

No. 704,137.

Patented July 8, 1902.

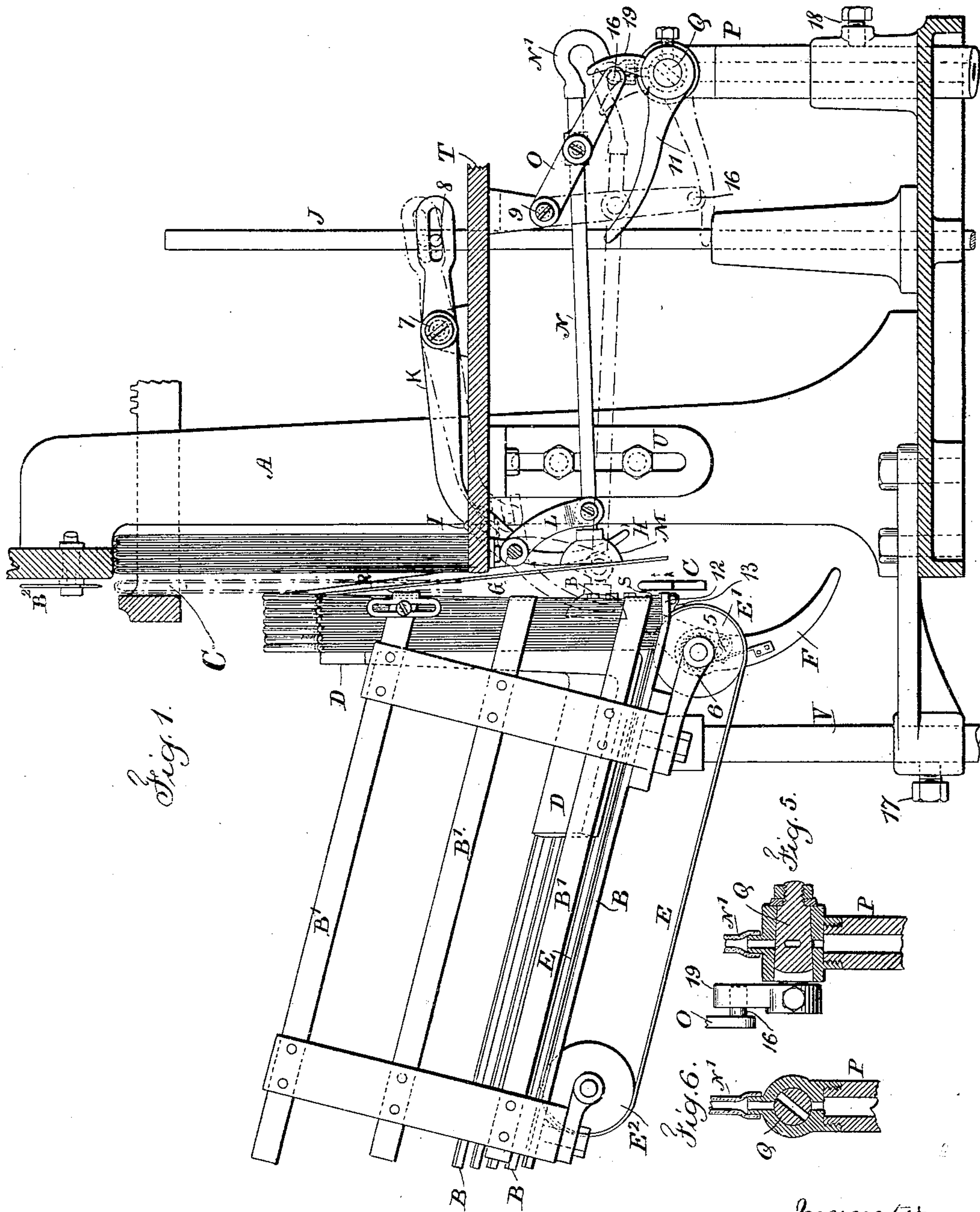
D. M. SMYTH.

FEEDING MECHANISM FOR SEWING MACHINES.

(Application filed Jan. 30, 1899.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses
Chas. H. Smith
J. Stair

Inventor
David M. Smyth
per L. W. Ferrell & Son atty

UNITED STATES PATENT OFFICE.

