

Nov./28, 1944.

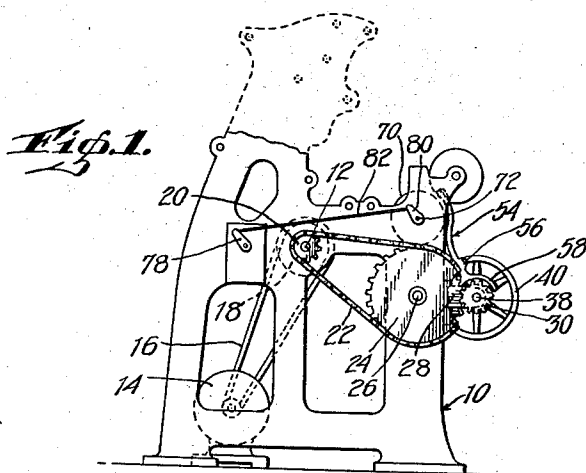
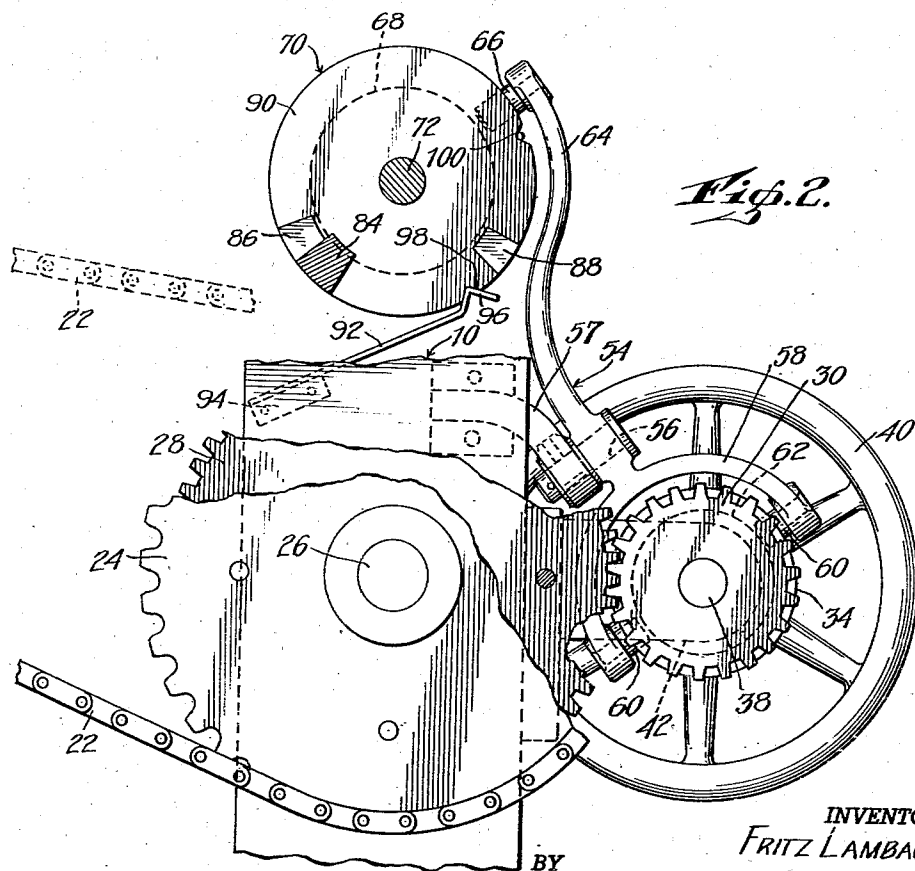
F. LAMBACH

2,363,535

KNITTING MACHINE

Filed Oct. 21, 1943

2 Sheets-Sheet 1



INVENTOR
FRITZ LAMBACH
BY
ATTORNEY

Nov. 28, 1944.

