

July 13, 1926.

1,592,174

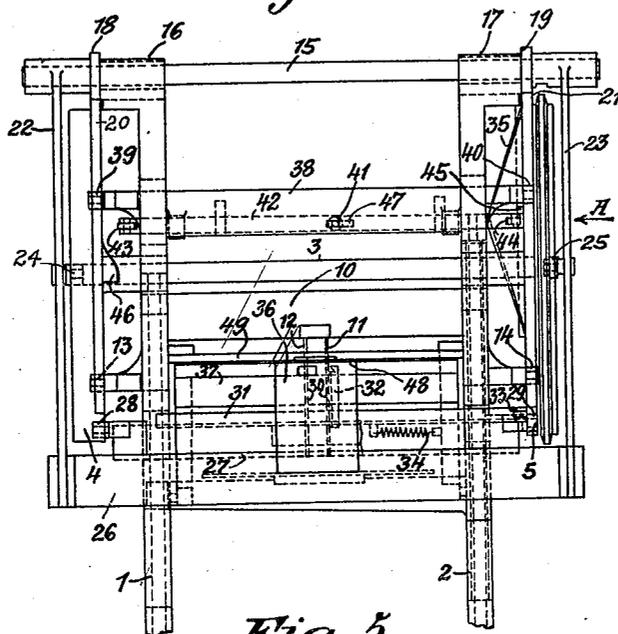
U. BISCHOF

THREAD STITCHING MACHINE

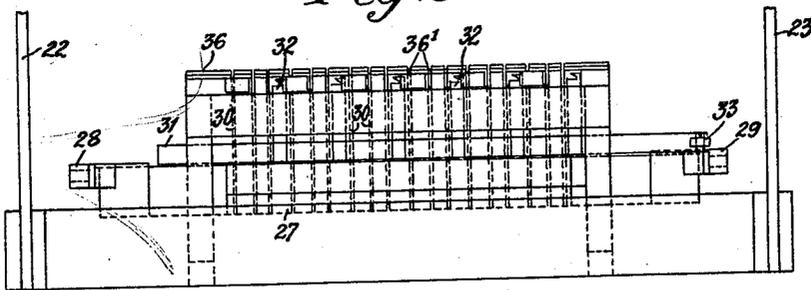
Filed March 7, 1925

4 Sheets-Sheet 1

*Fig. 1.*



*Fig. 5.*



*Inventor*  
*U. Bischof*  
*By Mark Clerk*  
*HENY.*

July 13, 1926.

