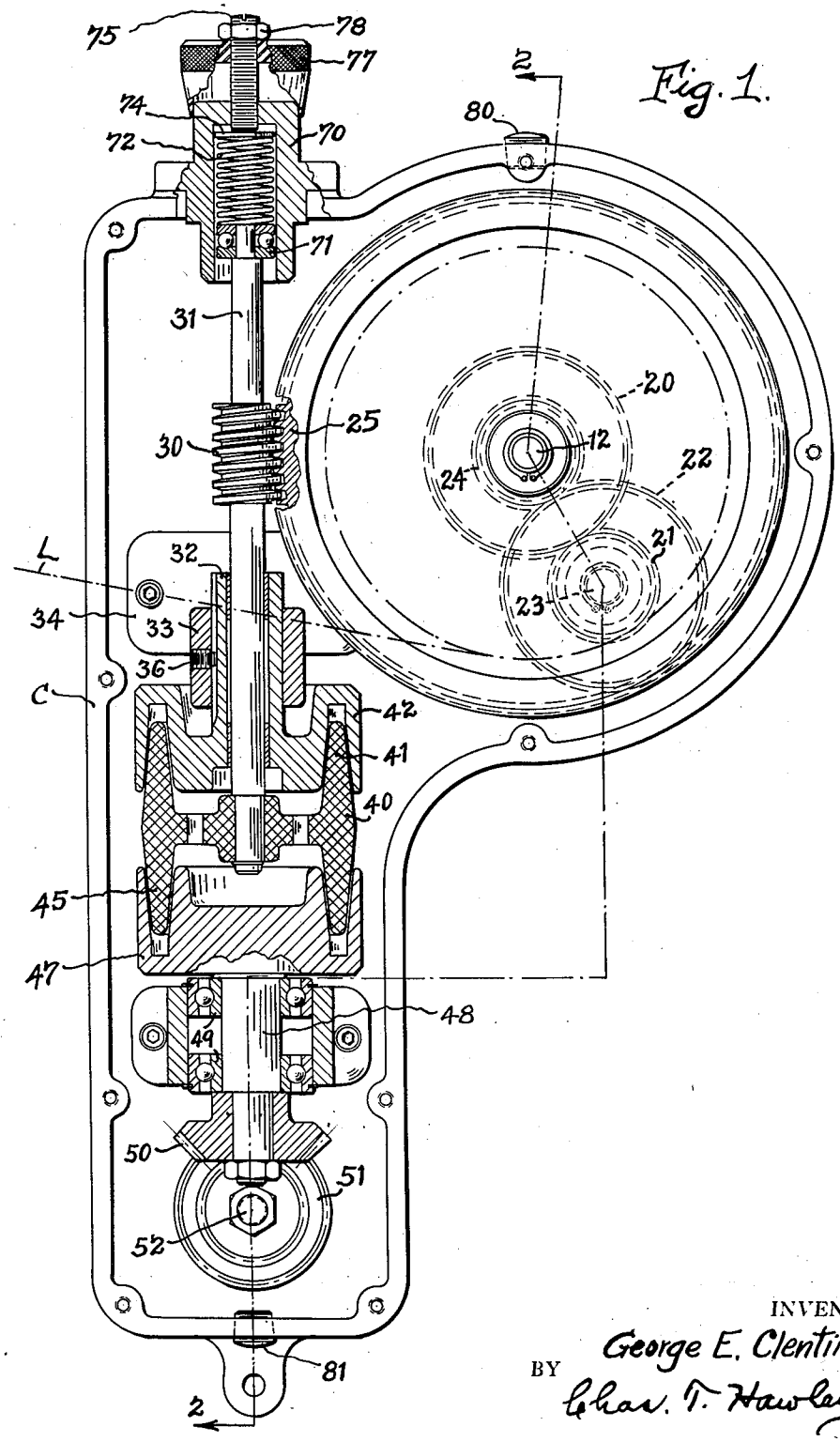
Dec. 16, 1952 G. E. CLENTIMACK 2,621,500

POSITIVE AND CONSTANT-TENSION TAKE-UP MECHANISM FOR KNITTING AND OTHER TEXTILE MACHINES

Filed April 4, 1951 2 SHEETS—SHEET 1

Fig. 1.