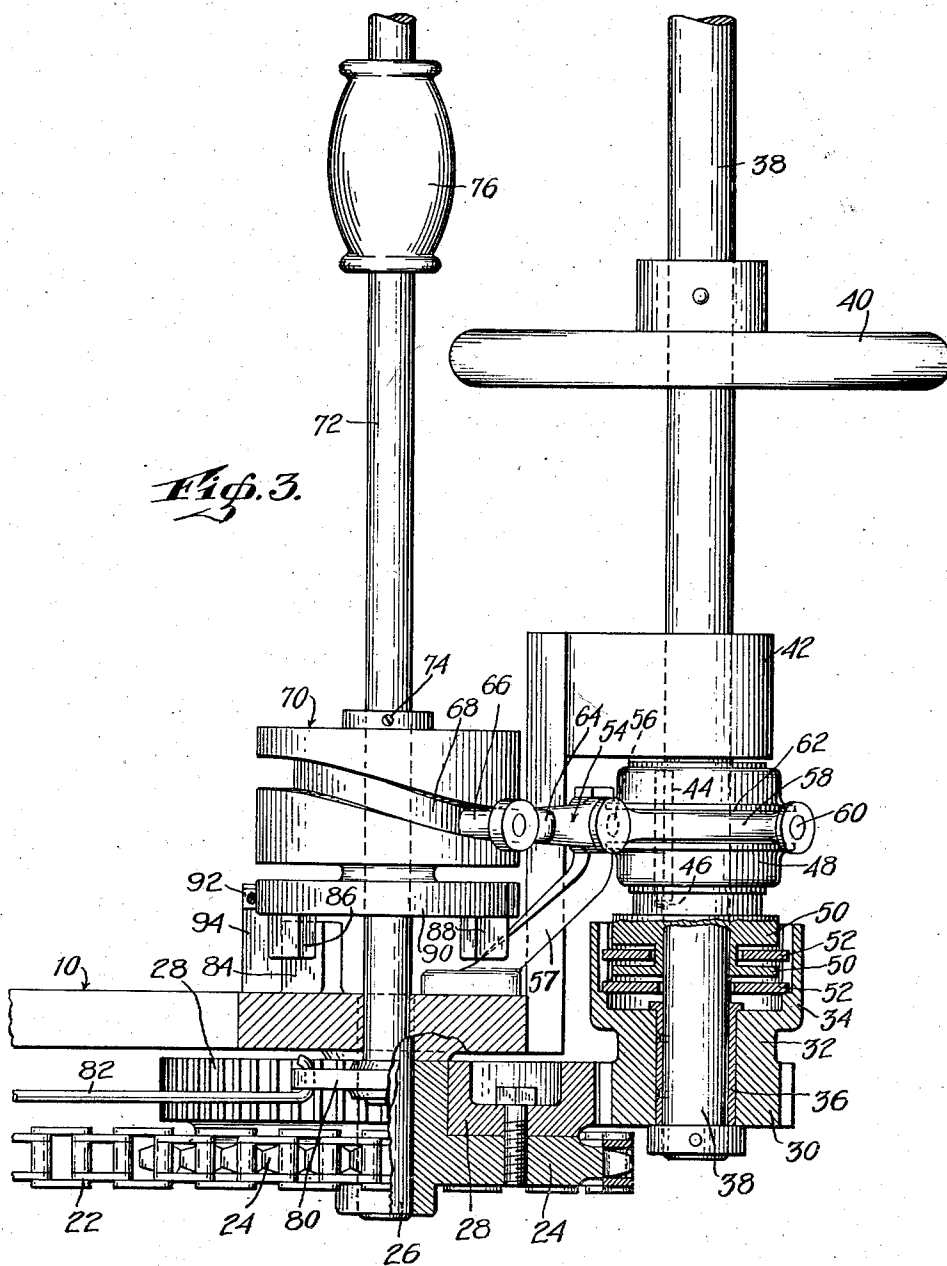
F. LAMBACH

2,363,535

KNITTING MACHINE

Filed Oct. 21, 1943

2 Sheets-Sheet 2



BY

INVENTOR
FRITZ LAMBACH
F. Lambach
ATTORNEY

UNITED STATES PATENT OFFICE

2,363,535

KNITTING MACHINE

Fritz Lambach, Tenafly, N. J.

Application October 21, 1943, Serial No. 507,059

9 Claims. (Cl. 66—86)

My invention relates to textile machines, and more particularly to a knitting machine with a main cam shaft, which may be rotated either by an electromotor or by a hand wheel secured to a hand wheel shaft.

An object of my invention is to provide a knitting machine of above described type with means causing an automatic disengagement of the hand wheel shaft from the main cam shaft simultaneously with the switching on of the electromotor and causing an automatic engagement of the hand wheel shaft with the main cam shaft simultaneously with the switching off of the electromotor.

Another object of my invention is to improve upon knitting machines of above described type as now ordinarily made.

In order to carry out my invention into practice I provide a knitting machine comprising: a main shaft, an electromotor connected with said main shaft, a switch in circuit with said electromotor for the control thereof, a hand wheel shaft, a clutch having a shiftable member, said clutch being interposed between said hand wheel shaft and said main shaft, and a mechanism arranged for the control of said shiftable member, said mechanism being associated with said switch for an automatic disengagement of said two shafts from each other by said clutch simultaneously with a switching on of said electromotor by said switch and for an automatic engagement of said two shafts with each other by said clutch simultaneously with a switching off of said electromotor by said switch.

