

(No Model.)

7 Sheets—Sheet 1.

R. W. THOMSON & E. M. PHELPS.
MACHINE FOR OVERSTITCHING BUTTONHOLE THRUMS.

No. 484,647.

Patented Oct. 18, 1892.

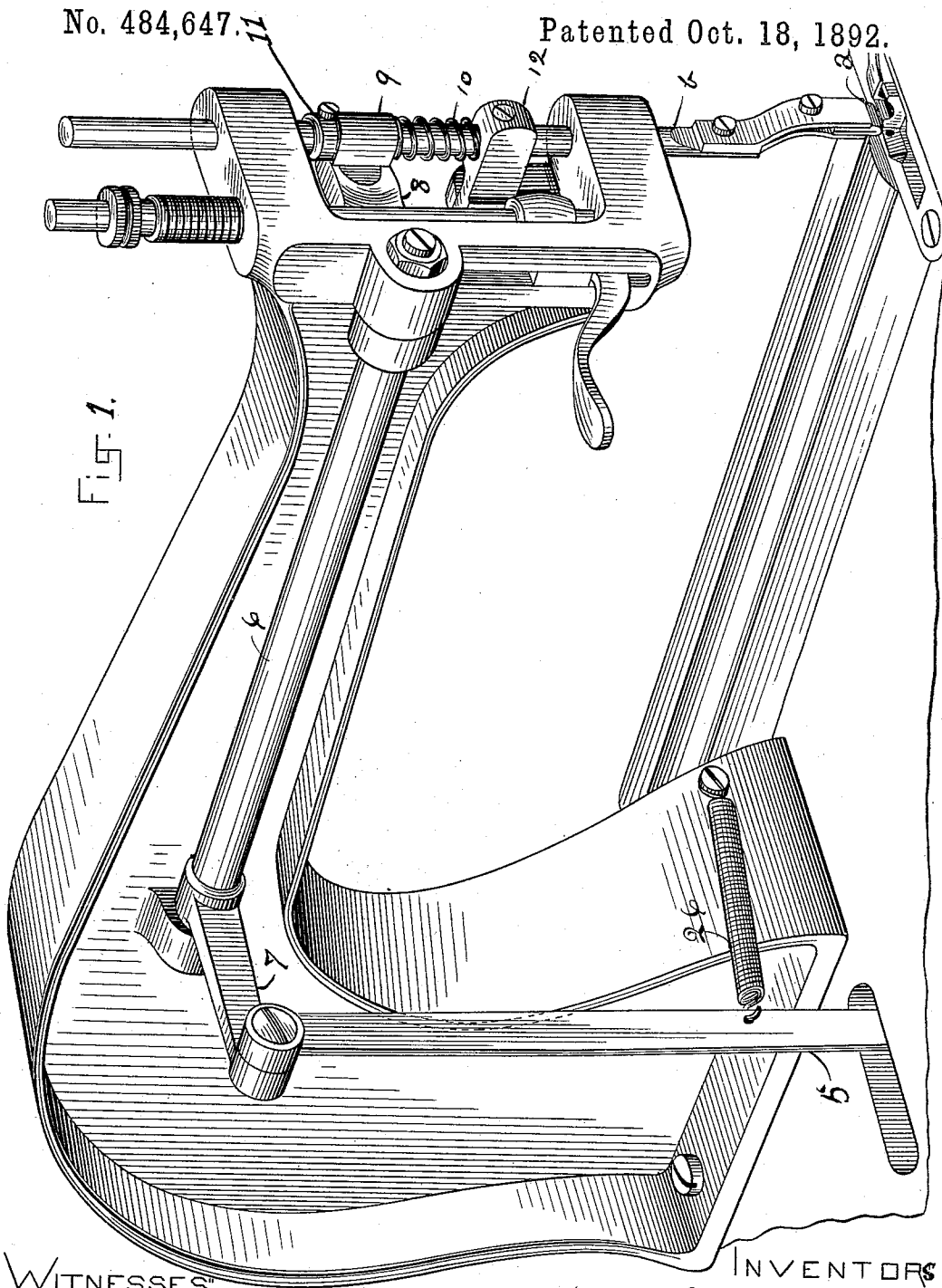


Fig. 1.