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Fig. 2.

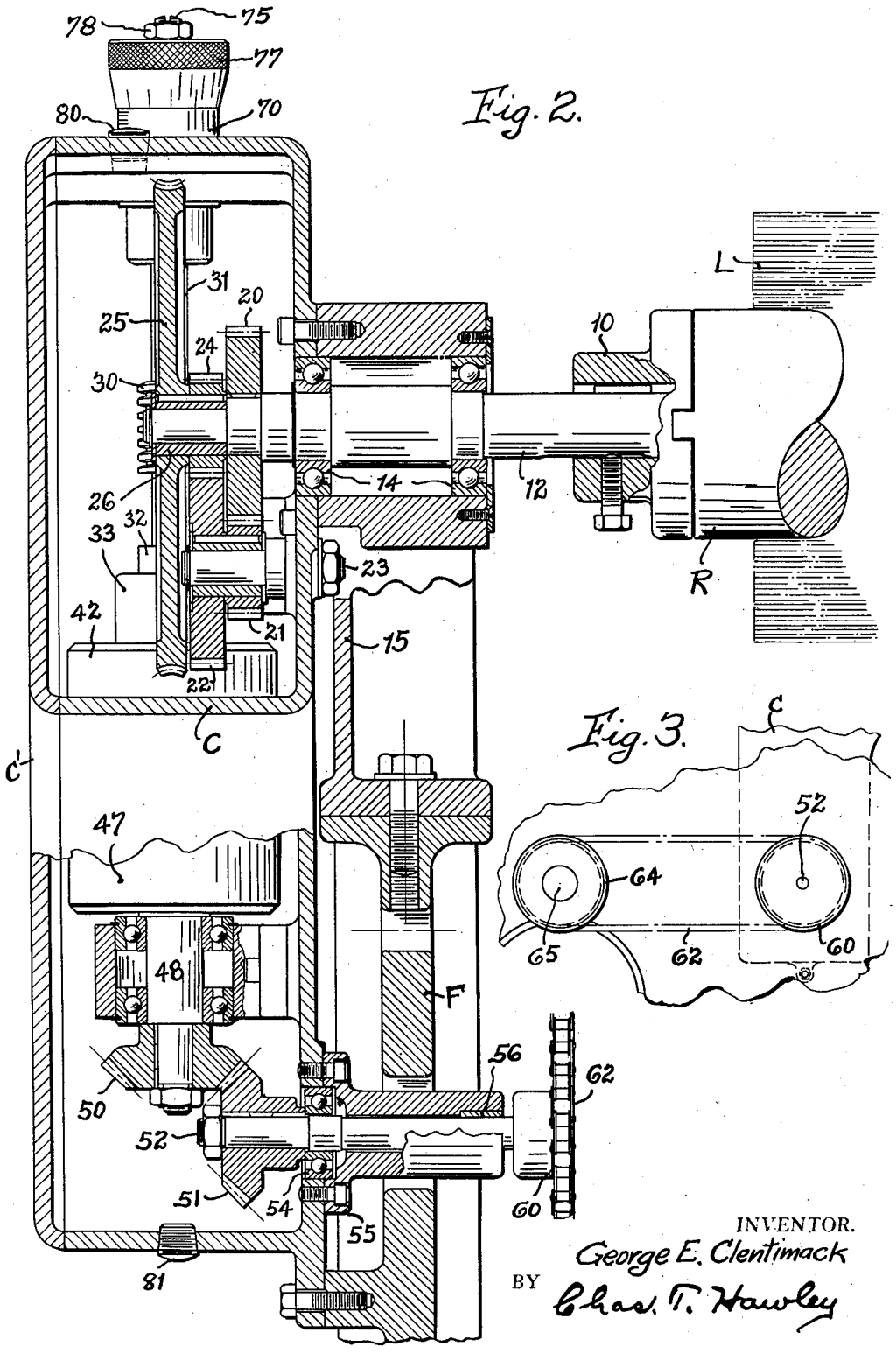


Fig. 3.