The above mentioned objects and advantages as well as other objects and advantages will be more fully disclosed in the following specification reference being had to the accompanying drawings forming part of this specification, wherein:

Fig. 1 is a diagrammatical end view of a warp knitting machine equipped with a controlling mechanism according to my invention,

Fig. 2 is an enlarged detail end elevation of the controlling mechanism shown in Fig. 1, some parts being broken away, and

Fig. 3 is a top plan view of the controlling mechanism shown in Fig. 1, some parts being shown in section.

In the drawings, 10 generally indicates the frame of a warp knitting machine. The main cam shaft 12 carrying the cams (not shown) is journaled in suitable bearings of the frame 10. For a normal operation of the knitting machine the main cam shaft 12 may be rotated by an

electromotor 14 through the medium of a belt 16 trained around a disc 18 keyed to the main cam shaft 12.

As best shown in Fig. 1 a sprocket gear 20 is keyed to the end of the main cam shaft 12. A chain 22 is trained around the sprocket gear 20 and another sprocket gear 24 rotatably mounted on a stud 26 projecting from the frame 10 of the knitting machine. As best shown in Figs. 2 and 3 the sprocket gear 24 is rigidly connected with a gear 28 meshing with a pinion 30 forming an integral part of the member 32 of a friction clutch generally indicated by 34. The member 32 of the clutch 34 is rotatably mounted on a sleeve 36 secured to the hand wheel shaft 38 carrying the hand wheels 40 (only one hand wheel being shown in the drawings). The hand wheel shaft 38 in turn is rotatably arranged in bearings 42 (only one bearing being shown in the drawings), which are attached to the frame 10 by brackets or the like. The hand wheel shaft 38 is provided with a key 44 for engagement with a groove 46 in the shiftable member 48 of the clutch 34 slidably mounted on the hand wheel shaft 38. The shiftable clutch member 48 carries discs 50 for frictional engagement with corresponding discs 52 of the axially immovable clutch member 32. In the position shown in Fig. 3 the discs 52 of the clutch member 32 are disengaged from the discs 50 of the shiftable clutch member 48, so that upon a rotation of the gear 28 by the motor 14 through the belt drive 16, 18 and chain drive 20, 22, 24 the clutch member 32 being in engagement with the gear 28 freely rotates on the sleeve 36 secured to the hand wheel shaft 38, while the latter remains at a standstill.

The shiftable member 48 of the clutch 38 is controlled by the following mechanism: A controlling lever generally indicated by 54 is pivotally mounted at 56 on a bracket 57 secured to the frame 10 in a suitable manner. The controlling lever 54 has a forked arm 58 carrying pins 60 in engagement with an annular groove 62 of the shiftable clutch member 48. Furthermore the controlling lever 54 has an arm 64 carrying a pin 66 in engagement with a cam slot 68 on the cylindrical surface of a cylindrical element 70 secured to a switch rod 72 by a set screw 74. The switch rod 72 carrying handles 76 (only one being shown in Fig. 3) is journaled in suitable bearings of the frame 10 of the knitting machine and serves to control the switch 78 (Fig. 1) of the electromotor through an arm 80 secured to the free end of the switch rod 72 and a connecting rod 82 having its ends connected with the

arm 80 and the switch 78 respectively. Obviously a rotation of the switch rod 72 for a change of the position of the switch 78 in circuit with the electromotor 14 causes at the same time a rotation of the controlling lever 54 about the pivot 56 by means of the cam slot 68 of the cylindrical element 70, so that the position of the shiftable member 48 of the clutch 34 is changed simultaneously with a change in the position of the switch 78. The various members of the controlling mechanism for the clutch 34 are arranged and shaped in such a way that the discs 50 of the clutch member 48 are disengaged from the discs 52 of the clutch member 32 when the switch 78 of the electromotor is in the switching on position, and that said discs 50 and 52 are in engagement with each other when the switch 78 is in the switching off position. Obviously, the engagement of the discs 50 and 52 with each other permits a rotation of the main cam shaft 12 by a hand wheel 40 through the medium of the hand wheel shaft 38, the clutch 34, the gear 28 in mesh with the pinion 30 of the clutch 34 and the chain drive 24, 22, 20.

The extreme positions of the switch rod 72 are limited by an abutment 84 projecting from the frame 10 for engagement with a lug 86 or 88 projecting from a disc-like portion 90 of the cylindrical element 70.

