J. L. MacADAMS.

STITCH LENGTH MECHANISM FOR STRAIGHT BAR KNITTING MACHINES.

APPLICATION FILED MAR. 6, 1908.

1,030,100. **Patented June 18, 1912.**

5 SHEETS—SHEET 1.

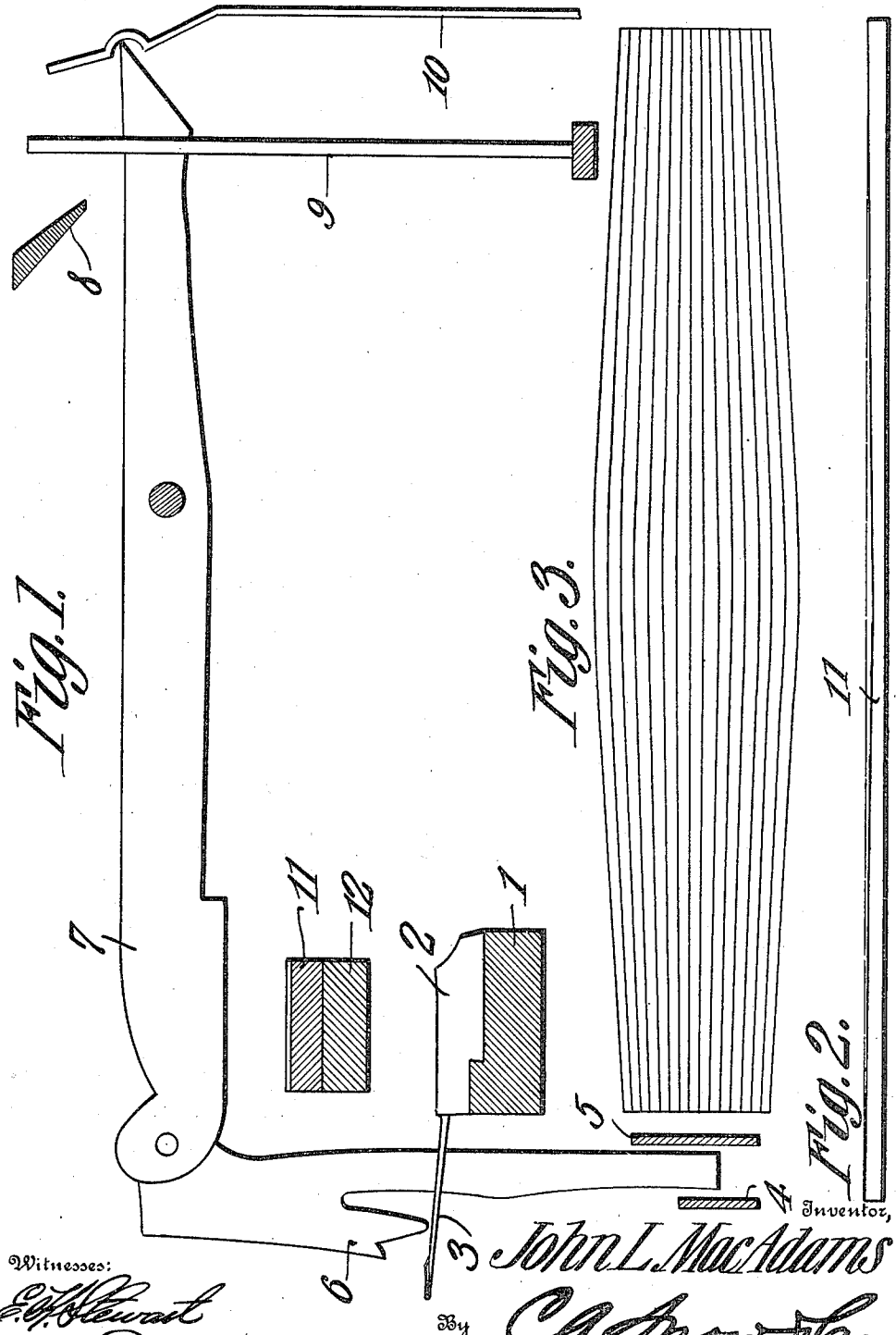

Fig. 1.

