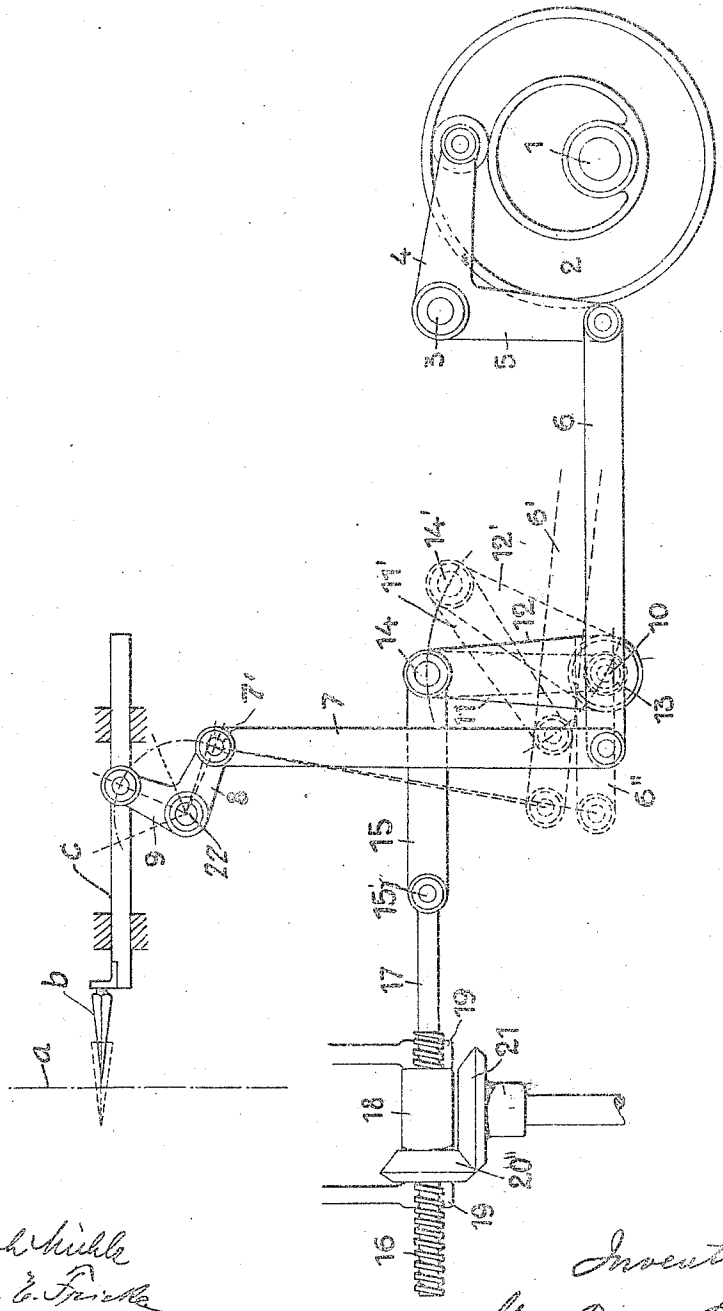
Aug. 18, 1925. 1,550,200

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MECHANISM FOR CONTROLLING THE STROKE OF THE BORE AND STURFEL APPARATUS IN EMBROIDERY MACHINES

Filed Sept. 22, 1921



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Patented Aug. 18, 1925. 1,550,200

UNITED STATES PATENT OFFICE.

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MECHANISM FOR CONTROLLING THE STROKE OF THE BORE AND STUPFEL-APPARATUS IN EMBROIDERY MACHINES.

Application filed September 22, 1921. Serial No. 502,491.

To all whom it may concern:

Be it known that I, MAX RICHARD BRETSCHNEIDER, a citizen of the Republic of Germany, residing at Plauen, in Saxony, Germany, have invented certain new and useful Improvements in Mechanism for Controlling the Stroke of the Bore and Stupfel Apparatus in Embroidery Machines, of which the following is a specification.