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POSITIVE AND CONSTANT-TENSION TAKE-UP MECHANISM FOR KNITTING AND OTHER TEXTILE MACHINES

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8 Claims. (Cl. 66—149)

1

This invention relates to knitting and other textile machines in which a sheet of cloth or other fabric is produced and is thereafter wound on a take-up roll.

It is essential for uniformity in cloth structure that the cloth be wound under uniform cloth tension, so that the cloth will contain the same number of picks or stitches per unit of length. It is also necessary to gradually reduce the winding speed as the diameter of the cloth roll increases.

It is the general object of my invention to provide improved take-up mechanism in which the rate of winding will be automatically decreased in definite relation to the increase in cloth roll diameter, and in which uniform cloth tension is automatically and continuously maintained.

In the preferred form of my invention, the cloth take-up is under the control of an actuating member which is rotated by the differential effect between the oil pull induced between a continuously-rotated driving member and said actuating member, and the oil drag induced between a stationary brake member and said actuating member.

My invention further relates to arrangements and combinations of parts which will be hereinafter described and more particularly pointed out in the appended claims.

A preferred form of the invention is shown in the drawings, in which

Fig. 1 is an end elevation of my improved take-up mechanism, partly in section, and with the casing cover omitted;

Fig. 2 is a sectional side elevation, taken along the irregular section line 2—2 in Fig. 1; and

Fig. 3 is a detail view to be described.

Referring to the drawings, I have shown a cloth roll R (Fig. 2) associated with a head 10 fixed on a take-up shaft 12. The shaft 12 is rotatable in bearings 14 in a bracket 15 mounted on the machine frame F.

The take-up shaft 12 is driven and rotated through a gear train comprising a gear 20 fixed to the shaft 12, and a pinion 21 and associated gear 22 mounted to rotate together on a stud 23 fixed in the casing C of the take-up tension unit, which casing is provided with a removable cover C'. The gear 22 engages a pinion 24 associated with a worm gear 25, and both are mounted on a bushing 26 freely rotatable on the reduced end portion of the take-up shaft 12.

The worm gear 25 is rotated by a worm 30 (Fig. 1) mounted on a worm shaft 31 which is rotatable in bearings in a sleeve 32. The sleeve 32

2

may be adjusted axially in a fixed bearing 33 on a stand 34 fixed to the back of the casing C. The sleeve may be held in axially adjusted position by a binding screw 35.

A driving member or runner 40 is mounted on the lower end of the worm shaft 31 and has an upper annular flange portion 41 extending into an annular recess in a brake member 42, preferably formed on the lower end of the sleeve 32. The driving member or runner 40 also has a depending annular flange 45 extending into an annular recess in the upper surface of a driving clutch member 47 mounted at the upper end of a short shaft 48.

The shaft 48 is rotatable in fixed bearings 49 and has a bevel gear 50 at its lower end which meshes with a bevel gear 51 (Fig. 2) mounted at the end of a driving shaft 52.

The shaft 52 has a fixed bearing 54 and extends through a sleeve or stand 55 fixed at the back side of the casing C. The shaft 52 has a second bearing 56 in the outer end of the stand 55 and is provided at its end with a sprocket 60 connected by a chain 62 (Fig. 3) to a sprocket 64 on a continuously rotated shaft 65, which may desirably be the cam shaft of an associated knitting machine.

At its upper end, the worm shaft 31 extends into an inverted cap or casing 70 and is provided with a thrust bearing 71 which receives the downward thrust of a compression coil spring 72. The upper end of the spring abuts a plate or washer 74 which is engaged and positioned by an adjusting screw 75 threaded into the upper end of the cap 70.

