

No. 714,531.

Patented Nov. 25, 1902.

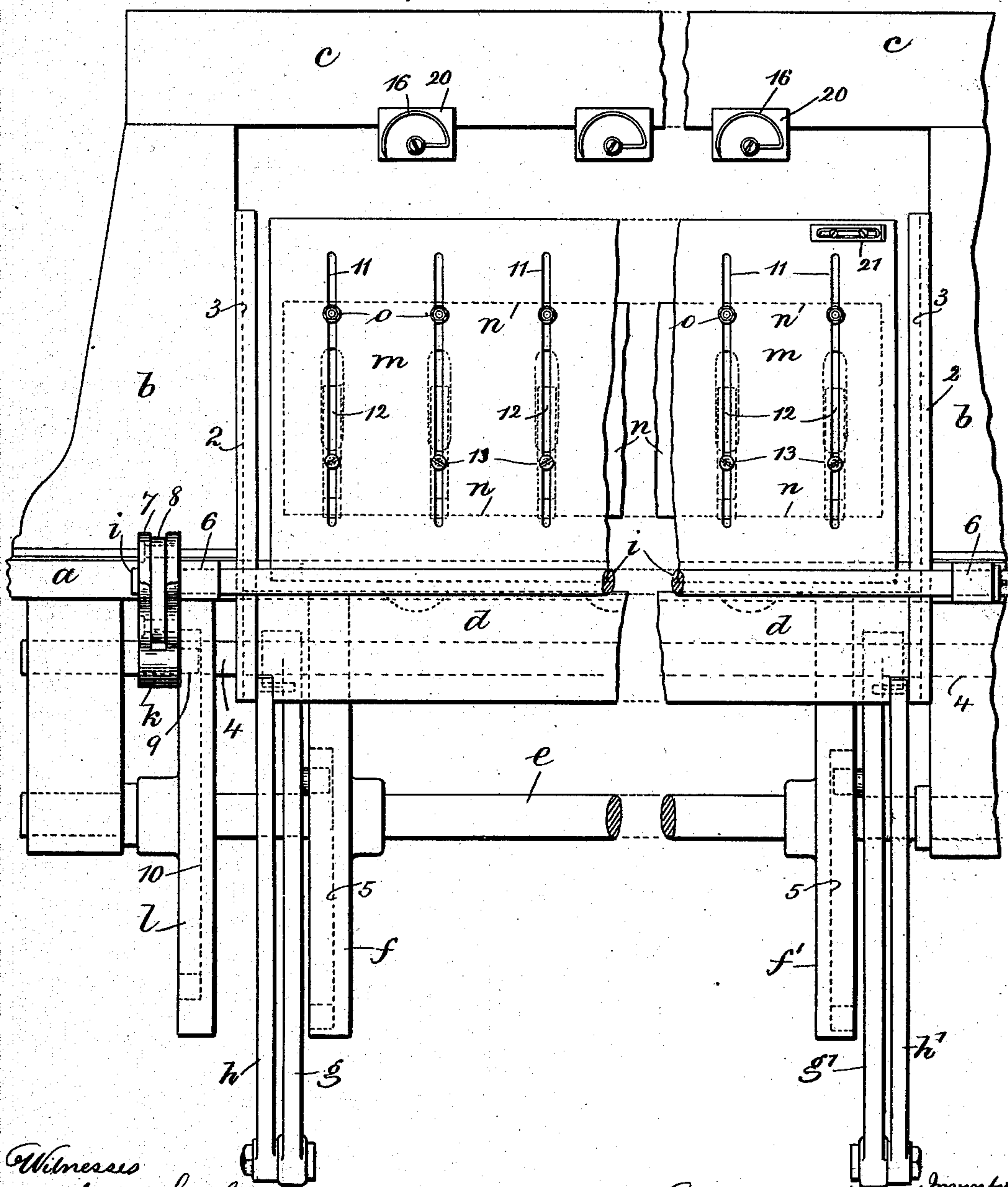
F. D. TAYLOR.
BOOK SEWING MACHINE.

