

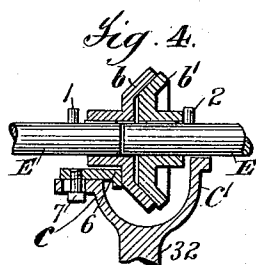
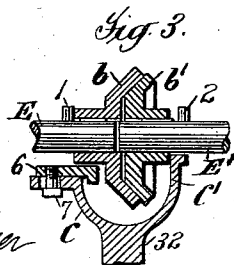
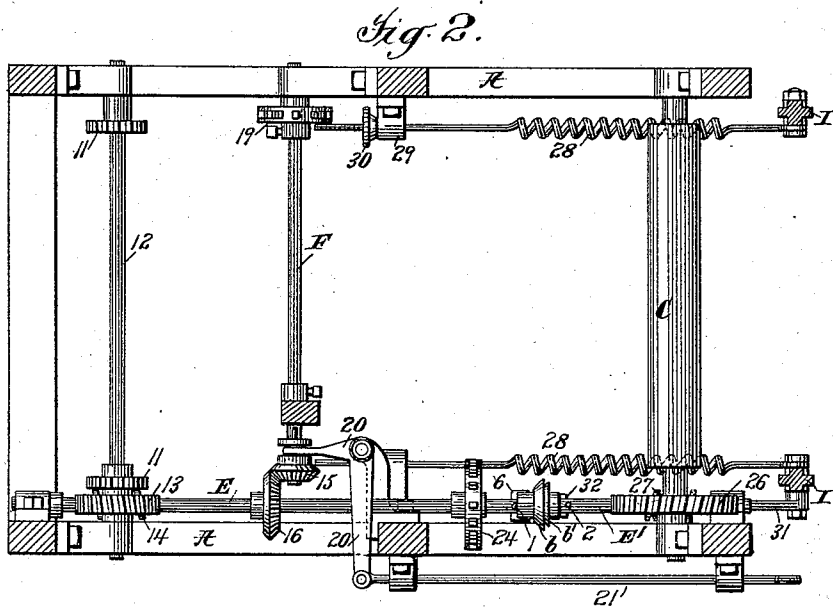
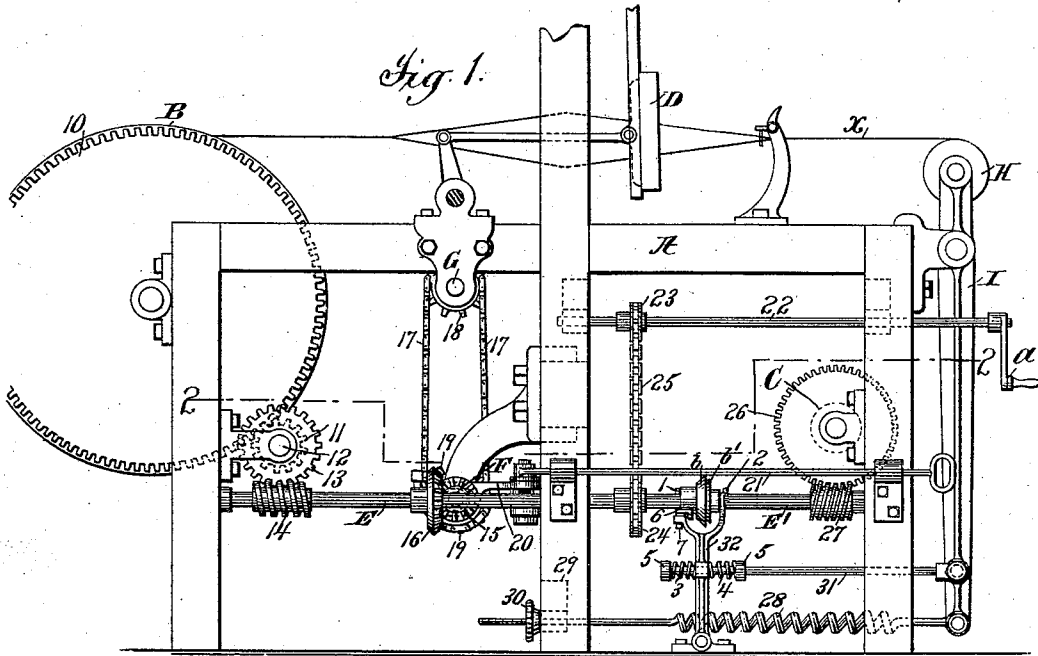
(No Model.)

C. B. RUMSEY.

LET-OFF AND TAKE-UP MECHANISM FOR LOOMS.

No. 532,341.

Patented Jan. 8, 1895.



Attest:
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UNITED STATES PATENT OFFICE.