A graduated sleeve or thimble 77 is also threaded on the screw 75 and may be fixed relative thereto by a lock nut 78. By turning the thimble 77 and screw 75, the degree of compression of the spring 72 may be manually adjusted.

The casing C is to be filled with heavy transmission oil above the upper surface of the fixed brake member 42, so that the runner 40 and the associated brake member 42 and driving clutch member 47 all run in oil.

A plug 80 (Fig. 1) is provided at the top for feeding oil to the casing, and a plug 81 provides for drawing off the oil should it become necessary to remove the cover C' from the casing. A portion of cloth L is indicated in broken lines on the roll R, and the direction of approach of the cloth L is indicated in Fig. 1.

Operation

As previously stated, my improved take-up

mechanism is designed to take-up or wind the cloth L on the roll R at a constant rate of linear travel, and also under constant and continuous tension.

The desired tension is initially obtained by experimental axial adjustment of the braking member **42** and sleeve **32** in the bearing **33**, and by adjusting the compression of the spring **72** by means of the adjusting screw **75** and thimble **77**.

The clutch member **47** is continuously rotated at constant speed and in definite relation to the speed of rotation of the cam shaft **65**. The runner **40** is rotated by the differential between the pull of the oil film between the lower flange **45** of the runner and the driving member **47** on the one hand, and the drag of the oil film between the upper flange **41** of the runner and the fixed brake member **42**.

As the runner **40** is shifted axially between the members **42** and **47**, the differential driving force and the corresponding speed of rotation of the runner **40** and associated parts will naturally increase or decrease. Such axial shifting is under the joint control of the winding tension in the cloth L as it approaches the take-up roll and the downward pressure of the spring **72**.

The winding tension acts directly through the teeth of the worm gear **25** to shift the worm **30**, worm shaft **31** and runner **40** upwardly, while the spring **72** acts directly to shift these same parts downwardly. When these forces are in balance, the runner is rotated at a constant but reduced speed by the clutch member **47** and takes up the cloth at the desired constant rate of winding.

If the winding tension increases, the worm **30** and runner **40** will be shifted slightly upwardly, thus increasing the braking effect and decreasing the speed until the undue winding tension has been relieved. If, on the other hand, the winding tension slackens, the spring **72** will overcome the pressure of the worm gear **25** on the worm **30** and will shift the runner **40** and associated parts slightly downward, thus increasing the pull of the clutch member **47** and speeding-up the winding until the desired winding tension has been restored.

All parts are thus maintained automatically in balance, and any deviation in winding tension is promptly corrected throughout the winding operation.

No adjustment is necessary to take care of the increase in diameter of the cloth roll, as the increased pull required to wind the cloth L on the roll R at a larger diameter automatically reacts through the worm gear **25** and worm **30** to shift the worm **30**, runner **40** and associated parts upward against the pressure of the spring **72**. Such upward shifting increases the braking effect of the brake member **42** and correspondingly reduces the speed of rotation of the runner **40** and the gear train operated thereby.

By selecting correct speed relations in the gear train, the winding speed will be constantly maintained in direct relation to the diameter of the cloth roll and will progressively decrease as the diameter of the roll increases. The winding tension will also be maintained substantially constant.

I claim:

1. A take-up mechanism for a textile machine having a rotated take-up roll comprising a driven shaft, a speed-reducing connection between said shaft and said rotated take-up roll, a continuously-rotated driving shaft, a clutch member thereon, an opposed stationary brake member, and a runner connected to said driven shaft and positioned between said rotating clutch member and said stationary brake member, said shafts and associated parts being immersed in transmission oil and said runner and driven shaft being rotated by the excess of the oil-transmitted pull of the clutch member over the oil-transmitted drag of the brake member.

2. The combination in take-up mechanism as set forth in claim 1, in which the speed-reducing connection to the take-up roll is irreversible.