The present invention relates to multiple needle embroidering machines and particularly to mechanism for operating auxiliary implements, such as the borers and stupfels, and for controlling the stroke thereof. It is well-known that borers and stupfels in operation have to enter the fabric to a fixed depth depending upon the nature of the pattern and that, therefore, before the operation of the borers and stupfels, a special adjustment is required. With embroidering machines of the automatic type, that is, where the operation is controlled through the jacquard, the control of the piercing depth of the borers and stupfels is effected by the jacquard card.

Heretofore the adjustment of the depth of penetration of the borers and stupfels has been generally effected by a mechanism comprising rods connected to the borers and stupfels and which are guided by a block or the like adjustably borne in a rocking cam. The rocking movement of said cam is mechanically effected from the cams operating the borers and stupfels. The amplitude of the movement of said rocking cam is varied by the adjustment of said block in said rocking cam, whereby the stroke of the borers and stupfels is adjusted. Such mechanism, however, is objectionable for various reasons. When the borers and stupfels are only seldom used, the parts operating or controlling the same are idle during the major part of the operating period of the machine and as a result become clogged with dust, fibre or the like, that, when the implements are set in motion, offer considerable resistance, causing often a complete breakdown of the jacquard or other mechanism or an interruption of the operation of the machine. Another drawback of said mechanism resides in that the displacement of the block in the rocking element or cam, during the adjustment, does not occur quickly and smoothly, but is rather slow and jerky.

These drawbacks are completely obviated by the present invention whose characteristic feature consists in that the adjustment of the stroke can be effected, while the machine is in operation, by a system of links, which afford easy manipulation under all conditions, adding considerably to the safety of the operation, because the same require much less power for their operation, than the displacement of the member within the rocking element.

In the accompanying drawing, one embodiment of my invention is illustrated in a diagrammatic view, only so much of the machine being shown as is necessary for a clear understanding of the invention.

Since identically the same mechanism is used for both kinds of implements, I shall in the following describe a mechanism used in connection with one kind of implement, say the borers.

Let *a* denote the fabric, which, as usual, is stretched in a vertical plane and *b* denote one of a set of auxiliary implements, say a borer.

It is understood that with multiple needle embroidering machines having about 1,000 needles, a long row of borers is provided, the latter being fixed to a horizontal reciprocating carrier or bar *c* whose operation is to be controlled either by hand (in pantograph machines) or by a jacquard mechanism in the automatic machines.

According to my invention, the mechanism reciprocating the bar *c* for controlling the stroke of penetration of the implements is constructed as follows:—Mounted on the driven shaft 1, is a cam disc 2, which operates a rocking bell-crank 4, 5. The latter is fulcrumed at 3 to a stationary part of the machine (not shown) and has one of its arms, say 5, pivoted to one end of a bar 6, the other end of which is pivoted to the lower end of a bar 7. The other end of said bar 7 is pivotally connected at 7′ to a bell-crank 8, 9 fulcrumed at 22 to a stationary part of the machine (not shown) and connected to the bar *c* carrying the implements. The operation of the

cam 2 will effect a horizontal reciprocatory movement of the bar *c* through the bell-crank 4, 5, bars 6 and 7 and bell-crank 8, 9, and according to the adjustment of the stroke of said reciprocating movement, the implements will penetrate the fabric to a greater or lesser extent or remain outside of the fabric, when their operation is not desired, carrying out a short idle to-and-fro motion.

