Feb. 1, 1938. H. W. START ET AL 2,107,221

STRAIGHT BAR KNITTING MACHINE

Filed May 11, 1937 2 Sheets-Sheet 1

Fig. 1.

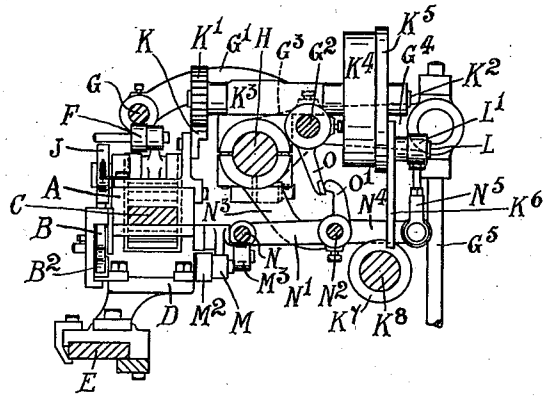


Fig. 2.

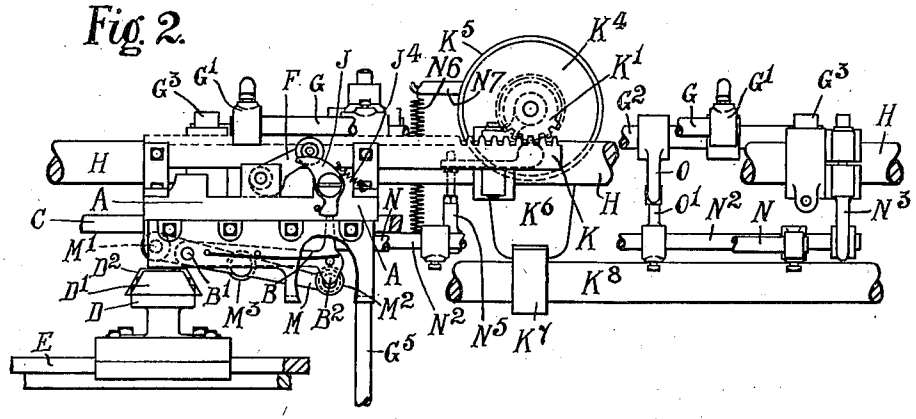
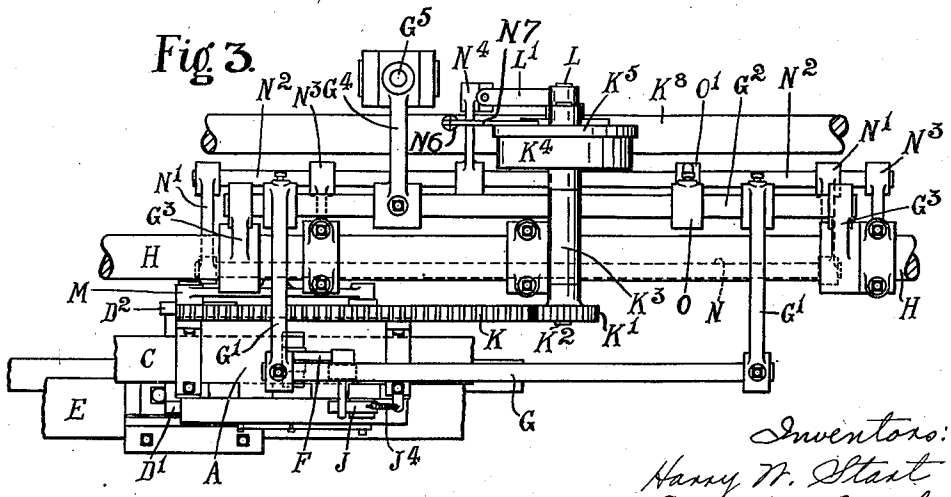


Fig. 3.