DAVID M. SMYTH, OF PASADENA, CALIFORNIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO SMYTH MACHINE COMPANY, OF HARTFORD, CONNECTICUT, A CORPORATION OF ARIZONA TERRITORY.

FEEDING MECHANISM FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 704,137, dated July 8, 1902.

Application filed January 30, 1899. Serial No. 703,812. (No model.)

To all whom it may concern:

Be it known that I, DAVID M. SMYTH, a citizen of the United States, residing at Pasadena, in the county of Los Angeles and State of California, have invented an Improvement in Feeding Mechanism for Book-Sewing Machines, of which the following is a specification.

In Letters Patent No. 220,312, granted to me October 7, 1879, a machine is represented for sewing books in which arms extending out from a vertical shaft receive a rising-and-falling movement, as well as a rotary motion, and the signatures to be sewed are placed upon the arms in succession as the shaft is revolved, so that they are brought around to the position in which they are sewed, the arm descending from the sewed signature. In other machines the arm has received simply a rising-and-falling motion, and in Letters Patent No. 250,988, granted to me December 13, 1881, the signatures are supplied onto a holder, and a tube from which the air is exhausted is represented as adapted to separate one part of the folded signature from the other, so that the arm rises within the folded signature and raises it to the point where the sewing takes place.

In the present invention a belt is made use of to aid in carrying the signatures to the place where the lowest signature of the group of signatures is taken off by the rising of the arm, and a peculiarly-constructed suction apparatus is employed that is moved in such a manner that the end is in line, or nearly so, with the portion of the signature to be acted upon by such suction, and a swinging finger is employed to press the group of signatures back, so as to cause them to assume the proper positions for being acted upon by the suction device and to prevent the signatures slipping down the holder too rapidly.

In the drawings, Figure 1 is an end elevation with a portion of the signature-holding table in section. Fig. 2 is an elevation at right angles to Fig. 1 and seen from the rear and with the tubular sucker-rod in section and the sewing devices removed. Fig. 3 is a face view of the sucker. Fig. 4 is a section in larger size near the line 4 4 of Fig. 2. Fig. 5

is a section of the cock longitudinally, and Fig. 6 is a cross-section of the same. Fig. 7 is a diagram of the signature and sheet-holding arm.

The standard A supports the sheet-sewing mechanism, which is of any desired character and applied upon the standard at B², and the sheet-holding arm C is carried by any suitable device and is adapted to being moved vertically from the lower position (shown by full lines in Fig. 1) to the elevated position. (Represented by dotted lines.) These parts being of any desired character and illustrated by the patents before referred to do not require any further description.

The signature-receptacle is composed of the bars B B', the bars B forming the bottom of the receptacle and the bars B' the end thereof, said bars B B' being at right angles to each other. The bottom is inclined downwardly toward its delivery edge and is also inclined downwardly toward the bars B', so as to form a signature-receptacle inclined in both directions, so that the folded top portions of the signatures will rest against the bars B' and the folded and unfolded portions of the signatures will rest upon the bars B, and the folded back portions of the signatures will come uppermost, and the holder for the pile of signatures being at an inclination they will tend to settle down into the angle between the parts B and B', and at this portion an endless belt E is applied, the same passing around the pulleys E E², and there is a lever F, carrying a pawl 5, acting against a ratchet-wheel 6 on the shaft of the pulley E', that is made use of in turning the pulley E' and moving the belt E, so that such belt tends to carry the signatures down the incline of the signature-holding box to the place where the signatures are taken off, and this lever F is acted upon by the sheet-holding arm C as it descends to the extreme of the downward movement and gives motion to the belt and to the signatures to move them down the incline, and the spring 32 returns the lever and pawl to a normal position as the sheet-holding arm C rises.

The follower D behind the pile of signatures holds them up in position and slides

down the inclined bottom B of the receptacle as the signatures are removed successively.

There is a rock-shaft at G, that carries a curved finger H, that occupies a position sufficiently distant from the bars B' of the signature-receptacle to push the signatures back in the pile at the same time that the sucker, hereinafter described, acts against the signatures near the angle of the signature-holding box, and this rock-shaft is moved by any suitable device. I have, however, represented a slotted arm I upon the rock-shaft, acted upon by a lever K, pivoted at 7 and having a slotted end with a pin 8 on a slide-rod J, that receives motion from the main shaft or other convenient portion of the book-sewing machine.