Fig. 3.

Fig. 2.

Witnesses:

E. C. Stewart

R. M. Elliott

Inventor,

John L. MacAdams

By C. A. Snow & Co.

Attorneys.

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

J. L. MacADAMS.

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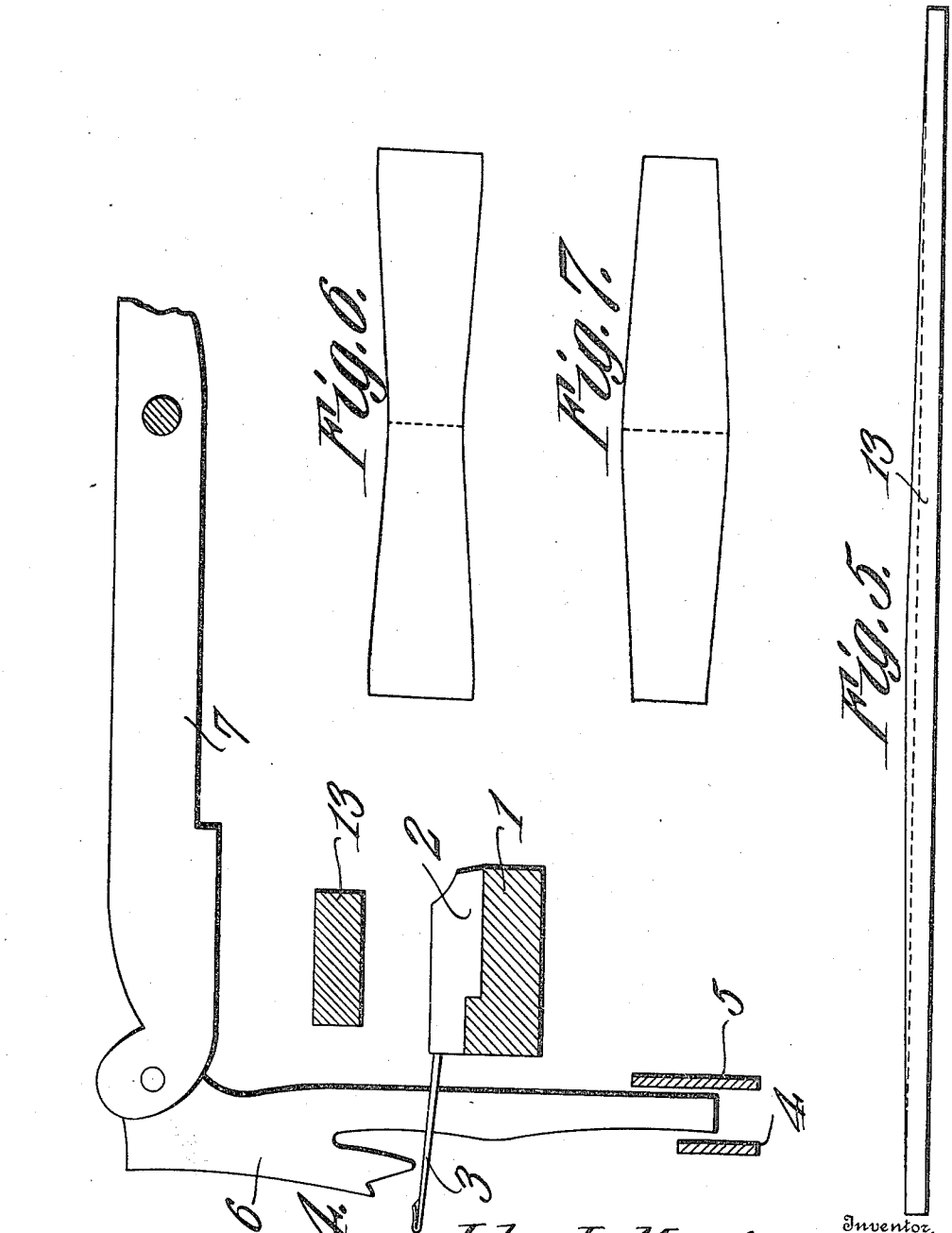

Inventor.

John L. MacAdams.

By Church & Church

Attorneys.