WITNESSES:
E. E. Hamill
G. Foster Biscoe

INVENTORS
Robert W. Thomson
Eugene M. Phelps
BY
Calvin B. Tuttle

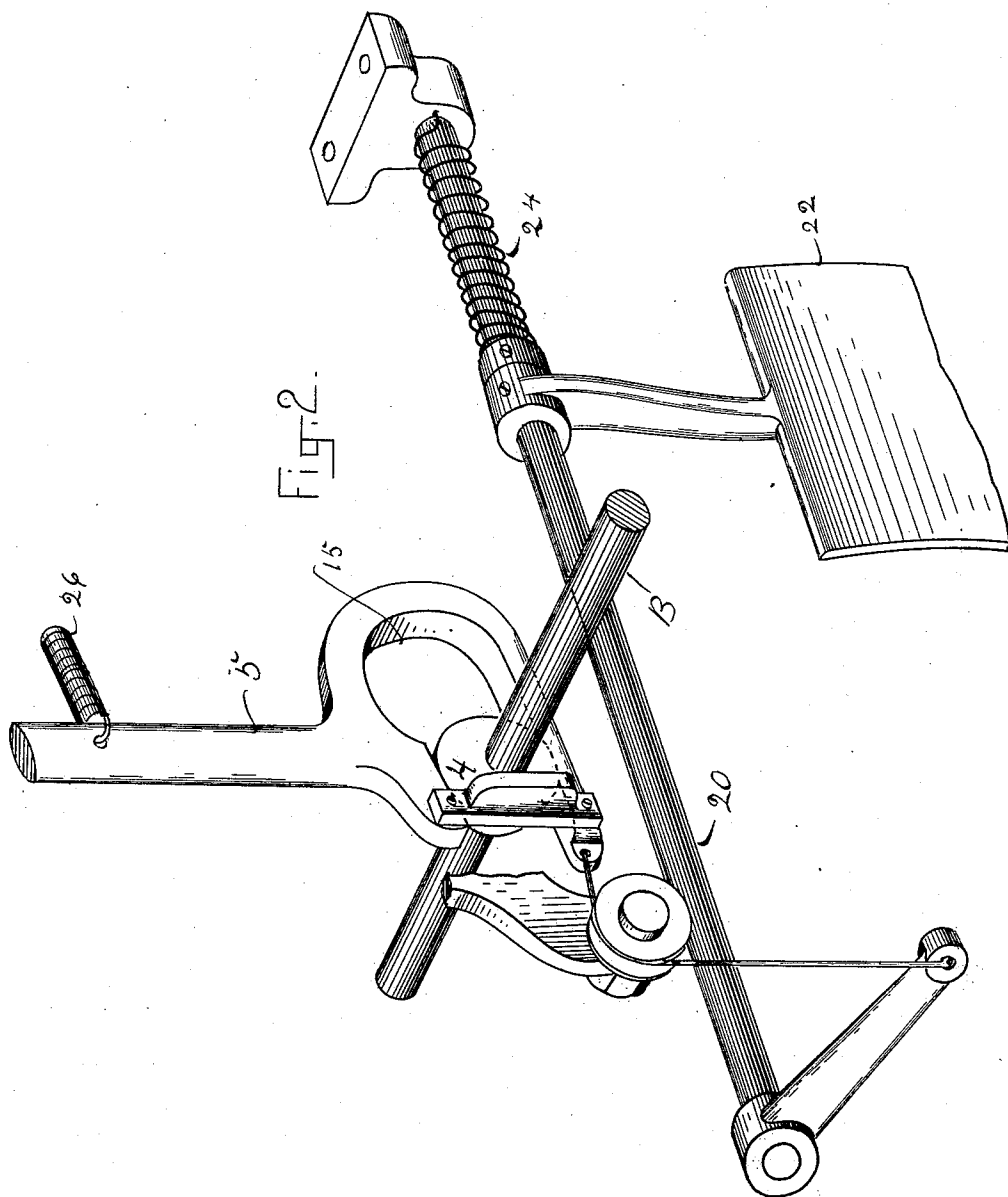
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E. E. Hamill
J. F. B. Brocoe.