1,592,174

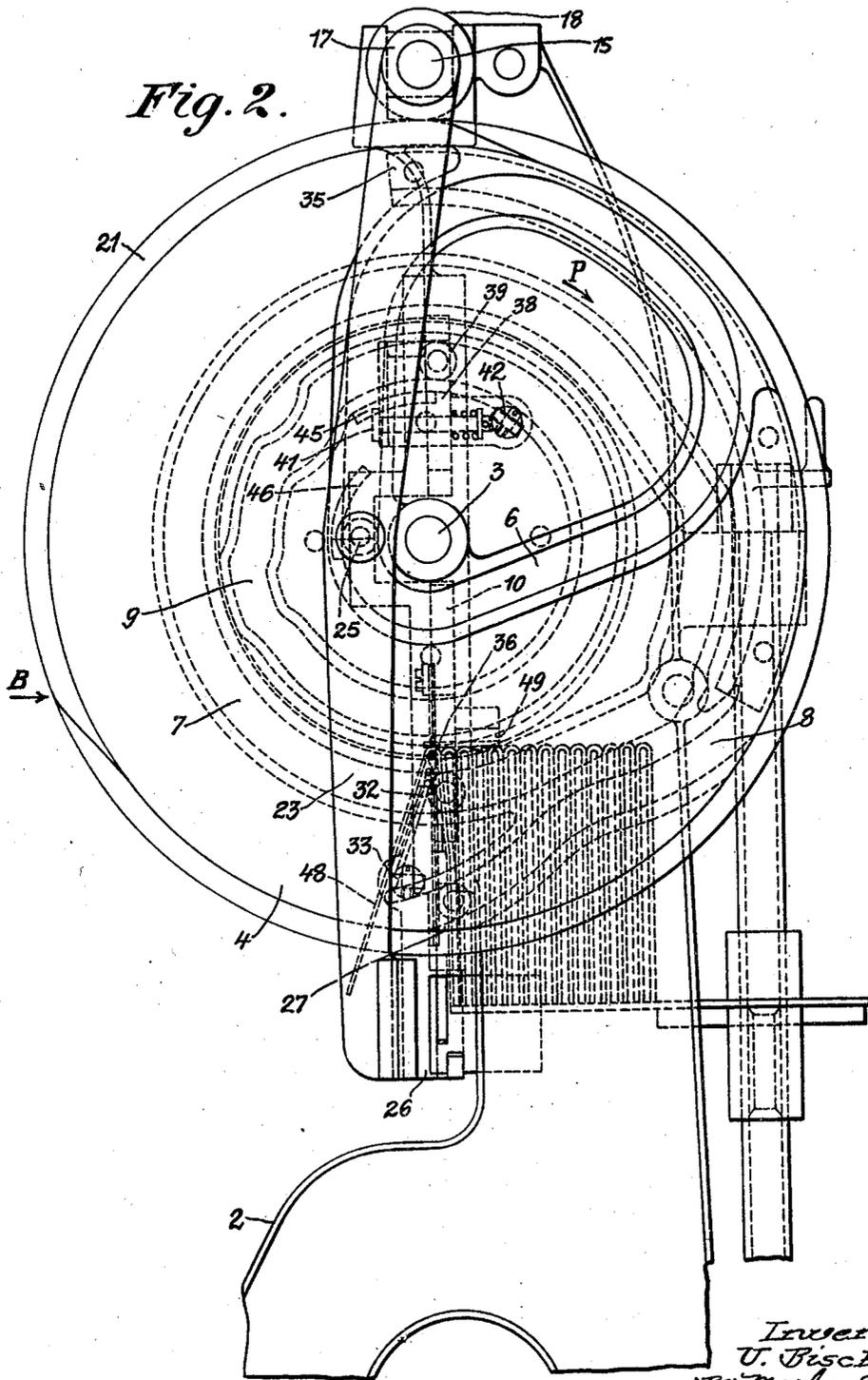
U. BISCHOF

THREAD STITCHING MACHINE

Filed March 7, 1925

4 Sheets-Sheet 2

*Fig. 2.*



*Inventor*  
*U. Bischof*  
*By Mark Clerk*  
*ATTORNEY*

July 13, 1926.

1,592,174

U. BISCHOF

THREAD STITCHING MACHINE

Filed March 7, 1925

4 Sheets-Sheet 3

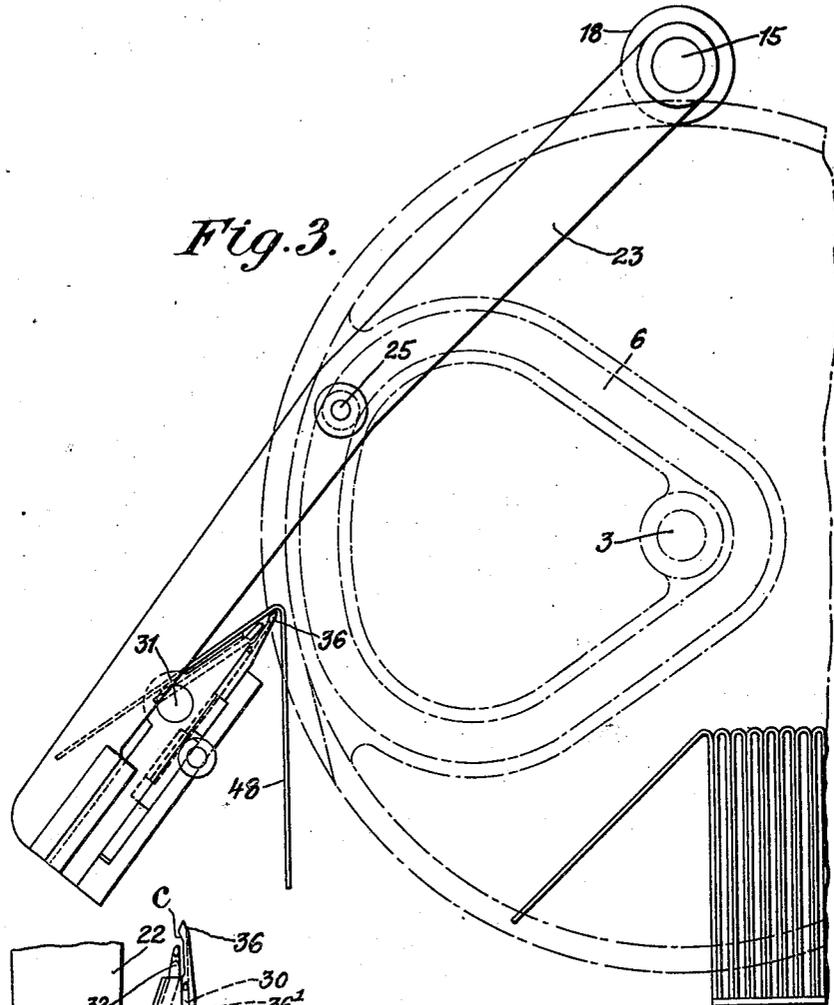


Fig. 3.