(Application filed Feb. 20, 1902.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.



Witnesses
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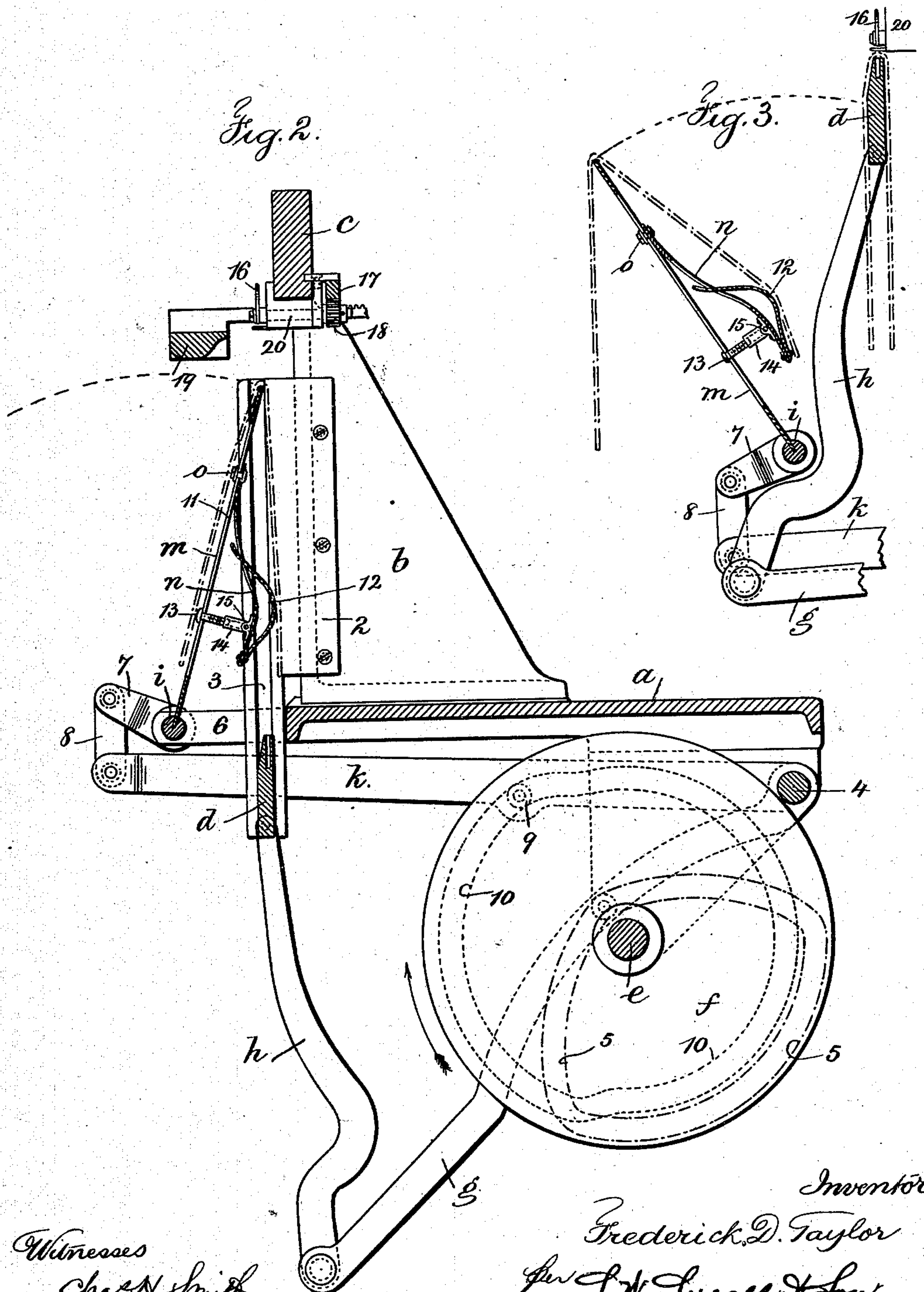
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2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

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BOOK-SEWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 714,531, dated November 25, 1902.