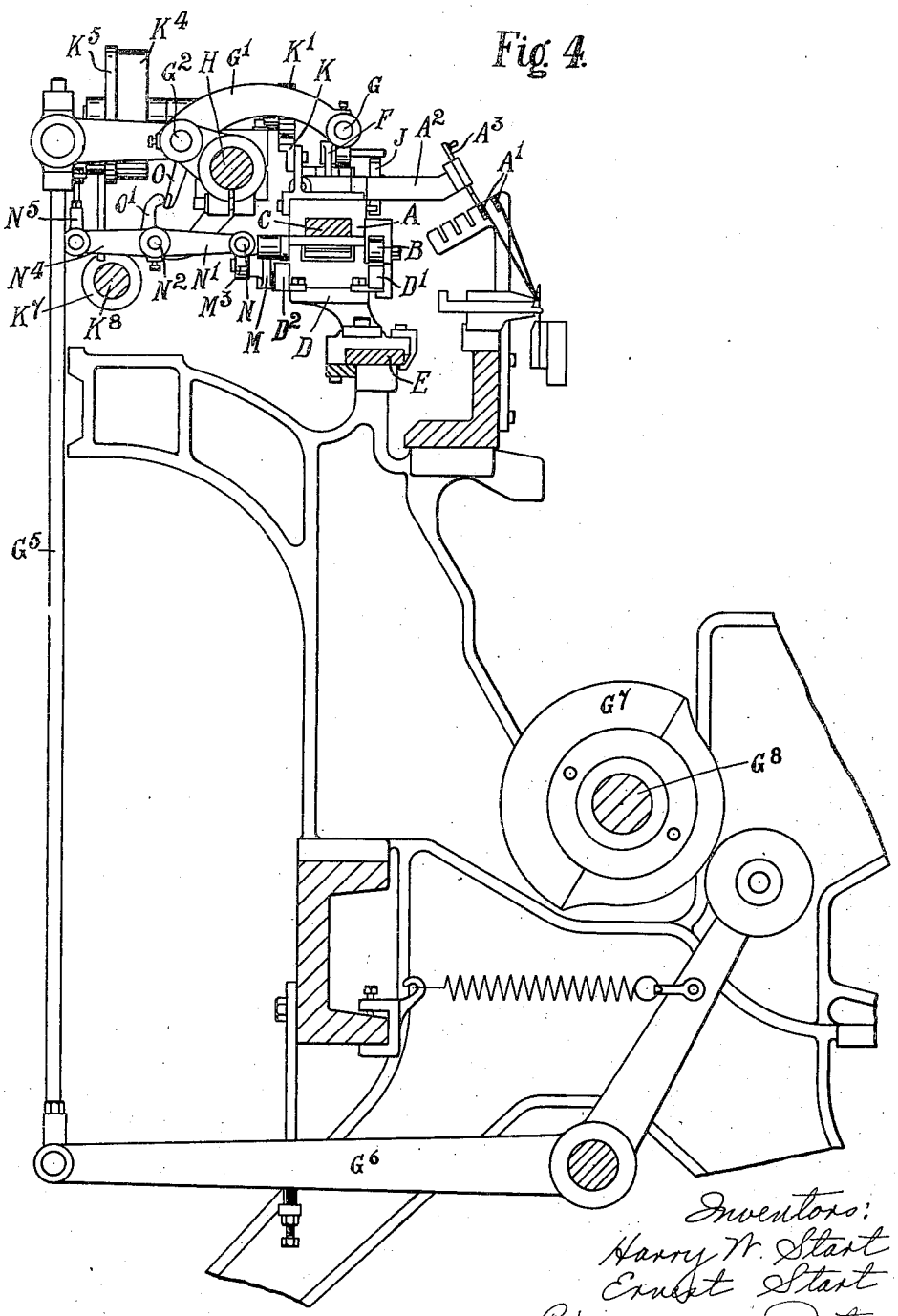
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Fig. 4.



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UNITED STATES PATENT OFFICE

2,107,221

STRAIGHT-BAR KNITTING MACHINE

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6 Claims. (Cl. 66—126)

This invention relates to straight-bar knitting machines such for example as those known as "Cottons", in which the thread carriers are disposed on longitudinal bars which are reciprocated in the direction of their length, and it refers to improvements in the means which are employed transmitting longitudinal reciprocating movements to the said bars.

The amplitude of movement of these thread carrier bars has to be varied from time to time in order to vary the width of the knitted fabric produced, and for this reason the usual arrangement adopted is to drive these bars through the agency of one or more friction boxes disposed on friction bars, and check them at the required points by means of adjustable end stops. The object of the present invention is to provide positive means for imparting the initial movements to the thread carrier bars, and frictional means for completing such movements. With this system higher speeds can be attained without risk, and the friction can be reduced, so that less power is wasted in driving the machine and less wear is set up.