CHARLES B. RUMSEY, OF HOMER, NEW YORK, ASSIGNOR TO THE NEW JERSEY WIRE CLOTH COMPANY, OF TRENTON, NEW JERSEY.

LET-OFF AND TAKE-UP MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 532,341, dated January 8, 1895.

Application filed February 2, 1894. Serial No. 498,907. (No model.)

To all whom it may concern:

Be it known that I, CHARLES B. RUMSEY, a citizen of the United States, residing at Homer, county of Cortland, and State of New York, have invented certain new and useful Improvements in Let-Off and Take-Up Mechanism for Looms, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention is of general application in various classes of looms, but is more especially designed for looms for weaving wire fabrics.

The object of the invention is to provide a let-off and take-up mechanism which shall be more efficient than those heretofore in use, and especially to provide a simple, durable and efficient mechanism for controlling the movement of the take-up roll by the fabric so as to keep the latter and the warp wires under proper tension, during the action of the loom, and at the same time permit the let-off and take-up rolls to be stopped or the fabric reversed, when desired.

For a full understanding of the invention a detailed description of a construction embodying the invention in the preferred form as applied to a loom of common construction will now be given in connection with the accompanying drawings forming a part of this specification, and the features forming the invention then pointed out in the claims.

In the drawings: Figure 1 is a side elevation of such portion of a loom as is necessary to illustrate the invention. Fig. 2 is a horizontal section on the line 2 of Fig. 1. Fig. 3 is a detail central section of the clutch showing the parts in the normal position while the fabric is being wound on the cloth roll. Fig. 4 is a similar view showing the parts in the position they occupy when the let-off and take-up rolls are both reversed.

Referring to said drawings, A is the loom frame; B, the let-off or warp roll; C, the take-up or cloth roll, and D the lay, all these parts being of any common or suitable construction. The warp roll B carries a gear 10, or preferably two gears, one at each end, which mesh with pinions 11 on a shaft 12 mounted

in the frame, this shaft carrying a larger gear 13 which engages a worm 14 carried by a horizontal shaft E extending longitudinally of the loom, and driven from a horizontal cross shaft F through beveled gears 15, 16, the shaft F being driven from the main driving shaft G by a sprocket chain 17 and sprocket wheels 18, 19. Any other suitable means may be substituted for this sprocket chain construction, but this is preferable as affording a convenient means for adjusting the speed of the shaft E and let-off and take-up rolls by using sprocket wheels of different relative sizes.

For the purpose of throwing the shaft E out of gear when the let-off and take-up rolls are to be stopped or reversed, any suitable means may be used. As shown, the beveled gear 15 is carried by a sleeve splined on the shaft F a circumferential groove in the sleeve being engaged by one arm of a bell crank lever 20 and pivoted on the frame and actuated from the front of the loom by a slide bar 21, so that the gear 15 may thus be moved on the shaft F into and out of mesh with the gear 16. When the shaft E is thus released from the driving mechanism, the said shaft may be rotated in either direction by hand, a convenient means for this purpose being shown, consisting of a shaft 22 mounted in the frame and provided with a handle *a* at the front of the loom by which it may be rotated, and connected to the shaft E by sprockets 23, 24 and chain 25. It will be understood, however, that any other suitable means may be used for this purpose.

Referring now to the mechanism by which the speed of the wind-up roll C is controlled in accordance with my invention, and which may be applied to looms of widely different construction from that shown and above described, the shaft E is in line with a shaft E', by which the take-up roll is driven, and connected to the shaft E previously described, by a friction clutch consisting in the form shown of a cone clutch of common form having the driving and driven members *b, b'* splined on, respectively, the shafts E, E', and having their movement limited by stops 1, 2 on said shafts. The shaft E' may be connected to the take-up

roll C in any suitable manner, being shown as driving it through gear 26 on the roll engaging a worm 27 on the shaft E'.

For the purpose of shifting the clutch *b, b'* so as to clutch or unclutch shafts E, E' and thus control the take-up roll C by the fabric, the following construction is used: In place of the usual stationary breast beam, a movable breast beam is used, this breast beam preferably consisting, as shown, of a roll H and being mounted in a vertical frame I pivoted at the top of the frame A, and extending downward nearly to the base of the loom frame so as to form a lever with the short arm carrying the breast roll and the long arm extending downward, the frame being spring pressed against the tension of the fabric so as to form a tension frame by which the slack is taken up and the fabric held under proper tension, this spring pressure being secured in the construction shown by spring rods 28 connecting the lower end of the frame I to the loom, the spring pressure preferably being made adjustable so that the tension upon the roll may be varied as desired. As shown, the ends of the spring rods 28 are passed through brackets 29 on the frame, and adjustment secured by thumb nuts 30 screwed on the ends of the rods against the brackets.