The switch rod 72 and consequently the switch 78 as well as the shiftable member 48 of the clutch 34 may be held in their extreme positions by a resilient locking member 92 secured to a lug 94 projecting from the frame 10. Said resilient locking member 92 has a V-shaped end 96 for engagement with notches 98 and 100 arranged at a predetermined distance on the surface of the disc-like portion 90 of the element 70. When the locking member 92 is in engagement with the notch 98, the shiftable member 48 of the clutch 34 is held in a position, wherein the discs 50 are disengaged from the discs 52; when the locking member 92 is in engagement with the notch 100, the shiftable member 48 of the clutch 34 is held in a position, wherein the discs 50 are engaged with the discs 52.

The operation of the mechanism described above is as follows:

In order to start the knitting machine, the switch rod 72 is turned in counter-clockwise direction as viewed in Figs. 1 and 2 until the lug 86 abuts against the abutment 84 as shown in Figs. 2 and 3. This rotation of the switch rod 72 brings the switch 78 into the position for a switching on of the electromotor 14. Furthermore this rotation of the switch rod 72 causes an automatic disengagement of the hand wheel shaft 38 from the main cam shaft 12 by a movement of the controlling lever 54 through the cam slot 68 into the position shown in Fig. 3, wherein the discs 50 of the shiftable clutch member 48 are disengaged from the discs 52 of the clutch member 34. Thus, the shafts 38 and 12 are automatically disengaged from each other simultaneously with the switching on of the electromotor 14 by the switch 78.

In order to stop the knitting machine, the switch rod 72 is rotated in clockwise direction as viewed in Figs. 1 and 2, until the lug 88 abuts against the abutment 84. This rotation of the switch rod 72 brings the switch 78 into a position for a switching off of the electromotor 14. Furthermore this rotation of the switch rod 72 causes an automatic engagement of the hand wheel shaft 38 with the main cam shaft 12 by a movement of

the controlling lever 54 through the cam slot 68 into a position, wherein the discs 50 of the shiftable clutch member 48 are in engagement with the discs 52 of the clutch member 34. Thus, the shafts 38 and 12 are automatically engaged with each other simultaneously with the switching off of the electromotor 14 by the switch 78. Now the main cam shaft 12 of the knitting machine may be rotated by a hand wheel 40, if desired.

I have described a preferred embodiment of my invention, but it is clear that numerous changes and omissions may be made without departing from the spirit of my invention. For example, the mechanism according to the invention may be applied to any other knitting machine than a warp knitting machine which is equipped with a hand wheel shaft for a temporary rotation of the main cam shaft by a hand wheel. Furthermore, a different type of a clutch may be used instead of the clutch shown in the drawings. Moreover, the shiftable member of the clutch used may be controlled by a different type of cam means associated with the start- and stop-switch of the electromotor. Another modification of the invention may consist in a different type of locking means for holding the shiftable member of the clutch in its extreme positions.

What I claim is:

1. A knitting machine comprising: a main shaft, an electromotor connected with said main shaft, a switch in circuit with said electromotor for the control thereof, a hand wheel shaft, a clutch having a shiftable member, said clutch being interposed between said hand wheel shaft and said main shaft, and a mechanism arranged for the control of said shiftable member of said clutch, said mechanism being associated with said switch for an automatic disengagement of said two shafts from each other by said clutch simultaneously with a switching on of said electromotor by said switch and for an automatic engagement of said two shafts with each other by said clutch simultaneously with a switching off of said electromotor by said switch.

2. A knitting machine comprising: a main shaft, an electromotor connected with said main shaft, a switch in circuit with said electromotor for the control thereof, a hand wheel shaft, a clutch having a shiftable member, said clutch being interposed between said hand wheel shaft and said main shaft, a mechanism arranged for the control of said shiftable member of said clutch, said mechanism being associated with said switch for an automatic disengagement of said two shafts from each other by said clutch simultaneously with a switching on of said electromotor by said switch and for an automatic engagement of said two shafts with each other by said clutch simultaneously with a switching off of said electromotor by said switch, and locking means arranged for holding said shiftable member of said clutch in its extreme positions.

3. A knitting machine comprising: a main shaft, an electromotor connected with said main shaft, a switch in circuit with said electromotor for the control thereof, a hand wheel shaft, a clutch having a shiftable member, said clutch being interposed between said hand wheel shaft and said main shaft, a cam connected with said switch, and a lever arranged for the control of said shiftable member of said clutch, said lever being controlled by said cam for an automatic disengagement of said two shafts from each other by said clutch simultaneously with a switching on of said electromotor by said switch and for

an automatic engagement of said two shafts with each other by said clutch simultaneously with a switching off of said electromotor by said switch.