INVENTORS

Robert W. Thomson
Eugene M. Phelps

By

Calvin B. Tuttle
Att'y

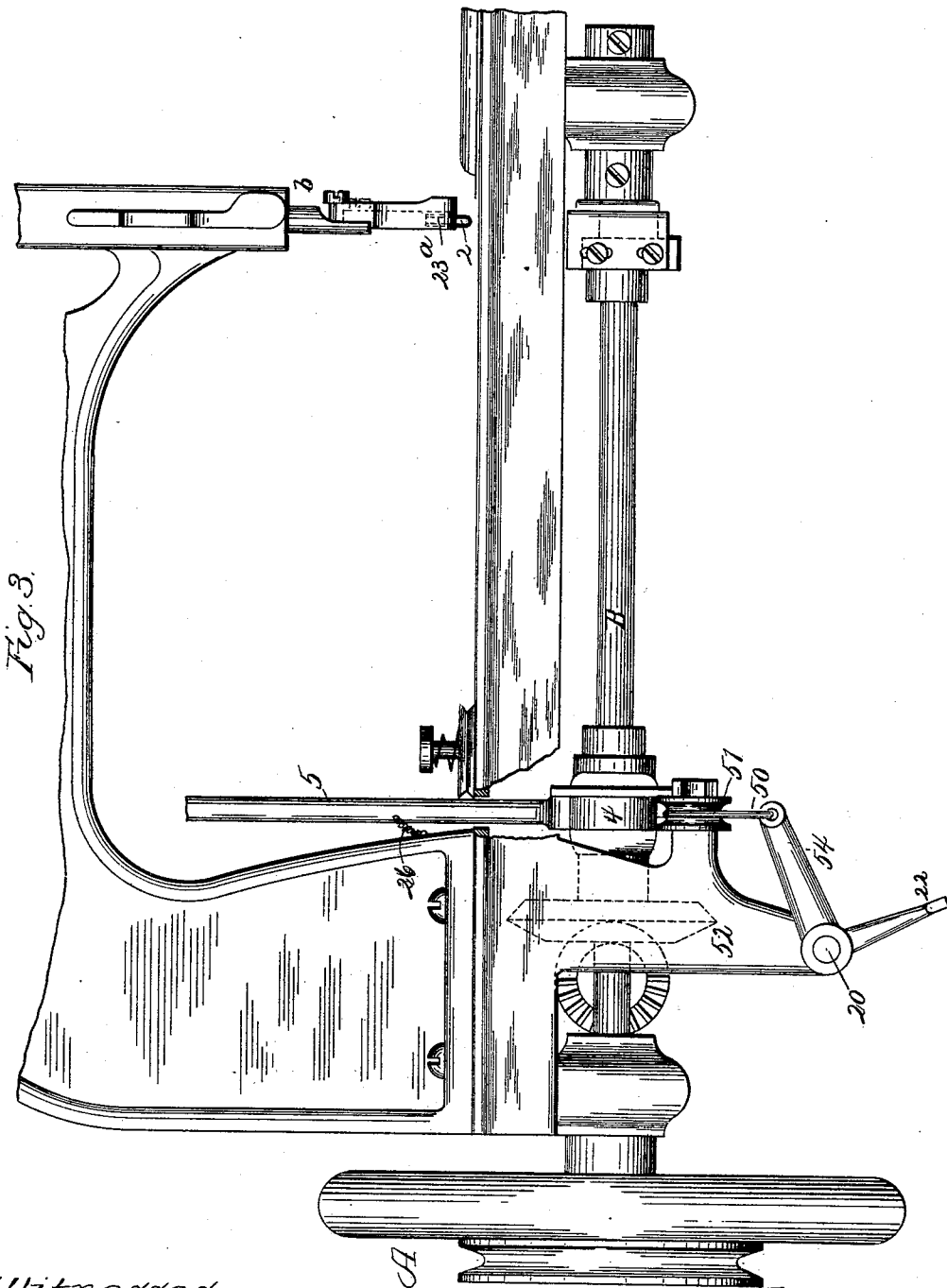
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Witnesses
Jas. J. Maloney
W. E. Hill

Inventors
R. W. Thomson
and E. M. Phelps
by James H. Laugel
Asso. Att'y.

(No Model.)

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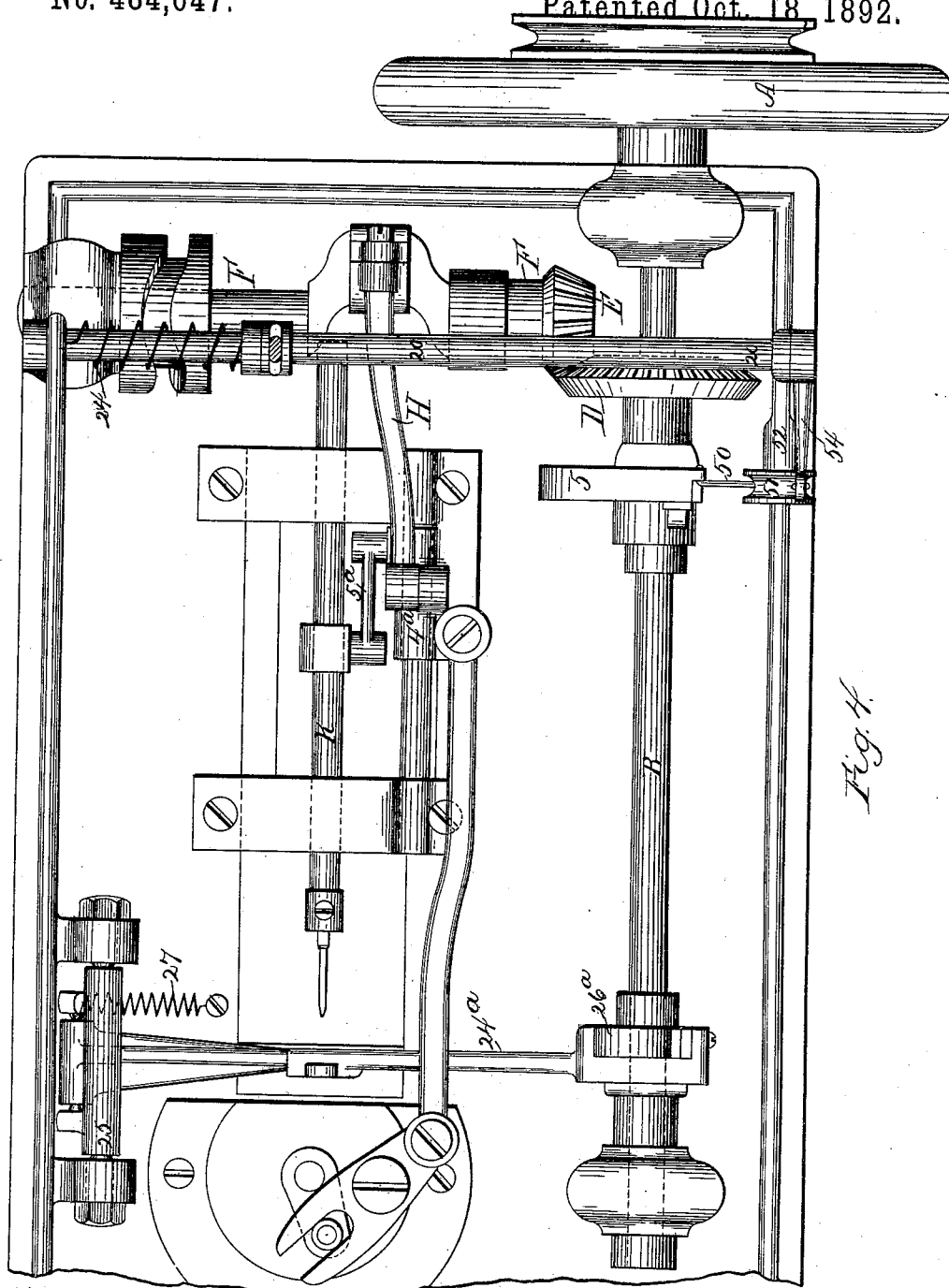