This improved result is due to the fact that more power is required to overcome the inertia of the said carriers bars when they are at rest than is required to keep them moving, and by providing positive means for starting the movements, a moderate amount of frictional contact is only necessary to complete such movements, and the frictional resistance that is met with when the carrier bars are stopped is considerably reduced.

In the usual arrangement, the friction box is mounted on a longitudinal friction bar which is disposed just above the slur-cock rail, and this friction bar is connected to and receives positive reciprocating movements from the said rail. The thread carrier bar is connected to the friction box, and it will be understood, that when the thread carrier bar is stopped, the friction box will stop, while the friction bar on which it is disposed will continue its movement, and consequently the frictional resistance set up between the friction box and the bar has to be overcome.

It will also be understood that under normal circumstances, the frictional grip of the box on the bar must be adjusted so that it will promptly start the thread carrier bar from rest, and that in consequence the friction between the bar and the friction box must be very considerable, and that it acts like an efficient brake on the moving friction bar when the friction box is stopped.

According to this invention a bracket on the reciprocating slur-cock rail carries a driving member which engages with a latch on the friction box when it is at rest and positively moves it for a short distance. The latch which is locked by a tumbler during this initial movement is then released from the driving member while the friction plates in the friction box are simultaneously pressed down on the reciprocating friction bar, so that the remainder of the movement is frictionally effected by the said bar. On the completion of the movement the friction is released, and the return movement is started by the positive arrangement again.

A brake is provided to hold the friction box when it is released from the friction bar and is at rest, in order to prevent it from creeping out of its proper position during the initial movements of the friction bar.

The invention will now be more particularly described with reference to the accompanying drawings, in which

Fig. 1 is a vertical cross section, and

Fig. 2 a front elevation, and

Fig. 3 a plan of thread carrier driving mechanism constructed according to our invention.

Fig. 4 is a cross section of a knitting machine to which the invention is applied.

Like letters indicate like parts throughout the drawings.

In carrying out this invention, the friction box A (see Figs. 1 and 2) which is mounted on the longitudinally reciprocating friction bar C, is fitted on its underside with a latch B which is pivoted to the friction box at B^1 and is provided at its free end with a nose B^2. This nose B^2 is bevelled on both sides, and a bracket D on the longitudinally reciprocating slur cock rail E, is fitted with a driving member D^1 which is bevelled at each end and is adapted to engage with the nose B^2 of the latch B, when the rail E is moving in either direction. When the latch B is locked as will be hereinafter described, the driving member D^1 will drive the friction box A, but will release it as soon as the latch B is released.

The friction set up between the friction box A and the friction bar C in the present case is controlled by the action of a cam lever F which is pivoted in the top of the box. This cam lever F which is hereinafter termed the friction lever, is adapted to compress the friction plates in the friction box on to the friction bar C, when its free end is depressed, and thus cause the box A to grip the friction bar C. This grip is again relieved when the free end of the friction lever F is released.

Above the friction box A is a bar G which is disposed parallel to the friction bar C. This bar G is carried in the free ends of two arms G^1 secured on a rocking shaft G^2, which latter is disposed parallel to the friction bar C in bearings G^3 secured on a fixed longitudinal shaft H.

The rocking shaft G^2 is provided with another arm G^4 which has its free end connected by a connecting rod G^5 to a lever G^6 (see Fig. 3) which is actuated by a cam G^7 on the main cam shaft G^8 of the machine. This cam G^7 is adapted to depress the bar G which is hereinafter termed the presser bar, down on to the free end of the friction lever F on the friction box A, and the friction grip when applied can be maintained as long as is required even when the friction box is reciprocating, as the presser bar G is adapted to maintain its pressure on the friction lever F under these circumstances.