Application filed February 20, 1902. Serial No. 94,893. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK DENNISON TAYLOR, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented an Improvement in Book-Sewing Machines, of which the following is a specification.

My invention is designed as an improvement upon the class of book-sewing machines illustrated and described in Letters Patent granted to Reynolds and Jacobs September 2, 1890, No. 435,613, and the same relates particularly to the feeding devices employed in this class of book-sewing machines. Heretofore in these machines the sheet or signature holding bar was moved vertically, or approximately so, and when at its lowest point the operator placed thereon a folded sheet or signature, which was thereafter raised by the vertically-moving bar up to the position of sewing and at which place the signatures or sheets were connected by the sewing mechanism. This bar has heretofore remained in its lowest position only a very short period of time. Consequently it required considerable skill on the part of the operator to accurately place thereon a sheet or signature, and the speed of the machine was in a large measure governed by the appreciable period made necessary for properly placing the sheet or signature on the bar, it being a fact that if substantially no period of rest was required at the lowest point of the bar for this purpose more work could be got out of the machine, because the sewing devices were capable of performing their functions at a higher rate of speed. In my improvement I overcome these hereinbefore-stated difficulties and the sheet or signature is not placed by hand on the vertically-moving bar. I employ a sheet or signature carrier and devices for imparting a movement thereto timed with the vertical movement of the bar, and this carrier remains in its outermost position in a state of rest for a very much longer period than it would be possible to retain the vertically-moving signature-holding bar. The sheet or signature is placed on this carrier by the operator with more or less deliberation, and the same is moved quickly into the path of

the rising bar. The bar lifts the signature from the carrier up to the sewing mechanism and the carrier returns to its outward position, remaining there while the sewing is being performed and while the bar is returning to its lowest position. I prefer to employ a shaft, upon which the carrier is mounted, and suitable independent devices for imparting a rocking or forward-and-backward movement thereto, and also adjustable devices having a spring function for locating the portion of the sheet or signature within which the bar rises, all of which are hereinafter more particularly described.

In the drawings, Figure 1 is an elevation representing my improvement and sufficient of the book-sewing machine to show an operative device, the said parts being broken open and condensed to show both sets of operative means. Fig. 2 is a vertical section and partial elevation with the sheet or signature carrier in position for the sheet or signature to be taken therefrom, the same being shown in dotted lines; and Fig. 3 is a diagrammatic view showing the sheet or signature holding bar in its vertical position with a sheet or signature in dotted lines and in position to be sewed and with the carrier in its outermost position with a sheet or signature placed thereon and shown by dotted lines.

a represents the bed or table of the machine, and *b b* side frames extending upward therefrom and to which the head-frame *c* is connected. The head-frame supports the needle-blocks 20, sewing-needles 16, the rack-bar 17, the pinion 18, and the presser-bar 19, all of well-known and usual construction, the operations and functions of which are well understood and require no further description.

To the opposite inner faces of the side frames *b b* are secured guide-frames 2, in which are vertical grooves 3, and the sheet or signature holding bar *d* is at its ends received in the grooves 3 and moved vertically therein. I employ a main driving-shaft *e* in suitable bearings, supported from the bed or table *a*, and an auxiliary pivot-shaft 4, also suitably supported in bearings. Upon the main shaft *e* are cams *f f'*, having cam-grooves 5 of the

approximate triangular configuration shown in Fig. 2. Rocker-arms $g g'$ are pivoted to the shaft 4 and provided with rollers running in the cam-grooves 5 of the cams $f f'$, and links $h h'$ are pivotally connected to the free ends of the rocker-arms $g g'$ at their lower ends, and at their upper ends they are pivotally connected to opposite ends of the sheet or signature holding bar d .

With the rotation of the shaft e and cams $f f'$ the rocker-arms $g g'$ swing on the shaft 4 and raise and lower the sheet or signature holding bar d by the links $h h'$, the rollers upon the rocker-arms $g g'$ traveling in the cam-grooves 5 for effecting this movement, and from the shape of these cam-grooves it will be apparent that there is a rising period and a descending period of equal length and a period of rest during which the signature-holding bar d is at its uppermost point and the sewing is being effected and which period of rest is slightly longer than the rising or descending period.