Upon the rock-shaft G is an arm L, to the end of which the sucker M is hinged, and the tubular rod N of the sucker extends to the rear and is pivoted to the link O, which swings on a stud 9, and the link O is longer than the arm L, so as to provide for the movement hereinafter described. As the parts swing by the movement of the rock-shaft in carrying the sucker toward the signatures the back end of the tubular rod N descends with the link O the most rapidly, and hence the face of the sucker M corresponds generally to the positions of the surface of the signature as such sucker is pressed forward against the signature, (see dotted lines in Fig. 1,) and when it is drawn back it carries with it one fold of the lower signature, as indicated in Figs. 1 and 4, and opens the signature for the sheet-holding arm C to enter within the signature and raise the same up to the point of sewing.

The suction action against the paper of the signature is liable to crumple or bend the same, especially where the signature is of comparatively thin paper, and in this operation air is liable to pass into the sucker and interfere with the proper holding of the paper by the suction action. To prevent this difficulty, I find it advantageous to place across the open hollow end of the sucker the horizontal bars 10, which effectually prevent the formation of bends in the paper in the direction where they are most liable to occur. Hence when the end of the sucker is pressed against the paper of the signature and the atmosphere exhausted or partially exhausted the paper of the signature is held firmly to the end of the sucker without liability to bend, crumple, or distort the paper, or thereby to admit the air at any place between the surface of the paper and the end of the sucker. The suction action is applied as soon as the sucker presses against the end signature, and as the sucker is drawn back one part of the signature moves with it, and the suction action is to be maintained until the arm C passes into the signature as said arm rises, and it will be observed that this arm C passes in between the folded parts of the signature at the folded top corners thereof to insure the en-

trance of the sheet-holding arm properly into such signature, and the sucker is applied near the top corner, so that by drawing back the half of the signature it is impossible for the sheet-holding arm to enter the signature improperly, and as the arm C rises it lifts the signature, commencing at the back edge of the folded top of such signature, and carries the signature up to the place where it is sewed. The suction or partial vacuum in the sucker may be supplied by any suitable device. I have, however, represented a flexible tube N', extending from the tubular rod N to an air-pipe P, there being an air valve or cock Q for the admission of the suction action or the closing of the same. I have represented the lever 11 of the cock Q as receiving its motion from a pin 16 on the extended lower end of the link O, and the parts are timed so that the suction is allowed to act through the tube N upon the sucker M immediately that the end of the sucker comes into contact with the paper, and the suction action is continued while the sucker is drawn back into the position shown in Figs. 1 and 4 and until the sheet-holding arm C has risen within the signature, and at or before the moment that the arm C comes into contact with the fold of the signature at the top thereof to lift the same air may be admitted to break the suction and allow the signature to be lifted freely, or the suction action may terminate at this time simply by shutting off the cock Q by the pin 16 coming into contact with the arm 19 on the plug of the cock and turning the same back into the position of Fig. 6, as the partial vacuum will not continue after the suction is cut off in consequence of air passing into the sucker through the pores of the paper.

It will be observed that the sucker M and the curved finger H receive their motion from the rock-shaft G and move together, and the finger H presses back the pile of signatures toward one end thereof, while the sucker M presses back the pile of signatures near the other end thereof and adjacent to the lower corner. In this manner the signatures as they remain in a pile within the holder are acted on with uniformity, or nearly so, and the signatures are prevented from working off the bottom of the holder, and as the sucker withdraws and moves the half of the lower signature away from the pile to allow the sheet-holding arm to enter the fold of such signature the curved finger H moves in the same direction to allow the pile of signatures to move down toward the lower end of the holder, and at this place there is a level portion 12, that tends to check the further downward movement of the pile of signatures, and in addition to this there is a stop at R, that is adjustable in position and is preferably made as a segment of a globe and is closely adjacent to the angle of the signature at the folded back and top edge, and this checks the movement of the pile of signatures as they slide down to prevent the pile of signatures

