it is desirable to still keep the detent up, and consequently the brake off, so that the machine may be turned over by hand by operating the hand wheel 5, and for this purpose a pin 40 on

the pawl comes against a slide 41 guided in an arm 42 on the fixed pin 19, and pivotally connected at 43 with the forward arm 28 of the horizontal lever, so that while the pawl 36 will drop part way down when the hand lever is lowered to unclutch, it will still be held just free of the teeth of the ratchet by the pin 40 engaging the slide 41 which thus forms a stop for the detent. Should, however, the machine be unclutched by the operation of the stop motion, the same movement of the horizontal lever 28 which releases the hand lever 18 will withdraw the contact edge 41* of the slide which acted as a stop for the pawl pin when the hand lever was operated manually, so that now the said pawl may drop all the way down and enter a tooth on the ratchet and hold it, together with the band which now acts as a brake to the revolution of the drum and shaft. Now this slide also insures that the stop motion be reset at the same time that the control of the pawl is resumed, that is, the control to hold it up for releasing the brake so that the machine can not be started without setting the stop motion. For this purpose I pivot on the slide 41 a finger lever 44 of bell crank form, lateral pressure against the finger piece 45 of which in the arrow direction, Fig. 1, will first lift the pawl by engaging its pin 40 and then, as the swinging movement of the finger lever is limited by its edge 46 striking the edge of the slide, further pressure on the finger lever will move the slide as a whole to the right, Fig. 1, to bring its stop edge 41* in front of the pawl pin 40, and this same movement will reset the stop motion connections, i. e., will set the lever 28, 28' so that the catch 27 will be in the position of Fig. 1 ready to engage and hold the hand lever up when this is lifted manually to start the machine.

I claim as my invention:—

1. In combination in a let-off for knitting machines, a drive shaft, clutch members for driving the same, a friction member connection between one clutch member and the drive shaft, a ratchet wheel connected with said friction member and clutch member, a detent for engaging the ratchet to make the friction member act as a brake, and means for controlling the clutch and said detent, substantially as described.

2. In combination in a let-off for knitting machines, a drive shaft, a clutch comprising the two members one of which is shiftable to and from the other, a friction member, a ratchet wheel connected thereto and to one of the clutch members, a detent for controlling the ratchet wheel, a hand lever with connections for operating the clutch and the detent, a stop for the detent to retain it inactive when the hand lever is manually operated to release the clutch so that the brake

will be held off, and stop motion connections for withdrawing the said stop and permitting the detent to engage the ratchet and set the friction member, said connections also controlling the throwing out of the clutch, substantially as described.

3. In combination in a let-off for knitting machines, a clutch member, a friction member connected with one clutch member to drive the shaft, detent means to prevent rotation of the friction member and thereby form a brake, stop motion means for setting the detent means for the braking effect, connections operated by the stop motion means for throwing the clutch members apart, and a resetting device for the stop motion means, said device also withdrawing the detent means to release the brake, substantially as described.

4. In combination in a let-off for knitting machines, clutch members, a friction member connected with one clutch member, to drive the shaft, a detent for said friction member, a stop for said detent, stop motion means connected with said stop to move the same into and out of position to control the said detent, a hand lever controlled by said stop motion connections and connections between the hand lever and the clutch for operating the same, substantially as described.

5. In combination in a let-off for knitting machines, a drive shaft, clutch members, a friction driving member to impart movement to the said shaft from one clutch member, a detent for said clutch member to arrest the same with the friction member to make the latter act as a brake, a stop for the detent, stop motion connections leading to said stop and connections controlling the clutch from said stop motion, a manually operated device for releasing the detent to take off the brake, said device, by the same movement, resetting the stop motion connections, substantially as described.

6. In combination in a let-off for knitting machines, a shaft, clutch members, one of which has a friction member for driving the shaft, a ratchet also connected with said clutch member, a detent for holding the said ratchet, a hand lever with connections therefrom to the clutch, said hand lever having means for holding the detent released, a stop motion controlled catch for holding the hand lever in position for the clutch to drive, means for manually releasing the hand lever from its catch to open the clutch, and a stop for the detent to prevent the setting of the brake when the hand lever is manually released, substantially as described.

7. In combination in a let-off for knitting machines, a shaft, clutch members, one of which has a friction member for driving the shaft, a ratchet also connected with said

clutch member, a detent for holding the said ratchet, a hand lever with connections therefrom to the clutch, said hand lever having means for holding the detent released, a stop motion controlled catch for holding the hand lever in position for the clutch to drive, means for manually releasing the hand lever from its catch to open the clutch, and a stop for the detent to prevent the setting of the brake when the hand lever is manually released, said stop being withdrawn when the catch is removed from the hand lever by the stop motion connections to allow the brake to be set, substantially as described.

8. In combination in a let-off for knitting machines, a shaft, clutch members, one of which has a friction member for driving the shaft, a ratchet also connected with said clutch member, a detent for holding the said ratchet, a hand lever with connections therefrom to the clutch, said hand lever having means for holding the detent released, a stop motion controlled catch for holding the hand lever in position for the clutch to drive, means for manually releasing the hand lever from its catch to open the clutch, a stop for the detent to prevent the setting of the brake when the hand lever is manually released, said stop being withdrawn when the catch is removed from the hand lever by the stop motion connections to allow the brake to be set, and a finger lever pivoted to the stop having limited swinging movement for withdrawing the detent, and having bodily movement with the stop to reset the stop motion connections and to set the stop in front of the detent, substantially as described.

9. In combination in let-off mechanism for knitting machines, a shaft, a clutch, a hand lever connected thereto, a friction device driving the shaft from one of the clutch members, a detent to make said friction device act as a brake, a connection from the hand lever to the detent for lifting the same, a stop for said detent, stop motion connections controlling said stop, a catch controlled by said stop motion connections for holding the hand lever with the clutch set when the stop motion is set, and a second catch controlled by the stop motion connection to prevent movement of the lever for throwing in the clutch after the stop motion connections have operated, substantially as described.

10. In combination in a let-off for knitting machines, a shaft, clutch members, a hand lever pivoted intermediate of its length and controlling the clutch members, and a stop motion connection for holding the lever in both its position for driving and its position for stopping said stop motion connection consisting of a vertical rock shaft having arms extending therefrom in opposite directions, catches on the arms, one lying adjacent the

hand lever in front of its pivot and the other lying adjacent the hand lever in rear of its pivot, and a latch carried by the hand lever to removably engage the front catch, said latch being operated manually to free the hand lever from the front catch, substantially as described.

In testimony whereof, I affix my signature in presence of two witnesses.

GEORGE LAWSON BALLARD.

Witnesses:

E. R. ROBERTS,
EDITH C. FRICK.