I provide a shaft i in bracket-arms 6 or similar supports from the bed a of the machine. At one end of this shaft i there is a crank 7, and a link 8 extends from the end of the crank to the end of a rocker-arm k . This rocker-arm k is pivoted to the shaft 4 and is provided with a roller 9, traveling in the cam-groove 10 of a cam l on the main driving-shaft e . A sheet or signature carrier m in the form of a plate of metal is let into or connected to the shaft i , and the respective positions occupied by this carrier m are shown in Figs. 2 and 3, the movement thereof between these positions agreeing substantially with about one-seventh of an entire revolution.

The form of the cam-groove 10 is indicated in Fig. 2, from which, considering the direction of rotation, it will be evident that the movement is quickly effected from one position to the other and that the position of the carrier shown in Fig. 2 is of shorter duration than the position of the carrier Fig. 3. The cams l and $f f'$ are all upon the main driving-shaft e , and they are so placed with reference to one another that the respective movements of the bar d and the carrier m may be timed as desired, and from Fig. 2 it will be seen that the carrier m remains in the position therein shown until the bar d is near its highest point, that then the carrier m is quickly moved out to the position shown in Fig. 3, that it remains in the position shown in Fig. 3 until the arm d completes its rest period of highest elevation and has moved down approximately to its lowest position before the carrier is quickly moved from the position Fig. 3 to the position Fig. 2, ready for the arm d to pass within the fold of the sheet or signature supported thereby. This sheet or signature carrier m is provided with a series of vertically-placed transverse slots 11, preferably at equal spaced-apart intervals, and I provide a spring-plate n , occupying a position

rearward or back of the carrier m , of smaller area and connected to the carrier m by bolt devices o , the same being adjacent to the upper edge of said plate n and extending through the slots 11 and upon the surface of the carrier, so that the plate n is clamped adjustably to the carrier and may by the loosening of the bolt devices o be moved vertically in its relation to the carrier m , according to the size of the sheet or signature employed in the machine. This spring-plate n is provided with vertically-placed transverse slots, preferably agreeing in number and occupying the same transverse vertical plane as the slots in the carrier m , and I provide spring-fingers 12, agreeing in number with the slots in the spring-plate n , and secured to the same at the lower edge of the plate and at the upper ends of the spring-fingers the same pass through the slots in the spring-plate n , and I provide screws 13, passing through the slots 11 in the carrier m and into screw-sockets 14, connected to the spring-plate n by pivot devices 15.

The spring-fingers 12 are to be of thin material requiring very little force to move the same out of their normal position, and the spring-plate n is adapted to move in relation to the carrier m at the same time, causing a movement of the screws 13 through the slots 11 of the carrier. The office of the spring-plate n and the spring-fingers 12 is essentially to carry the inner portion of the sheet or signature beyond the path of the vertically-moving sheet or signature holding bar d in the position of the parts Fig. 2, so as to insure said bar d passing within the sheet or signature, and in this position it will be noticed that the spring-fingers 12 pass across the vertical path of the bar d , while the spring-plate n only passes up to the edge of said path, and in the operation of the parts the bar d passes within the lower edge of the sheet or signature, as shown by dotted lines, Fig. 2, and in rising presses back the spring-fingers 12 and the spring-plate n as the same passes by in its vertical movement, and as the bar d rises above the spring-fingers and plate n the same return to their normal position, which they maintain when the parts are in the position Fig. 3 and a new sheet or signature is placed thereon and until the parts return to the position Fig. 2, and they are again acted upon by the vertically-moving bar d . In this manner the operations are progressively repeated, and it will be apparent that there is no appreciable rest period of the bar d at its lowermost point and that there is a considerable rest period of the sheet or signature carrier m in its outermost position, giving the operator ample time to carefully place the sheet in position, and I have shown in Fig. 1 an adjustable stop 21 at the right-hand end of the carrier m , against the end of which the sheet or signature is to come as the same is placed on the carrier. This machine not only provides the operator

with ample time to place the sheet or signature on the carrier, but permits the movement of the bar *d* and the sewing devices to be accelerated. Consequently the machine is adapted to perform a greater amount of work.