Fig. 4.

Witnesses
Jas. J. McAloney
H. E. Rice

Inventors,
R. W. Thomson
and E. M. Phelps.
By James H. Dwyer
Att'y.

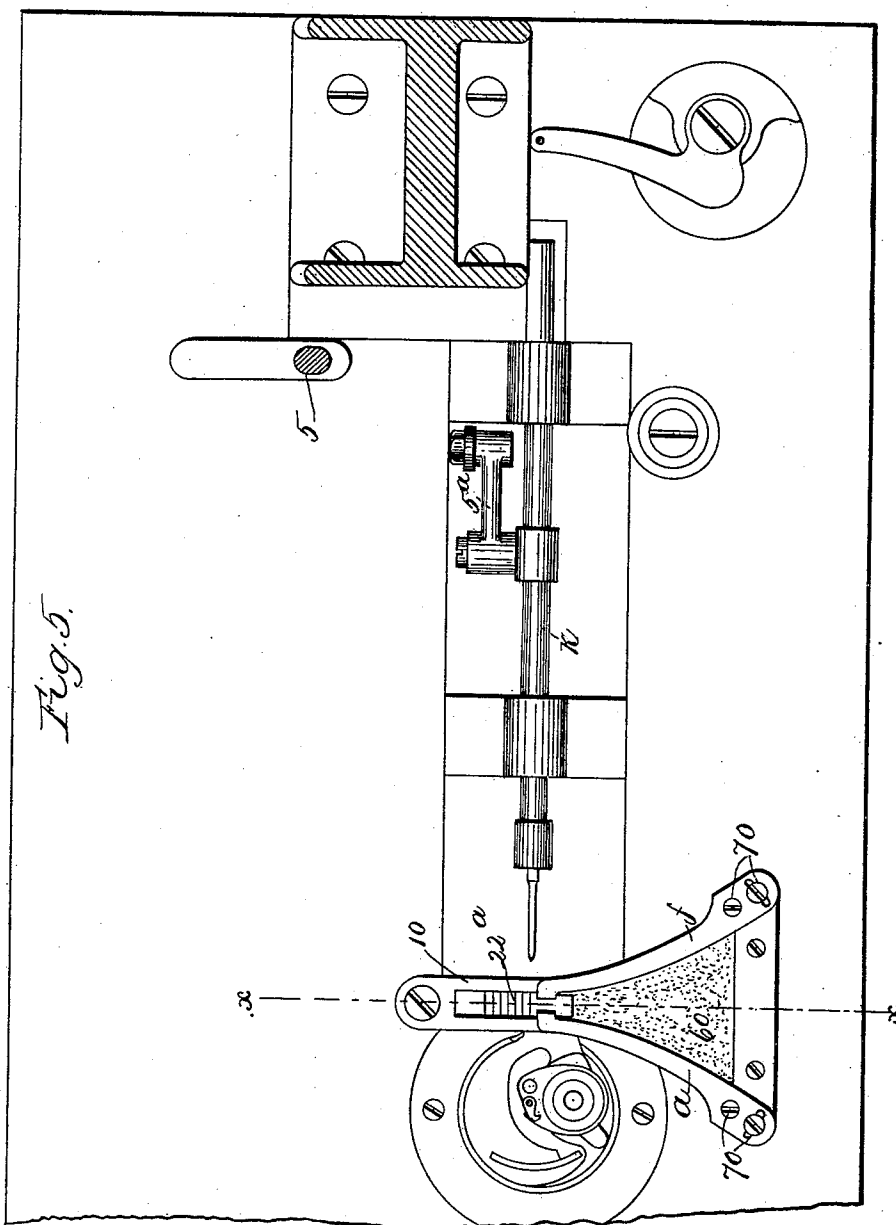
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Witnesses
Jas. J. Maloney
H. C. Hall

Inventors
R. W. Thomson
and E. M. Phelps
by James H. Dudge
Atty.

(No Model.)