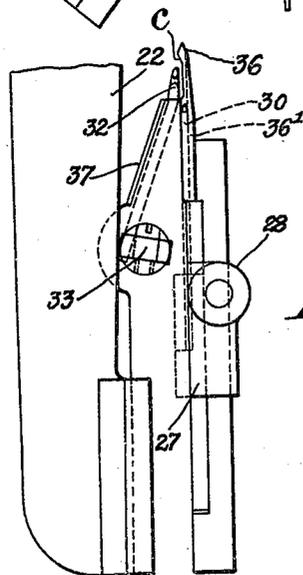


Fig. 6.

Inventor  
U. Bischof  
By Markso Clark  
ATTORNEY

July 13, 1926.

1,592,174

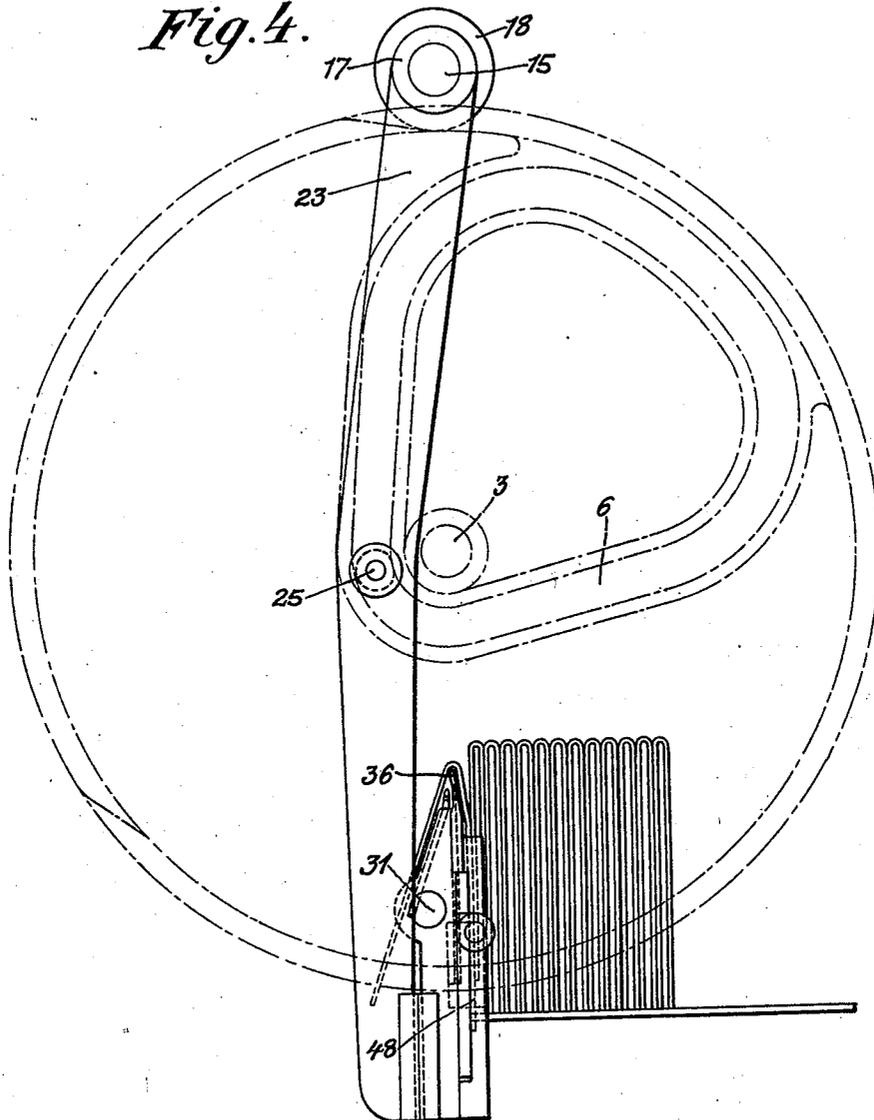
U. BISCHOF

THREAD STITCHING MACHINE

Filed March 7, 1925

4 Sheets-Sheet 4

*Fig. 4.*



*Inventor*  
*U. Bischof*  
*By Markes Clerk*  
*HETZEL*

# UNITED STATES PATENT OFFICE.

ULRICH BISCHOF, OF HORGEN, SWITZERLAND, ASSIGNOR, BY MESNE ASSIGNMENTS, TO SMYTH MANUFACTURING COMPANY, OF HARTFORD, CONNECTICUT, A CORPORATION OF CONNECTICUT.