I am aware that in the patent to Holbrook of February 23, 1869, No. 87,258, a divided sheet-carrier was employed which normally occupied a vertical position in receiving the folded sheet and which was then turned down into a horizontal position and that thereafter a horizontally-moving bar passed between the parts of the carrier to remove the folded sheets successively therefrom and carry the same to the sewing devices, and I distinctly disclaim such a structure.

I claim as my invention—

1. In a book-sewing machine, the combination with a sheet or signature holding bar, of vertical guides for the same, devices for raising and lowering the signature-holding bar timed for a quick up-and-down movement and a rest period while the sewing is being performed, a carrier upon which the sheet or signature is placed, devices for imparting movement thereto in order to bring the sheet or signature into the path of the upwardly-moving bar and from which carrier the bar takes the sheet or signature, raising the same to the sewing devices, and means for imparting quick movements to the said carrier in opposite directions, and for timing the movements so that the rest period for placing the sheet or signature on the carrier exceeds in duration the rest period during which the bar takes the sheet or signature off the carrier, substantially as set forth.

2. In a book-sewing machine, the combination with a sheet or signature holding bar, of vertical guides for the same, devices for raising and lowering the signature-holding bar timed for a quick up-and-down movement, and a rest period while the sewing is being performed, a carrier upon which the sheet or signature is placed, devices for imparting movement thereto in order to bring the sheet or signature into the path of the upwardly-moving bar and from which carrier the bar takes the sheet or signature raising the same to the sewing devices, and means for imparting quick movements to the said carrier in opposite directions and for timing the movements so that the rest period for placing a sheet or signature on the carrier exceeds in duration the rest period during which the bar takes the sheet or signature off the carrier, the moving and timing devices being so placed in relation to one another that the outward movement of the carrier begins before the upward movement of the bar is fully completed, substantially as set forth.

3. In a book-sewing machine, the combination with a sheet or signature holding bar, ways in which the same is adapted to move vertically, cams upon a main shaft, rocker-arms actuated by said cams and links connecting the rocker-arms with the bar for im-

parting thereto a vertical movement, of a shaft in suitable bearings upon the machine, a sheet or signature carrier in the form of a plate secured to said shaft, spring-actuated regulatable devices connected to said carrier for controlling the position of the sheet or signature placed thereon, and means for imparting to said devices, the carrier and the shaft to which the same are connected, a rocking forward-and-backward movement, substantially as and for the purpose set forth.

4. In a book-sewing machine, the combination with a sheet or signature holding bar, ways in which the same is adapted to move vertically, cams upon a main shaft, rocker-arms actuated by said cams and links connecting the rocker-arms with the bar for imparting thereto a vertical movement, of a shaft in suitable bearings upon the machine, a sheet or signature carrier in the form of a plate secured to said shaft, spring-actuated regulatable devices connected to said carrier for controlling the position of the sheet or signature placed thereon, a crank secured to the said shaft, a link connected to the crank, a rocker-arm at one end connected to the link and at the other end to a fixed pivotal point, an independent cam having a groove receiving a roller upon the rocker-arm and by which the movement of the carrier is effected, substantially as set forth.

5. In a book-sewing machine, the combination with a sheet or signature holding bar, ways in which the same is adapted to move vertically, cams upon a main shaft, rocker-arms actuated by said cams and links connecting the rocker-arms with the bar for imparting thereto a vertical movement, of a shaft in suitable bearings upon the machine, a sheet or signature carrier in the form of a plate secured to said shaft, spring-actuated regulatable devices connected to said carrier for controlling the position of the sheet or signature placed thereon, a crank secured to the said shaft, a link connected to the crank, a rocker-arm at one end connected to the link and at the other end to a fixed pivotal point, an independent cam having a groove receiving a roller upon the rocker-arm, said groove having concentric portions of varying length and short connecting portions, whereby a quick movement is imparted to the carrier in both directions, and the rest period for placing the sheet or signature upon the carrier is of greater length than the rest period in which the same is elevated by the bar from the carrier, substantially as set forth.