4. A knitting machine comprising: a main shaft, an electromotor connected with said main shaft, a switch in circuit with said electromotor for the control thereof, a hand wheel shaft, a clutch having a shiftable member, said clutch being interposed between said hand wheel shaft and said main shaft, a cam connected with said switch, a lever arranged for the control of said shiftable member of said clutch, said lever being controlled by said cam for an automatic disengagement of said two shafts from each other by said clutch simultaneously with a switching on of said electromotor by said switch and for an automatic engagement of said two shafts with each other by said clutch simultaneously with a switching off of said electromotor by said switch, and locking means arranged for holding said shiftable member of said clutch in its extreme positions.

5. A knitting machine comprising: a main shaft, an electromotor connected with said main shaft, a switch in circuit with said electromotor for the control thereof, a switch rod connected with said switch for actuating same, a hand wheel shaft, a clutch having a shiftable member, said clutch being interposed between said hand wheel shaft and said main shaft, a cam secured to said switch rod, and a lever arranged for the control of said shiftable member of said clutch, said lever being controlled by said cam for an automatic disengagement of said two shafts from each other by said clutch simultaneously with a switching on of said electromotor by said switch and for an automatic engagement of said two shafts with each other by said clutch simultaneously with a switching off of said electromotor by said switch.

6. A knitting machine comprising: a main shaft, an electromotor connected with said main shaft, a switch in circuit with said electromotor for the control thereof, a switch rod connected with said switch for actuating same, a hand wheel shaft, a clutch having a shiftable member, said clutch being interposed between said hand wheel shaft and said main shaft, a cam secured to said switch rod, a lever arranged for the control of said shiftable member of said clutch, said lever being controlled by said cam for an automatic disengagement of said two shafts from each other by said clutch simultaneously with a switching on of said electromotor by said switch and for an automatic engagement of said two shafts with each other by said clutch simultaneously with a switching off of said electromotor by said switch, and locking means arranged for holding said shiftable member of said clutch in its extreme positions.

7. A knitting machine comprising: a main shaft, an electromotor connected with said main shaft, a switch in circuit with said electromotor for the control thereof, a switch rod connected

with said switch for actuating same, a hand wheel shaft, a clutch having a shiftable member, said clutch being interposed between said hand wheel shaft and said main shaft, a cylindrical element secured to said switch rod, said cylindrical element having a cam slot on its cylindrical surface, and a lever arranged for the control of said shiftable member of said clutch, said lever being in engagement with said cam slot for an automatic disengagement of said two shafts from each other by said clutch simultaneously with a switching on of said electromotor by said switch and for an automatic engagement of said two shafts with each other by said clutch simultaneously with a switching off of said electromotor by said switch.

8. A knitting machine comprising: a main shaft, an electromotor connected with said main shaft, a switch in circuit with said electromotor for the control thereof, a switch rod connected with said switch for actuating same, a hand wheel shaft, a clutch having a shiftable member, said clutch being interposed between said hand wheel shaft and said main shaft, a cylindrical element secured to said switch rod, said cylindrical element having a cam slot on its cylindrical surface, a lever arranged for the control of said shiftable member of said clutch, said lever being in engagement with said cam slot for an automatic disengagement of said two shafts from each other by said clutch simultaneously with a switching on of said electromotor by said switch and for an automatic engagement of said two shafts with each other by said clutch simultaneously with a switching off of said electromotor by said switch, and locking means arranged for holding said switch rod in its extreme positions.

9. A knitting machine comprising: a main shaft, an electromotor connected with said main shaft, a switch in circuit with said electromotor for the control thereof, a switch rod connected with said switch for actuating same, a hand wheel shaft, a clutch having a shiftable member, said clutch being interposed between said hand wheel shaft and said main shaft, a cylindrical element secured to said switch rod, said cylindrical element having a cam slot on its cylindrical surface and having two notches arranged at a predetermined distance on its cylindrical surface, a lever arranged for the control of said shiftable member of said clutch, said lever being in engagement with said cam for an automatic disengagement of said two shafts from each other by said clutch simultaneously with a switching on of said electromotor by said switch and for an automatic engagement of said two shafts with each other by said clutch simultaneously with a switching off of said electromotor by said switch, and a spring loaded locking member arranged for engagement with said notches on the surface of said cylindrical element so as to hold said switch rod in its extreme positions.

FRITZ LAMBACH.