Pivoted on the friction box A between the free end of the latch B and the free end of the friction lever F, is a tumbler J, and when this tumbler is in its normal position, in which it is shown in Fig. 2, its lower end engages with an upward extension of and locks the latch B, whilst its upper end is in the path of the free end of the friction lever F, so that when this lever F is depressed, it engages with and moves the lower end of the tumbler J clear of and releases the latch B. It thus follows that the latch B is released and the positive connection broken as soon as the friction lever F is depressed and the friction box A is gripped to the friction bar C. The tumbler J is returned to its normal position again as soon as it is released by means of a spring J^4.

The action of the arrangement described is as follows:—

At the commencement of each movement, the driving member D^1 on the bracket D on the slur cock rail E, engages with the nose B^2 of the latch B on the underside of the friction box A, and effects the first half of the movement by a positive connection. As soon as the friction box A has moved to the half way point, the friction lever F is depressed by the bar G and the tumbler J turned so as to release the latch B and destroy the positive connection. The remaining half of the movement is then effected by the frictional grip of the box A on the friction bar C, so that when the friction box A is stopped, the driving member D^1 which has continued to move with the friction box A, now moves past the nose B^2 of the latch B, and is ready to start the return movement by a positive connection with the latch B again which is again locked by the tumbler J when the presser bar G is raised at the termination of each movement.

With this arrangement, not only is the thread carrier bar A^1 (shown in Fig. 4) started promptly from rest without fail, but the friction required between the friction bar E and the friction box A can be considerably reduced, so that the resistance set up when one is stopped without the other is also reduced. The prompt starting of the thread carrier bars A^1 is specially important when making plated goods, as the plated thread carriers then only have a very short lead in advance of the slur-cocks, and the loss of any of this results in the sinkers striking the thread carriers and causing serious damage.

The thread carrier bar A^1 is connected to the friction box A in the usual manner by an arm A^2 which is pivoted in the box A and has a slide A^3 at its end which can be moved into and out of engagement with the thread carrier bar A^1.

It has been found that the friction box A has a tendency to move with the friction bar C, before the driving member D^1 reaches it, and in order to obviate this risk, a brake is provided to hold the box until such time as the driving member D^1 engages with the latch B therein, and the following arrangement is adopted for this purpose.

A toothed rack K on the friction box A engages with a toothed wheel K^1 on the rear end of an axle K^2 which is mounted in a bearing K^3 secured to the fixed shaft H previously referred to, and the rear end of the axle is fitted with a brake drum K^4 in which are disposed expanding brake shoes of the usual type. At the front of the brake drum K^4 is a plate K^5 which is mounted on the axle K^2, and this plate is prevented from turning by means of an extension plate K^6 which has a forked lower end which engages with a collar K^7 on a shaft K^8.

Mounted in the fixed plate K^6 is an axle L with a brake shoe expanding cam on its inner end and an arm L^1 on its outer end, and the brake is applied and removed by adjusting this arm L^1. This arm L^1 is connected as will be hereinafter described to a lever M which is pivoted at M^1 to the front of the friction box A and is provided at its free end with an antifriction roller M^2 which is disposed near the nose B^2 on the latch B. The bracket D previously described, is provided with cam member D^2 which engages with the roller M^2 on and raises the free end of the lever M, at the same time as the driving member D^1 engages with the nose B^2 of the latch, and this movement of the lever M is transmitted to the brake arm L^1 and serves to release the brake at the same time as the driving member D^1 engages with the latch B in the friction box A.

The lever M is connected to the brake arm L^1 by the following arrangement. At the front of the friction box A is a longitudinal bar N, which is carried in the free ends of arms N^1 on a rocking shaft N^2 which is carried in bearings N^3 secured to the fixed shaft H, and when the lever M is raised as previously described, a roller M^3 thereon engages with the underside of and raises this bar N and rocks the shaft N^2, and another arm N^4 on the latter is connected by a link N^5 to the brake lever L^1 and releases the brake. When the brake lever L^1 is released, the brake is again applied by the action of a spring N^6, one end of which is connected to the arm N^4 on the shaft and the other end to a hook member N^7 secured to the brake drum plate K^5.

A further arrangement is provided to insure the release of the brake when the friction lever F on the friction box A is depressed by the presser bar G. This arrangement consists of an arm O on the presser bar shaft G^2 which engages with an arm O^1 on the rocking shaft N^2.