6. In a book-sewing machine, the combination with a sheet or signature holding bar, ways in which the same is adapted to move vertically, cams upon a main shaft, rocker-arms actuated by said cams and links connecting the rocker-arms with the bar for imparting thereto a vertical movement, of a sheet or signature carrier in the form of a plate of metal, a horizontally-placed shaft to which the lower edge of the same is connect-

ed, a crank on the shaft, a link therefrom, a rocker-arm connected at one end to the link and at the other end to a fixed pivotal point, an independent cam for actuating the carrier
 5 and imparting thereto a swinging movement, a spring-plate and devices for adjustably connecting the same to the said carrier, devices for adjusting the distance of said spring-plate from the carrier and a series of spring-fingers
 10 secured at their lower ends to the lower edge of the spring-plate, and at their upper ends passing through slots in the spring-plate, substantially as and for the purposes set forth.

7. In a book-sewing machine, the combination with a vertically-moving sheet or signature holding bar, and means for actuating the same, of a rocking shaft, means for actuating the same independently of the devices actuating the aforesaid bar, a sheet or signature
 15 carrier in the form of a plate of metal secured to the said rocking shaft and having therein a series of vertically-placed or transverse slots, a spring-plate having therein vertically-placed or transverse slots coinciding with the
 25 slots in the carrier, adjustable bolt devices connecting the spring-plate and carrier, and by which the relation of the said parts may be changed, pivot-plates secured to the spring-plate and screw-sockets connected therewith
 30 and screws passing through the slots of the carrier into the screw-sockets, whereby the proximity of the spring-plate to the carrier is regulated, and spring-fingers secured at their lower ends to the lower edge of the spring-
 35 plate and at their upper ends passing through the slots of the spring-plate, substantially as and for the purposes set forth.

8. In a book-sewing machine, the combination with a vertically-moving sheet or signature holding bar, and means for actuating the same, of a sheet or signature carrier, and means for swinging the same across a vertical
 40 plane passing through the axis of movement so that a sheet or signature may be hung by gravity upon the carrier in its outermost position and be moved by the carrier forward into the path of the rising signature-bar and be there supported in an opened substantially vertical position for the vertically-ris-
 45

ing sheet-holding bar to pass between the parts of the opened signature, and which bar with its farther upward movement lifts the signature from the carrier. 50

9. In a book-sewing machine, the combination with a vertically-moving sheet or signature holding bar and means for actuating the same, of a sheet or signature carrier, a pivot-shaft therefor along the lower horizontal edge, and means for swinging the same across a vertical plane passing through the axis of
 55 movement so that a sheet or signature may be hung by gravity upon the carrier in its outermost position and be moved by the carrier forward into the path of the rising signature-bar and be there supported in an opened substantially vertical position for the vertically-rising sheet-holding bar to pass between the parts of the opened signature, and which bar with its farther upward movement lifts the signature from the carrier. 60 70

10. In a book-sewing machine, the combination with a vertically-moving sheet or signature holding bar, and means for actuating the same, of a sheet or signature carrier, and means for swinging the same across a vertical
 75 plane passing through the axis of movement so that a sheet or signature may be hung by gravity upon the carrier in its outermost position and be moved by the carrier forward into the path of the rising signature-bar and be there supported in an opened substantially vertical position for the vertically-rising sheet-holding bar to pass between the parts of the opened signature, and which bar with its farther upward movement lifts the
 80 signature from the carrier, the parts being so timed that the bar takes a sheet or signature from the carrier and a second sheet or signature can be placed upon the carrier while the sewing devices are acting upon the first
 85 sheet. 90

Signed by me this 13th day of February, 1902.

FREDERICK DENNISON TAYLOR.

Witnesses:

D. C. KIMBALL,
 GEO. C. KIMBALL.