7 Sheets—Sheet 6.

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Fig. 6.

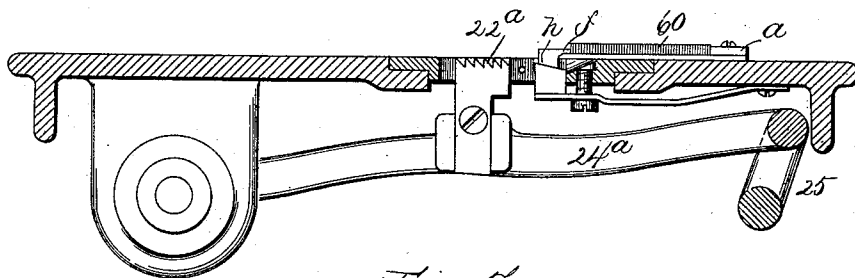
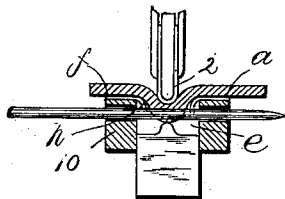


Fig. 7.



Witnesses
Jas. J. McAloney.
W. E. Hill

Inventors.
R. W. Thomson,
and E. M. Phelps.
by James H. Laug.
Asso. Atty.

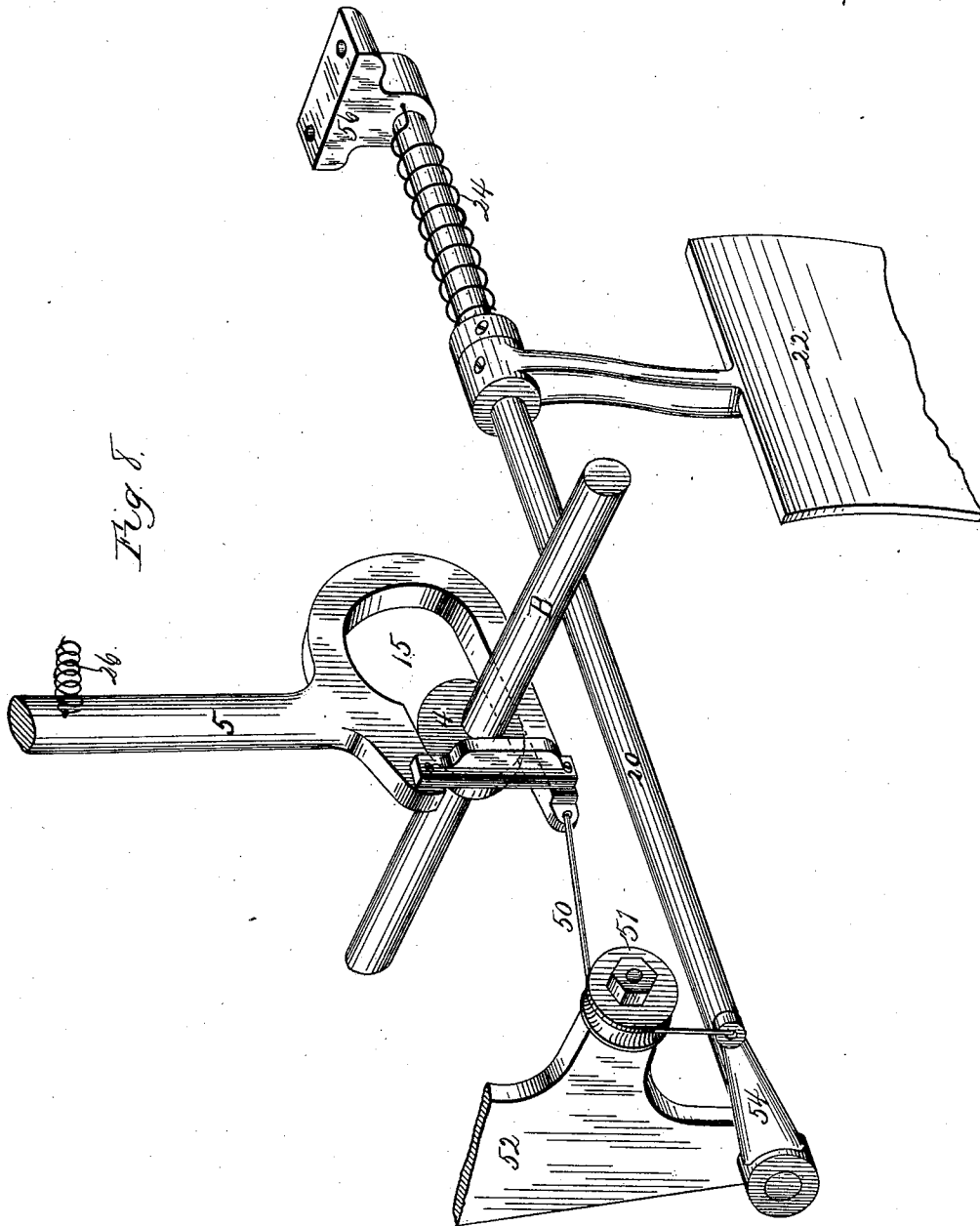
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Witnesses
Jas. J. Maloney.
Mc. E. Hall.