The adjustment of the stroke of the reciprocating movement of the implements, according to this invention, is effected by the following mechanism:—A pair of arms or links 11, 12 of equal length are connected by a common pivot 14 to an adjustable member to be later described. The opposite end of one of the links, say 11, is pivoted to the bar 6 at 10 and the opposite end of the other link 12 has a fixed pivot 13 provided in a stationary part of the machine (not shown). The member 15 carrying the common pivot 14 of the arms 11, 12 is pivoted at 15′ to one end of a rod 17, whose other opposite end is screw-threaded, as at 16, and works in an internally threaded sleeve 18, which is rotatively mounted in brackets 19 and to which a rotary motion is imparted by a pair of bevel gears 20, 21 controlled either by hand or a jacquard mechanism (not shown). By virtue of the screw 16 and sleeve 18, the adjustment of the links 11, 12 will be uniform and continuously gradual to effect a corresponding adjustment of the strokes of the implements during the operation of the machine.

The mode of operation is as follows:—When the pair of links 11 and 12 are in alignment with one another, that is, their separate pivots 10 and 13 in axial extension of one another, as shown by full lines in the drawing, the operation of the cam 2 will cause the bar *c* to practically remain at rest, or carry out a slight to-and-fro motion, and the implements carried thereby will not penetrate the fabric, as the bar 6, while reciprocated, is only slightly displaced in vertical direction from the full line position into the dotted line position indicated by 6″. When, while the links 11, 12 are in this position, the rod 17, through the operation of the sleeve 18, by the gears 20, 21, is displaced longitudinally to the right, the common pivot 14 will be moved from its full line position toward the dotted line position indicated by 14′, the link 12 assuming the dotted line position 12′ as a result of which, during the operation of the bell-crank 4, 5, the bar 6 will be caused to rise into the dotted line position indicated by 6′ and the link 11 into the dotted line position 11′, correspondingly changing the stroke of the carrier *c* and of the implements thereon.

It will be understood that by virtue of this mechanism, only a slight force will be required to change the stroke of the implements, and that the adjustment will be gradual and uniform and can be effected quickly and smoothly without interrupting the operation of the machine. It is also to be noted that inasmuch as the alignment of links 11, 12 concurs with the end of the outward stroke of the implements, a short period of time is afforded for the change of stroke notwithstanding the continuation of the operation of the machine.

What I claim is:—

1. In an embroidering machine, the combination with an auxiliary implement carrier and a continuously driven means reciprocating said carrier, of means capable of effecting uniform and gradual changes of the stroke of the reciprocatory motion of said carrier to correspondingly vary the depth of penetration of the implements thereon, during the operation of the machine, said means including a pair of links having a common adjustable pivot and which at the end of the outward stroke of said carrier are adapted to be in alignment with one another.

2. In an embroidering machine, the combination with an auxiliary implement carrier, of a driven rocking member, means operatively connecting said member to said carrier to impart reciprocatory motion thereto and means for controlling the stroke of said motion, comprising an adjustable member, a pair of links having a common pivot on said adjustable member and which at the end of the outward stroke of said carrier are adapted to be in alignment with one another.

3. In an embroidering machine, the combination with an auxiliary implement carrier, of a driven rocking member, means operatively connecting said member to said carrier to impart reciprocatory motion thereto and means for controlling the stroke of said motion, comprising an adjustable member, a pair of links having a common pivot on said adjustable member and of which one has a fixed fulcrum and the other is pivotally connected to said rocking member, so that, at the end of the outward stroke of said carrier, said links will be in alignment with one another and the operation of the rocking member will not affect said carrier, and while in such alignment, said links can be adjusted to change the stroke of said carrier.

4. In an embroidering machine, the combination with an auxiliary implement carrier, of a cam operated rocking member, means operatively connecting said carrier to said member to impart reciprocatory motion thereto and means for controlling the stroke of said motion, including a member capable

of a uniform and gradual adjustment, an arm pivoted thereto at one end, a pair of links having a common pivot on the other end of said arm, one of said links having a fixed fulcrum and the other being pivoted to said first named means, so that at the end of the outward stroke of said carrier, said links will be in alignment with one another and ineffective, and while in such alignment, can be adjusted to change the stroke of said implement carrier.

In testimony whereof I affix my signature.

MAX RICHARD BRETSCHNEIDER.