## THREAD-STITCHING MACHINE.

Application filed March 7, 1925, Serial No. 13,808, and in Switzerland November 20, 1924.

Thread-stitching machines having at least one pair of needles, which are capable of an upward and downward movement and comprising an eyed needle and a hooked needle, a thread laying member passing to and fro between the said needles, a preliminary perforator, a thread tensioning means, a thread gripper, a table and the like are well known. Hitherto in machines of this type for operating these tools long levers and connecting rods have been used in addition to the cam discs, which rendered the machine very complicated and expensive and caused the accuracy of the work to suffer. In other thread-stitching machines this drawback was partially overcome, by doing away with the long connecting rods and operating the tools by means of shorter and smaller levers and motion transmitting members, and also by working some of the motions directly from the usual cam discs without the interposition of levers.

In some other thread-stitching machines all the tools have been operated from a single cam disc at one side of the frame of the machine, which necessitated the retention of all the many levers and motion transmitting members, the machine thus still being comparatively complicated. The employment of a single cam disc has the further disadvantage that such a cam disc produces all the motions only on one side, which causes rapid wear in the cam grooves.

The object of the present invention is to make the driving means for the tools very simple, cheap and reliable, which also renders the manipulation of the machine simple and makes it possible to increase the output of the same. According to the invention this is effected by all the members taking part in the stitching operation being actuated directly from the cam surfaces provided at either side of the machine on rotating discs, without the employment of levers, connecting rods and other motion transmitting members.

In the accompanying drawing a constructional example of the thread-stitching ma-

chine according to the invention is shown:

Fig. 1 being a side elevation looking in the direction of the arrow B in Fig. 2,

Fig. 2 a front elevation looking in the direction of the arrow A in Fig. 1 and

Figs. 3 to 6 details to an enlarged scale.

The machine shown in the drawing works in a known manner with a pair of needles consisting of an eyed needle and a hooked needle and capable of an upward and downward motion. This pair of needles stitches the sheets at one place only, but two or more pairs of needles may be used according to the length of the sheets to be stitched. The machine has two lateral frames 1 and 2, in which the horizontal shaft 3 is journaled. On the said shaft are fixed the cam discs 4 and 5, each of which is provided with a cam 6 for raising and lowering the table, a cam 7 for raising and lowering the needles, a cam 8 for the preliminary puncturing means and a screwed-on cam 9 for the thread tensioning means. In the lateral frames 1 and 2 a bar 10 is guided so as to be capable of upward and downward movement, which bar carries the needles 11 and 12 and the rollers 13 and 14 which engage with the cams 7 to the right and left. In guides at the top of the lateral frames blocks 16 and 17 are slidable, in which a shaft 15 is journaled, rollers 18 and 19 on the shaft 15 resting at either side on circumferential cams 20 and 21 on the cam discs 4 and 5. On the shaft 15 are mounted the arms 22 and 23 supporting at the bottom the transverse member 26 of the table, each of the arms being provided with a roller 24 and 25 respectively. The roller 24 engages with the cam 6 of the lefthand disc 4 and the roller 25 with the cam 6 of the righthand disc 5. In the transverse member 26 of the table a rail 27 is guided so as to be capable of an upward and downward motion. The rail 27 has rollers 28 and 29, one at either end, which rollers engage in the cams 8 of the discs 4 and 5, and preliminary puncturing needles 30. In the transverse member 26 is also journaled a bar 31 provided with a roller 33 and sup-

porting the thread laying member 32, which bar is drawn by a spring 34 against the cam disc 5 and is moved to and fro in the lateral direction by a cam 35 screwed to the said disc.