Inventors.
R. W. Thomson
and E. M. Phelps
by James H. Laugel
Assn. Att'y.

UNITED STATES PATENT OFFICE.

ROBERT W. THOMSON AND EUGENE M. PHELPS, OF LYNN, MASSACHUSETTS,
ASSIGNORS TO THE HAND METHOD FINISHING MACHINE COMPANY, OF
NASHUA, NEW HAMPSHIRE.

MACHINE FOR OVERSTITCHING BUTTONHOLE-THRUMS.

SPECIFICATION forming part of Letters Patent No. 484,647, dated October 18, 1892.

Application filed December 12, 1890. Serial No. 374,433. (No model.)

To all whom it may concern:

Be it known that we, ROBERT W. THOMSON and EUGENE M. PHELPS, both of Lynn, in the county of Essex and Commonwealth of Massachusetts, have invented certain Improvements in Machines for Finishing Buttonhole-Pieces, of which the following, taken in connection with the accompanying drawings, is a specification.

The present invention relates to and is an improvement in that class of machines for finishing buttonhole-pieces by means of the so-called "blind-stitch"—that is to say, machines which secure the thrum ends and stay-cord to the under side of buttonhole-pieces by means of securing stitches or threads which enter the material and also overlay the thrum ends and stay-cord, but do not penetrate through and show at the face side of the buttonhole-piece. For instance, such a machine of the class referred to is shown and described in our application for Letters Patent filed July 2, 1888, Serial No. 278,826, and patented June 14, 1892, No. 477,028, for improvements in machines for finishing buttonhole-pieces; and the present invention is more particularly an improvement upon the machine therein shown and described, although, as above noted, it is capable of embodiment in various kinds of machines of this class. It becomes advantageous for the purpose of economy in time and amount of work accomplished to feed one buttonhole-piece immediately after another through the machine to effect the stitching of the thrum ends and stay-cord to the under side thereof without stopping the machine. In doing this with a machine such as is shown and described in Patent No. 477,028 above referred to the stitching is carried or continued from the last buttonhole of one buttonhole-piece to the end of that buttonhole-piece, and in view of the immediate presentation of the succeeding buttonhole-piece the stitching is likewise carried from the initial end of that buttonhole-piece to the first buttonhole of said piece. In following out this method to secure, as stated, economy in time and increased output the finished appearance of the buttonhole-piece is disturbed and depreciated by this extended stitching, and it

has been sought to provide means to avoid this objection, and at the same time to continue the feed of one buttonhole-piece after another in the manner pointed out. The present invention has for its object to accomplish this result, and it contemplates, primarily, the combination, with certain necessary elements of a machine such as is described in patent No. 477,028 above referred to, of a shifter mechanism whereby in the operation of the machine as soon as the stitching shall have reached the end of the series of buttonholes of one buttonhole-piece the machine may be stopped in part to prevent the continuation of the stitching across the finished end of that buttonhole-piece and the adjacent finished end of the next succeeding buttonhole-piece fed to the machine, and yet permit the operation of other parts of the machine, more especially of the feed of the machine, so that the continued and practically-unbroken feed of buttonhole-pieces in succession may be carried on. This may be accomplished in the machine of the kind shown in said patent above referred to when supplied with our present improvements by reason of the fact that the feeding mechanism operates independently of the folder and that the stitch is taken in the material only when the latter is depressed by the folder into the grooved throat-plate (or what we shall here term the "work-receiver") and in the needle-plane of the machine.

The main parts which are new in the present application as compared with those in Patent No. 477,028 are shown in perspective in Fig. 3 exclusive of the shaft (marked B,) the cam 4, and, in general terms, the lever 5, although it is of modified construction as compared with the lever marked 42 in the patent referred to, and such modification is new in the present application—that is to say, the lower bifurcated end of the lever 42 in the patent referred to is not provided with the throat 15 nor has the lever the oscillating motion with relation to the cam, as shown in Fig. 3 of the present drawings, and as will be presently fully described, and the purpose thereof pointed out.

With this explanation we now proceed to

describe the construction and operation of the machine shown in the drawings with our present improvement embodied therein, premising that said machine, exclusive of said improvements, is substantially that shown, described, and claimed in Patent No. 477,028 above referred to, to which reference may be made for a more particular description and understanding of certain minor features which have no intimate relation with the present invention.

In the accompanying drawings, Figure 1 is a perspective view of the top part of a machine embodying this invention. Fig. 2 is a similar view of the shifter mechanism and detail parts of the machine. Fig. 3 is a side elevation of a machine with the overhanging arm partly broken away and showing in part our improvements as applied thereto. Fig. 4 is a plan of the bed of the machine and its parts as seen from the under side. Fig. 5 is a top view of the bed with the overhanging arm cut away and showing the horizontally-reciprocating needle and needle-bar, the shuttle mechanism, and thrum comb or gatherer. Fig. 6 is a sectional detail on line *x x*, Fig. 5. Fig. 7 is a detail sectional view showing the material as pressed down by the folder and engaged by the needle. Fig. 8 is a perspective of the shifter mechanism detached or broken from the machine and showing their normal position of parts when the shifter is not in operation.