What we claim is:—

1. In straight-bar knitting machine thread carrier driving mechanism, a longitudinally reciprocating friction bar, a friction box mounted thereon, a thread carrier bar connected to the friction box, a pivoted latch on the friction box, a tumbler for locking the latch, a driving member carried on the reciprocating slur cock rail which is adapted to engage with the latch on the friction box and give the latter a positive starting movement first in one direction and then in the other, and means for releasing the latch and destroying the positive driving connection, substantially as described.

2. In straight-bar knitting machine thread car-

rier driving mechanism, a longitudinally reciprocating friction bar, a friction box mounted thereon, a thread carrier bar connected to the friction box, a pivoted latch on the friction box, a tumbler for locking the latch, a driving member carried on the reciprocating slur cock rail which is adapted to engage with the latch on the friction box and give the latter a positive starting movement first in one direction and then in the other, a friction lever on the friction box for applying the frictional grip to the friction bar, means for depressing this lever, and a latch locking tumbler with a part which is engaged by the friction lever when depressed whereby the said tumbler is at the same time turned so as to release the latch, substantially as described.

3. In straight-bar knitting machine thread carrier driving mechanism, a longitudinally reciprocating friction bar, a friction box mounted thereon, a thread carrier bar connected to the friction box, a pivoted latch on the friction box formed with a nose, a tumbler for locking the latch, a driving member carried on the reciprocating slur cock rail which is adapted to engage with the latch on the friction box and give the latter a positive starting movement first in one direction and then in the other, a friction applying lever on the friction box, a longitudinal bar for depressing the friction lever carried by arms on a rocking shaft which is connected to and actuated by a cam on a running shaft, and a latch locking tumbler with a part which is engaged by the friction lever when it is depressed whereby the said tumbler is at the same time turned so as to release the latch, substantially as described.

4. In straight-bar knitting machine thread carrier driving mechanism, a longitudinally reciprocating friction bar, a friction box mounted thereon, a thread carrier bar connected to the friction box, a pivoted latch on the friction box formed with a nose, a tumbler for locking the latch, a driving member carried on the reciprocating slur cock rail which is adapted to engage with the nose of the latch on the friction box and give the latter a positive starting movement first in one direction and then in the other, means for releasing the latch so as to destroy the positive driving connection and simultaneously applying the frictional grip on the friction bar, a toothed rack on the friction box, an axle with a toothed pinion in engagement with the rack, a brake drum on the axle fitted with brake shoes which are expanded by a spring actuated cam, and means for releasing the brake at the commencement of each movement of the friction box, substantially as described.

5. In straight-bar knitting machine thread carrier driving mechanism, a longitudinally reciprocating friction bar, a friction box mounted thereon, a thread carrier bar connected to the friction box, a pivoted latch on the friction box with a nose, a tumbler for locking the latch and a driving member carried on the reciprocating slur cock rail which is adapted to engage with the nose of the latch on the friction box and give the latter a positive starting movement first in one direction and then in the other, means for releasing the latch so as to destroy the positive driving connection and simultaneously applying the frictional grip on the friction bar, a toothed rack on the friction box, an axle with a toothed pinion in engagement with the rack, a brake drum on the axle fitted with brake shoes which are expanded by a lever, a spring connected to this lever which holds the brake on, a lever on the friction box which is tripped by a cam member on the slur-cock rail and means for connecting the lever on the friction box to the brake lever so that the brake is released at the commencement of each movement of the friction box, substantially as described.

6. In straight-bar knitting machine thread carrier driving mechanism, a longitudinally reciprocating friction bar, a friction box mounted thereon, a thread carrier bar connected to the friction box, a latch pivoted on the friction box with a nose, a tumbler for locking the latch, and a driving member carried on the reciprocating slur-cock rail which is adapted to engage with the nose of the latch on the friction box and give the latter a positive starting movement first in one direction and then in the other, a friction lever on the friction box, a longitudinal bar for depressing the friction lever carried by arms on a rocking shaft, a cam on a running shaft for actuating the rocking shaft, brake mechanism, an arm on the rocking shaft which is connected to the brake mechanism, a latch locking tumbler on the friction box which is engaged by the friction lever when it is depressed whereby the said tumbler is turned to release the latch at the same time as the frictional grip is applied to the friction bar, substantially as described.

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