The transverse member 26 of the table has at the top a plate 36 terminating in a sharp ridge (Fig. 6), thus providing a saddle for the support of the sheets, and is also provided with a plate 37 for protecting the sheets. The plate 36 is provided with grooves 36<sup>1</sup>, in which the needles 30 for making the preliminary punctures are guided vertically and an inclined surface, on which the threads for forming the stitches can slide upwards. A rail 38 (Figs. 1 and 2) is guided in the lateral frames 1 and 2 so as to be capable of an upward and downward motion and has rollers 39 and 40 at the left-hand and right-hand ends, which engage with the corresponding cams 9 of the discs 4 and 5, and supports the thread gripping pin 41 and a bar 42. The bar 42 has guide rollers 43 and 44 at the left-hand and right-hand ends which bear against the cams 45 and 46 screwed on the cam discs 5 and 4; the cam 45 displacing it to the left and the cam 46 to the right, whereby the thread gripping pin is caused to be opened and closed by an inclined surface 47 on the bar 42.

It is evident from the drawing, that the shaft carrying the cams 4 and 5 with the driving curves is located in the vertical plane of the main shaft, that the vertically movable shaft 15 carrying the table saddle 26, 36, as also the vertically movable tightening bar 38 and the thread gripper 41, 42, 43 are located over and substantially in the vertical plane of the shaft 3, while the vertically movable needle bar 10, the inwardly and outwardly swingable table-saddle 26, 36, the puncturing needle 27, 30 vertically movable in the table saddle and the reciprocating thread laying member are located in the working position under and substantially in the vertical plane of the shafts 3.

Hereby the cam-driven rollers 18—19, 39—40, 43—44, 13—14, 28—29 and 33 of the saddle-shaft 15, the thread tightening bar 38, the thread gripper 41, the needle bar 10, the puncturing needle 27, 30 and the thread laying member 33 are located substantially in the vertical plane of the main shaft 3.

The machine described above operates as follows:

The sheet 48 which is to be stitched (Figs. 1 and 2) is laid on the saddle 36 which is swung out to the left (Fig. 3) and, on the cam discs 4 and 5 being turned in the direction indicated by the arrow P (Fig. 2), the saddle together with the sheet is brought by the cams 6 under the stitching rail 49. The saddle is thereupon raised also by the two cams 20 and 21 on the cam discs 4 and

5 towards the stitching rail 49, whereby the fold of the sheet is forced exactly into the middle of the saddle (Figs. 1 to 4). In this position the preliminary puncturing needles 30 puncture the sheet, through the bar 27 with the rollers 28 and 29 being moved upwards by the cams 8. Thereupon the sewing and hooked needles 11 and 12 enter the punctured holes, the bar 10 with the rollers 13 and 14 being moved downwardly also by the cams 7 to the left and right. The thread laying member 32 thereupon moves to the left through the bar 31 with the roller 33 being forced by the cam 35 to the left, the thread which has been introduced into the sheet by the sewing needle 11 in a known manner being seized by the thread laying member 32, carried across to the hooked needle, caught by the latter, also in a known manner, and drawn up through the sheet. During this operation the thread is taken in and drawn tight by the thread tightening bar 38 and at the correct moment is liberated by the thread gripping pin 41 and gripped again, the bar 38 with the rollers 39 and 40 to the left and right being moved upwards and downwards by the cams 9 and the bar 42 with the rollers 43 and 44 being pushed to the left and right by the cams 45 and 46, whereby the thread gripping pin 41 is opened and closed again.

It will be clear from the above, that the movements of all the members taking part in the stitching operation are actuated directly from the cams, without the use of levers, connecting rods and other motion transmitting members. This has the great advantage, that there are far fewer wearing surfaces, that the machine will consequently continue to work with the greatest accuracy and that the construction of the machine is considerably simplified and cheapened. By the great reduction in the number of working parts of the machine the danger of any breakdown is considerably reduced.

What I claim is:

A thread stitching machine of the type described, comprising a main horizontal shaft, two cams fixed on the ends of said shaft, a vertically movable shaft, a vertically movable thread tightening bar arranged substantially in the vertical plane of the main shaft, a thread gripper lodged in the thread tightening bar and arranged substantially in the vertical plane of the main shaft, a vertically movable needle bar arranged under and substantially in the vertical plane of the main shaft, an inwardly and outwardly swinging table saddle carried by the vertically movable shaft and arranged under and substantially in the vertical plane of the main shaft when in stitching position, a puncturing needle movable vertically in the table saddle, a reciprocating

ing thread laying member located in the table saddle, and rollers engaging the said cams for operating the vertically movable shaft, the thread tightening means, the thread gripping means, the needle bar, the puncturing needle and the thread laying member. said rollers being located one over another and positioned substantially in the vertical plane of the main shaft when in stitching position to ensure of the exact and smooth working of the cams. 10

In testimony whereof I have affixed my signature.

ULRICH BISCHOF.