Figs. 3, 4, 5, 6, and 7 are substantial reproductions of Figs. 1, 3, 2, 5, and 8, respectively, of the drawings of said Patent No. 477,028, except in so far as modified by the embodiment in said machine of our present improvements, and such figures of drawings, together with Fig. 8, are provided in this case in connection with original Figs. 1 and 2 to more clearly show the construction and arrangement of the machine with applied improvements.

A main shaft B, having the fixed driving-wheel A, is provided with a beveled gear D, meshing with a similar gear E to impart rotary motion to the counter-shaft F, which, through the pitman H, connected thereto and to the carriage 4^a, reciprocates the latter. The needle-bar K, journaled in suitable hangers or bearings, as shown, receives reciprocating endwise movements from the carriage 4^a through the pitman 5^a and connections, as represented, the needle-bar being located to vibrate in a plane parallel and nearly even with the machine-bed plate.

In connection with the needle-bar K, with its eye-pointed thread-carrying needle, a shuttle mechanism is employed, preferably such as is known in the art as a "rotary oscillating shuttle mechanism" and found in the Singer, zigzag, and other machines. Said shuttle mechanism is located in the machine relatively to the needle-bar and other parts, as fully represented in Figs. 4 and 5. Between the needle-bar and shuttle mechanism is a

grooved guide-block or work-receiver 10, secured in the bed-plate of the machine and across which the needle is made to travel in order to reach the shuttle mechanism, and into the groove of which the material is depressed by the folder, to be mentioned later on, in order to be penetrated by the needle. This grooved guide-block or work-receiver is not only known in the art and its functions well understood; but for convenience we show the form of guide-block or work-receiver that is represented and described in the patent referred to, to which attention may be directed for a full and detailed description thereof, since its particular construction forms no part of the present invention. Suffice it to say that the groove of the guide-block is projected below the needle-path plane and the block is provided with an opening to allow passage of the needle and is provided, also, with an opening at its lowermost portion or face to permit the feed mechanism to operate through said opening and engage and feed the material, as will be presently described.

In operation the material is placed upon the machine-bed plate and bent downwardly in the grooved block or work-receiver 10, with its bottom face below the needle-path, while the needle is made to pass through the bend of the material, as shown in Fig. 7. To this end a folder 2 (see Fig. 1) is employed to bear upon and bend the material downwardly, and it is supported in alignment with the groove of the work-receiver 10 to permit movement toward and from the needle-path. To this end the folder is fixed upon or formed integrally with the bar *b*, supported in the machine-arm to permit endwise movement in said support-bearings. Between the bar *b* and the main shaft B are connections by which the folder is lifted and depressed. These connections comprise a cam 4, fast on the shaft B, a cam-lever 5, having the lower bifurcated end to engage the cam 4, and then extending upwardly through the machine-bed plate and pivoted to the arm 7 of the rock-lever 6, supported in bearings on the machine-arm and having at its forward end the arm 8, engaging the stud of the loose collar 9, which encircles the folder-bar *b* between the fast collar 11 and the spring 10. This spring, as shown, encircles the bar *b* and presses at its lower end against a collar 12, adjustably fixed on the bar *b*. The collar 11 is fixed to the bar *b* to be engaged by the collar 9 at the upward movements of the latter to effect the upward movement of the bar *b* and its folder by the arm 8 of the rock-shaft, whereas the spring 10 when compressed by the downward movement of the collar 9 will bear upon the adjustable collar 12 with increased force to effect the depression of the folder when it is desired to have it bend the material in the grooved guide-block or work-receiver.

As described in Patent No. 477,028, the work-supporting guides *e h* (see Fig. 7) co-operate with the guide-block in the support of the mate-

rial when forced into the latter by the folder 2. The guide *e* is provided with a spring-supporting lever *a* and the guide *h* is similarly provided with a spring-supporting lever *f*. (See Fig. 5.) These levers are secured by screws 70 to the machine-bed, by loosening which screws the levers may be adjusted toward and from each other and then be secured in adjusted position by tightening said screws.

On the machine-bed plate between the levers *a f* is a thrum-combing device 60. Said device consists of a piece of pileated material, preferably a camel's hair pile. Its purpose is to engage and comb the thrum ends into lines extending along the under surface of the material at right angles, or approximately so, across the needle-path, so that the said thrums may be arranged and brought into position to be overlaid and drawn together progressively by means of the finishing-stitches.

Referring now to the feed mechanism, we employ a feed-bar 22^a and a co-operating presser-foot 23^a, the latter being located in the arm of the machine above the feed-bar, as represented in Fig. 3. The feed-bar 22^a is supported on a lever 24^a in position to be operated as stated, and the latter engages at one end with a rocking frame 25 and with its opposite end embraces a cam 26 on the shaft B. Said connections impart from the shaft B the necessary movements to the feed-bar. The first movement of the feed-bar is downward to allow the material to be depressed by the folder into the groove of the work-receiver 10 for receiving the needle-thrust, and during the taking of the stitch thus through the bend of the material the feed-bar is drawn backward by means of a spring 27. (See Fig. 4.) The bar is then elevated and supported above the plane of the needle-path while a stitch is taken beneath the material over the stay-cord and thrum ends. The feed-bar then moves the material one step forward and again descends to permit depressing and stitching through the material, as before. It is observed that the folder 2 and the feed-mechanism derive motion primarily from the shaft B, while the stitch-forming mechanism is actuated from the shaft F.