3. A take-up mechanism for a textile machine having a rotated take-up roll comprising a driven shaft, a speed-reducing connection between said shaft and said rotated take-up roll, a continuously-rotated driving shaft, a clutch member thereon, an opposed stationary brake member, a runner connected to said driven shaft and positioned between said rotating clutch member and said stationary brake member, said shafts and associated parts being immersed in transmission oil and said runner and driven shaft being rotated by the excess of the oil-transmitted pull of the clutch member over the oil-transmitted drag of the brake member, and means to adjust the total amount of clearance between said clutch member, said runner and said brake member.

4. A take-up mechanism for a textile machine having a rotated take-up roll comprising a driven shaft, a speed-reducing connection between said shaft and said rotated take-up roll, a continuously-rotated driving shaft, a clutch member thereon, an opposed stationary brake member, a runner connected to said driven shaft and positioned between said rotating clutch member and said stationary brake member, said shafts and associated parts being immersed in transmission oil and said runner and driven shaft being rotated by the excess of the oil-transmitted pull of the clutch member over the oil-transmitted drag of the brake member, and means to vary the proportionate clearance of said runner relative to said clutch member and to said brake member.

5. A take-up mechanism for a textile machine having a rotated take-up roll comprising a driven shaft, a speed-reducing connection between said shaft and said rotated take-up roll, a continuously-rotated driving shaft, a clutch member thereon, an opposed stationary brake member, a runner connected to said driven shaft and positioned between said rotating clutch member and said stationary brake member, said shafts and associated parts being immersed in transmission oil and said runner and driven shaft being rotated by the excess of the oil-transmitted pull of the clutch member over the oil-transmitted drag of the brake member, and means to vary the proportionate clearance of said runner relative to said clutch member and to said brake member, and said latter means including a spring acting to shift said runner axially toward said clutch member on decrease in take-up tension.

6. The combination in take-up mechanism as set forth in claim 5, in which the speed-reducing connections include a worm gear on the take-up roll and a worm on the driven shaft, and in which the take-up tension acts through said worm gear directly against said worm to shift said driven shaft axially and to thereby decrease the effective oil-transmission pull of the clutch member on the runner.

7. A take-up mechanism for a textile machine having a rotated take-up roll comprising a driven

shaft, a speed-reducing connection between said shaft and said rotated take-up roll, a continuously-rotated driving shaft, a clutch member thereon, an opposed stationary brake member, a runner connected to said driven shaft and positioned between said rotating clutch member and said stationary brake member, said shafts and associated parts being immersed in transmission oil and said runner and driven shaft being rotated by the excess of the oil-transmitted pull of the clutch member over the oil-transmitted drag of the brake member, means to vary the proportionate clearance of said runner relative to said clutch member and to said brake member and including a spring acting to decrease the clearance of said runner with respect to said clutch member on decrease in take-up tension, and manual means to adjust the initial compression of said spring.

8. A take-up mechanism for a textile machine having a rotated take-up roll comprising an axially slidable driven shaft, a speed-reducing connection between said shaft and said rotated take-up roll and including a worm and worm gear, a continuously-rotated driving shaft, a clutch member thereon, an opposed stationary brake member, means to adjust said brake member axially, a runner connected to said driven shaft and positioned between said rotating clutch member and said stationary brake member, said shafts and associated parts being immersed in transmission oil and said runner and driven shaft being rotated by the excess of the oil-transmitted pull of the clutch member over the oil-transmitted drag of the brake member, and yielding means to shift said driven shaft and runner axially to decrease the rate of take-up on increase in take-up tension.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,450,489	Sepavich et al.	Oct. 5, 1948
2,529,241	Bassist	Nov. 7, 1950
2,539,296	Clentimack	Jan. 23, 1951

FOREIGN PATENTS

Number	Country	Date
423,222	Great Britain	Jan. 28, 1935
624,642	Germany	Jan. 25, 1936