The tension frame I at one side of the loom is connected by a rod 31 to the shifter 32, the shifter being pivoted to the base frame of the loom, and the rod 31 being preferably connected thereto, as shown, by passing the rod through the shifter with springs 3, 4 on opposite sides of the shifter pressing against the latter, and collars 5 on the rod, a spring pressure of the rod 31 upon the shifter in both directions being thus secured. The shifter 32 has forks *c, c'* at its upper end which engage respectively the clutch members *b, b'* on opposite sides of the clutch, the distance between these forks being somewhat greater than the thickness of the clutch so as to provide for the lost motion desired, and this distance is preferably made adjustable. As shown, one of the forks, as *c*, carries a sliding piece 6 adjustably held to the fork by a bolt 7 sliding in a slot in the fork and carried by the sliding piece.

The operation of the construction will be understood from a brief description.

When the fabric is taken up too rapidly by the take-up roll C, the breast roll H is drawn to the left in Fig. 1 by the tension upon the fabric, and the tension frame I thus rocked so as to carry its long end to the right against the tension of spring rods 28, thus drawing on the rod 31 and moving the shifter 32 to the right from the position shown in Figs. 1 and 3. This carries the fork *c'* away from clutch member *b'*, so as to release the pressure upon the clutch and, as this pressure is released, the clutch members slip upon each other when the tension of the fabric exceeds the friction between their surfaces, and the shaft E' and roll C rotate more slowly or stop. If the fab-

ric be slackened by the stopping of the take-up roll, or by its rotating too slowly, the breast roll H is moved to the right in the drawings by the tension of the spring rods 28, thus taking up the slack and preserving the proper tension upon the fabric and warp, and the lower end of the tension frame I with the rod 31 and shifter 32 are thus carried to the left. This forces the fork *c'* against the clutch member *b'* again, and the clutch members are thus pressed together again against the stop 1, as shown in Fig. 3. Thus the swinging of the tension frame I controls the taking up of the fabric and preserves the required tension thereon.

When it is desired to reverse the fabric for any purpose, the slide rod 21 is pushed in from the front of the machine so as to shift the gear 15 out of engagement with the gear 16, thus releasing the shaft E. Then, by actuating the handle *a*, the shaft 22 will be rotated, and this movement transmitted to the shaft E through the sprocket chain 25. As the let off roll B is thus rotated to take up the warp, the tension upon the breast roll H draws this roll to the left in Fig. 1 and moves the lower end of the tension frame I to the right against the tension of spring rods 28, and thus moves the connecting rod 31 and shifter 32 in a direction to force fork *c* against the clutch member *b* and the latter toward the clutch member *b'*, and this movement is continued until the member *b'* is brought against the stop 2, and the two members pressed together, as shown in Fig. 4, when the friction between the two members will be sufficient to drive the shaft E' and thus reverse the wind-up roll C to unwind the fabric. This operation will continue during the unwinding of the fabric, or in case the fabric is not taken up by the let-off roll B as rapidly as it is let off by the roll C, the clutch members *b, b'* will be unclutched by the roll H moving to the right and the take up roll C thus retarded or stopped to be started again when the slack is taken up. It will be found in practice that by this control of the fabric upon the clutch, the slip of the clutch members upon each other will be such as to compensate for slight differences of tension, so that the movement of the roll H during the normal operation of the loom is very slight, and this roll practically stationary, except that as the size of the wind-up roll increases, the breast roll H will be moved farther inward to the left in Fig. 1, so as to lessen the pressure upon the clutch members *b, b'*.

It will be seen that the shafts E, E', actuating respectively the let-off and take-up rolls, are only frictionally clutched, so that in case of a block, no damage will result, while at the same time the pressure upon the friction surfaces by the tension frame may be made sufficient to secure the certainty of operation desired, and this pressure is readily adjustable. The connection of the tension frame to the shifter, also, is a spring connection, thus

avoiding the danger of breakage incident to a positive connection. While these features in combination form parts of the invention, however, it will be understood that my im-

proved tension frame construction may be used with friction clutches of other classes and positive connections thereto, and that the clutch construction may be used with other means for controlling it by the fabric.

The clutch shown and described and the means for controlling the same by the tension of the web may be applied also to machines of other construction than that shown, and this clutch in combination with a tension frame and connections for controlling the clutch by the tension on a web of any kind, forms in itself a part of the invention, and is thus claimed. It will be understood, also, that changes may be made in the form and arrangement of the devices shown as embodying my invention without departing from the latter, and that I am not to be limited to any specific construction of these devices.

What is claimed is—

1. In a loom, the combination with a positively driven let off roll, of a take up roll, a shaft driving said take up roll, a shaft for driving said first mentioned shaft, a friction clutch connecting said shafts, a vertical tension frame over which the fabric passes to the take up roll, and connections between said frame and clutch for controlling the movement of the take up roll, substantially as described.