In the finishing of buttonhole-pieces a stitch is formed in the material and the next stitch outside the material over the stay-cord and thrum ends. This necessitates two operations of the stitching devices to one of the folder and feed mechanisms. In order to provide these movements, we employ a gear E, one-half the diameter of gear D, to obtain thereby two revolutions of the shaft F to each complete rotation of the shaft B.

Turning now to our present improvements, the bifurcated lower end of the lever 5 is provided with the throat 15, while attached to the forward portion of the lower end of said lever is in the present instance a cord 50, which passes over the pulley 51, supported

on the bracket 52, secured to the under side of the bed-plate, and then is fastened to the arm 54 of the rock-shaft 20, having bearings in the brackets 52 56, secured to the under side of said bed-plate. The rock-shaft 20 is provided with the fixed arm 22, whose lower portion is to be acted upon by the knee of the operator to rock the shaft in one direction and cause the arm 54 to pull down upon the cord 50 and shift the lever 5 on its pivotal connection with the arm 7, whereby the lever is brought in such position that the cam 4 occupies the throat-opening 15, whereupon said cam will be prevented from acting on the lever 5 and reciprocation of the folder 2 stopped, which latter is then maintained in elevated position through the operation of the spring 10, which encircles the bar *b*, carrying said folder. When this takes place, the machine will continue to operate exclusive of the folder and the operator be enabled to feed that portion of a buttonhole-piece between the last buttonhole of the series and the adjacent end of the buttonhole-piece and also the like portion of the next succeeding buttonhole-piece without the stitch-forming mechanism operating to work stitches in the material of the buttonhole-piece, since at such time the buttonhole-piece will not have been carried into the grooved guide-block or work-receiver because of the continued elevation of the folder. As soon as the operator releases the arm 22, fixed on the shaft B, the coiled spring 24, which in the present instance encircles the said shaft B between the fixed arm 22 and the bearing-block 56, will return the rock-shaft 20 to normal position, whereupon by reason of the tension of the spring 26, secured at one end to the lever 5 above the bed-plate and at the other end to the arm of the machine the lever 5 will be brought back to what may be called "normal position"—namely, that position in which the cam 4 occupies the mouth or outer portion of the bifurcated lower end of said lever, as shown in Fig. 8 of the drawings. As soon as this is accomplished, rotation of the shaft B will, through the action of the cam 4 upon the bifurcated end of the lever 5, cause reciprocating motion to be given to the folder 2, and the machine will thereupon operate as usual—that is to say, to alternately effect the stitching of the material and then overlay the thrum ends and stay-cord outside the material, as above described.

In the present instance the cam 4 may fairly be termed the "folder-actuator," and the lever 5, the rock-shaft 6, with its arms 7 and 8, and the collar 9, in connection with the fixed collar 11, coiled spring 10, fixed collar 12, and bar *b*, constitute the connecting mechanism between said actuator and folder. It is obvious that a single rotation of the folder actuator or cam 4 effects a complete reciprocation of the folder. When the folder actuator or cam 4 revolves within the throat-opening 15 of the lever 5 it, effects no movement

whatsoever of said lever, as above pointed out. It will be noted that the arm 22 is moved or shifted and held in shifted position only during the period when it is desired to effect the feed of the buttonhole-piece through the machine without working stitches in the material of said buttonhole-piece, and that as soon as it is desired to again commence the stitching the operator releases the fixed arm 22, when the machine will be in normal condition and prepared to effect the stitching of the thrum ends and stay-cord of buttonhole-pieces to the under side thereof without the stitching-threads showing at the face side of the goods.

What we claim is—

1. A folder to bear upon the material and force it into the groove of the work-receiver, a work-receiver provided with a groove to receive said material, a folder-actuator, and connections between said actuator and folder to operate the latter, and a shifter co-operating with the folder and its actuating devices to prevent operation of the folder, combined with work-feeding devices and mechanism

for actuating the same and with an eye-pointed thread-carrying needle and complementary stitch-forming devices, for the purpose set forth.

2. A folder to bear upon the material and force it into the groove of the work-receiver, a work-receiver provided with a groove to receive said material, devices to actuate said folder, and a shifter co-operating with the folder and its actuating devices to prevent operation of said folder, combined with work-feeding devices to operate upon the material through the groove of the work-receiver, mechanism for actuating the same, an eye-pointed thread-carrying needle, and complementary stitch-forming devices, for the purposes set forth.

Signed at Lynn this 2d day of November, A. D. 1890.

ROBERT W. THOMSON.
EUGENE M. PHELPS.

Witnesses:

CHARLES H. HALE,
C. B. TUTTLE.