moving too far, and the bottom signature in the pile is easily separated from this stop as it is opened and lifted by the action of the sheet-holding arm. It is also necessary to hold backward the half of the folded signature as the other half is drawn away by the action of the sucker, and with this object in view a spring-claw S is provided at the level portion 12 of the bottom of the signature-holder. This claw is advantageously made as a small flat plate pivoted at the end of the arm 13 and having a helical spring by which the claw is pressed toward the signatures, and this claw yields as the half of the signature is drawn away by the sucker and springing up detains the other half of the signature, and by providing a screw 23, passing through the arm 13 of the claw, the claw can be raised or lowered at the opening occupied by the claw in the level portion 12 of the signature-holder, so as to present more or less of the surface of the claw in detaining the signature or the half of it.

The pivot 7 of the lever K, the shaft G, and the pivot 9 of the link O are preferably sustained by the table T, upon which the signatures are received as served up together. This table is usual in book-sewing machines and is raised or lowered according to the size of the signatures, and in so doing the connected parts are adjusted by the table.

The slotted bracket U is shown to illustrate a device that may be used for holding the table when adjusted.

The holder B B' and connected parts will require to be correspondingly raised or lowered. This may be accomplished by the post V, that carries the parts passing through a socket on the frame of the machine, where there is a clamp-screw 17.

The cock Q and air-pipe P may be raised or lowered, such pipe passing through a socket on the frame and held by a clamp-screw 18.

I claim as my invention—

1. In a book-sewing machine, a holder for the reception of signatures composed of a bottom and connected end portion at right angles to each other, the bottom being inclined downwardly toward its delivery edge and also longitudinally tipped so that the side to which the end portion is connected is lowest, the bottom having a portion along the delivery edge that in section is horizontal and level, substantially as specified.

2. The combination with the signature-holder, of the rock-shaft G, an arm L connected to said rock-shaft, the sucker M hinged to said arm, the tubular rod N connected at one end to said sucker, a pivoted lever O to which the other end of said rod N is connected, a pipe and cock connected to said tubular rod N and the arm 19 and lever 11 upon the cock against which the lever O acts to open and close said cock, substantially as specified.

3. The combination with the holder for a pile of signatures, a sucker for opening the lower signature in the pile of signatures by moving half of the signature away from the other half, an endless belt and pulleys for moving the pile of signatures toward the place of delivery, an adjustable stop R acting near the junction of the folded back and top edges of the signatures for preventing the signatures moving too far as they slide down the holder, a spring-claw acting at the lower edges of the signatures and means for giving motion to said endless belt, substantially as specified.

4. In a book-sewing machine the combination with the sheet-holding arm, of a signature-holder composed of a bottom and connected end portions at right angles to each other, said bottom being inclined downwardly toward its delivery edge and also longitudinally tipped so that the side to which the end portion is connected is lowest, an endless belt in the bottom and near the lower corner and end portion of the holder and inclined longitudinally to agree with the inclination of the signature-holder and parallel therewith and upon which belt the edges of all the signatures rest, pulleys around which the belt passes and a ratchet, pawl and lever-arm actuated by the sheet-holding arm for moving the belt progressively to carry the signatures toward said arm, substantially as specified.

5. In a book-sewing machine, the combination with the sheet-holding arm, of a signature-holder composed of a bottom and connected end portions at right angles to each other, said bottom being inclined downwardly toward its delivery edge and also longitudinally tipped so that the side to which the end portion is connected is lowest, an endless belt in the bottom and near the lower corner and end portion of the holder and inclined longitudinally to agree with the inclination of the signature-holder and parallel therewith and upon which belt the edges of all the signatures rest, pulleys around which the belt passes, and means for moving the belt progressively to carry the signatures toward said arm, substantially as specified.

6. The combination with the holder for a pile of signatures, of means for opening the lower signature in the pile of signatures by moving half of the signature away from the other half, an endless belt and pulleys for moving the pile of signatures toward the place of delivery, a pivoted spring-claw acting at the lower edges of the signatures, and means for giving motion to the endless belt intermittently, substantially as set forth.

Signed by me this 20th day of December, 1898.

DAVID M. SMYTH.

Witnesses:

JOHN McDONALD,
C. U. BUNNELL.