2. In a loom, the combination with a positively driven let off roll, of a take up roll, a shaft driving said take up roll, a shaft driving said first mentioned shaft, a friction clutch connecting said shafts, a tension frame, and connections between said frame and clutch for controlling the movement of the take up roll, substantially as described.

3. In a loom, the combination with a let-off roll, of a take-up roll, a shaft driving said take-up roll, a shaft driving said first mentioned shaft, a friction clutch connecting said shafts consisting of members having a limited movement longitudinally of the shafts, a tension frame, and connections between the frame and clutch engaging the clutch on opposite sides and having lost motion for moving the clutch members in opposite directions on said shafts, substantially as described.

4. In a loom, the combination with a let-off roll, of a take-up roll, a shaft driving said take-up roll, a shaft driving said first mentioned shaft, a friction clutch connecting said shafts consisting of members having a limited movement longitudinally of the shafts, a tension frame, a shifter engaging the clutch members on opposite sides of the clutch and providing for lost motion between the shifter and clutch on its movement in opposite directions, and connections between said shifter and frame for moving the shifter in opposite directions, substantially as described.

5. In a loom, the combination with a let-off

roll, of a take-up roll, a shaft driving said take-up roll, a shaft driving said first mentioned shaft, a friction clutch connecting said shafts consisting of members having a limited movement longitudinally of the shafts, a tension frame, a shifter engaging the clutch members on opposite sides of the clutch and providing for lost motion between the shifter and clutch on its movement in opposite directions, and yielding connections between the shifter and frame for moving the shifter in opposite directions, substantially as described.

6. The combination with two rolls on one of which a web is wound from the other, of a shaft driving one of said rolls, a shaft driving said first mentioned shaft, a friction clutch connecting said shafts consisting of members having a limited movement longitudinally of said shaft, a shifter engaging said clutch at opposite sides, a tension frame, and connections between said tension frame and clutch for moving the latter in opposite directions, substantially as described.

7. The combination with two rolls on one of which a web is wound from the other and reversible to rewind the web on the roll from which it was unwound, of a shaft driving one of said rolls, a shaft driving said first mentioned shaft, a friction clutch connecting said shafts consisting of members having a limited movement longitudinally of said shaft, a shifter engaging said clutch at opposite sides, a tension frame, and connections between said tension frame and clutch for moving the latter in opposite directions, substantially as described.

8. The combination with let-off and take-up rolls B, C, of a tension frame, shafts E, E' driving said rolls B, C respectively, sliding friction clutch members b, b' and stops 1, 2 on said shafts respectively, shifter 32 having forks c, c' engaging the respective clutch members, and connections between said shifter and tension frame for moving the shifter in opposite directions, substantially as described.

9. The combination with let-off and take-up rolls B, C, of vertical tension frame I carrying breast roll H, shafts E, E' driving said rolls B, C respectively, sliding friction clutch members b, b' and stops 1, 2 on said shafts respectively, shifter 32 having forks c, c' engaging the respective clutch members and connections between said shifter and tension frame for moving the shifter in opposite directions, substantially as described.

10. The combination with let-off and take-up rolls B, C, of a tension frame, shafts E, E' driving said rolls B, C respectively, sliding friction clutch members b, b', and stops 1, 2 on said shafts respectively, shifter 32 having forks c c' engaging the respective clutch members, and a yielding connection between said shifter and tension frame for moving the shifter in opposite directions, substantially as described.

11. The combination with let-off and take-up rolls B, C, of a tension frame, shafts E, E'

driving said rolls B, C respectively, sliding friction clutch members *b*, *b'*, and stops 1, 2 on said shafts respectively, shifter 32 having forks *c*, *c'* engaging the respective clutch members, means for adjusting the distance between the forks, and a yielding connection between said shifter and tension frame for moving the shifter in opposite directions, substantially as described.

10 12. The combination with the let-off and take-up rolls B, C, of shaft E geared to the roll B, shaft E' geared to the roll C, a friction clutch connecting said shafts, consisting of sliding clutch members *b*, *b'* and stops 1, 2 on

15 said shafts respectively, shifter 32 having forks *c*, *c'* engaging the respective clutch members and providing for lost motion on its movement in opposite directions, vertical tension frame I carrying breast roll H, and

connecting rod 31 between the frame I and shifter, substantially as described. 20

13. The combination with the driving and driven shafts E, E', of the sliding clutch members *b*, *b'* and stops 1, 2 on said shafts respectively, shifter 32 having forks *c*, *c'* engaging the respective clutch members *b*, *b'*, and means controlled by the movement of the shafts, for moving said shifter in opposite directions to control the movement of the shaft E' when shaft E is rotated in either direction, substantially as described. 25 30

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

CHARLES B. RUMSEY.

Witnesses:

EDWARD W. HYATT,
ASA DAVIS.