Witnesses:

E. J. Stamet

R. M. Elliott

J. L. MacADAMS.

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5 SHEETS—SHEET 3.

Fig. 9.

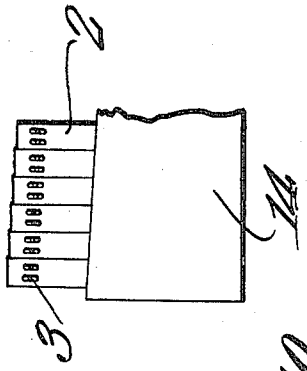

Fig. 10.

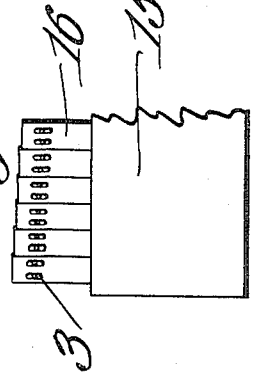

Fig. 8.

Witnesses:

E. F. Stewart

R. M. Elliott

Inventor,

John L. MacAdams.

By Cachow & Co

Attorneys.

J. L. MacADAMS.

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5 SHEETS—SHEET 4.

Fig. 11.

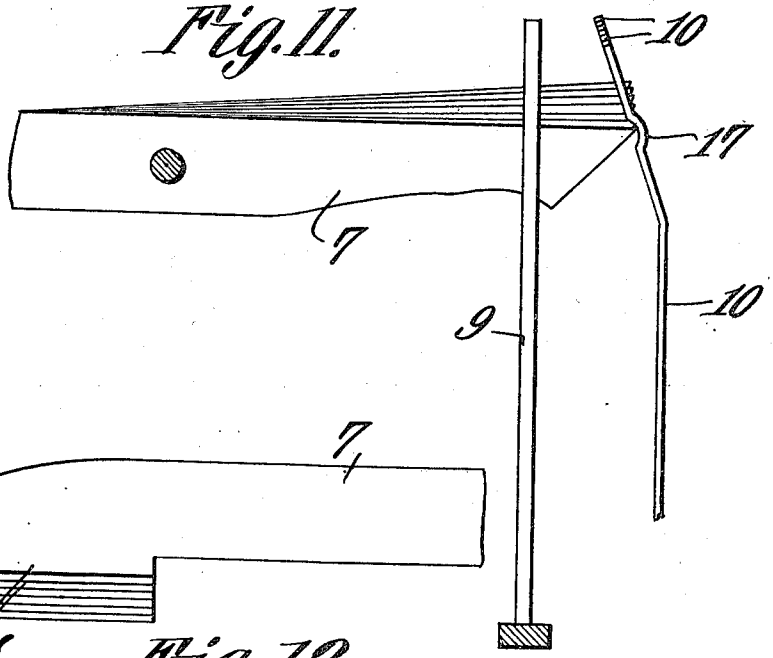
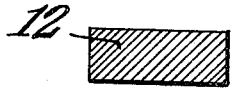


Fig. 12.



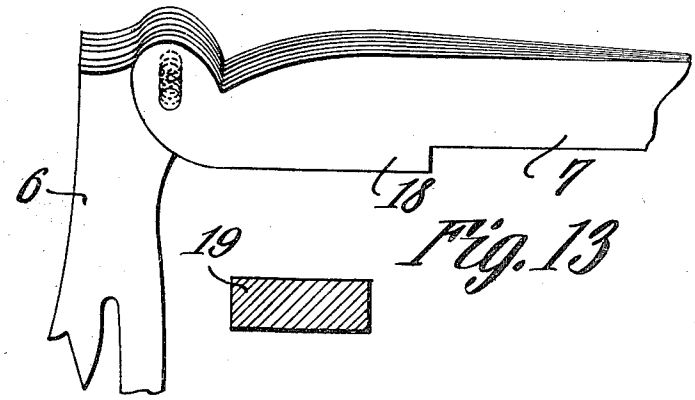


Fig. 13

Witnesses:

E. J. Clewett

R. M. Elliott

Inventor,

John L. MacAdams.

By Cushman & Co

Attorneys.

J. L. MacADAMS.

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APPLICATION FILED MAR. 6, 1908.

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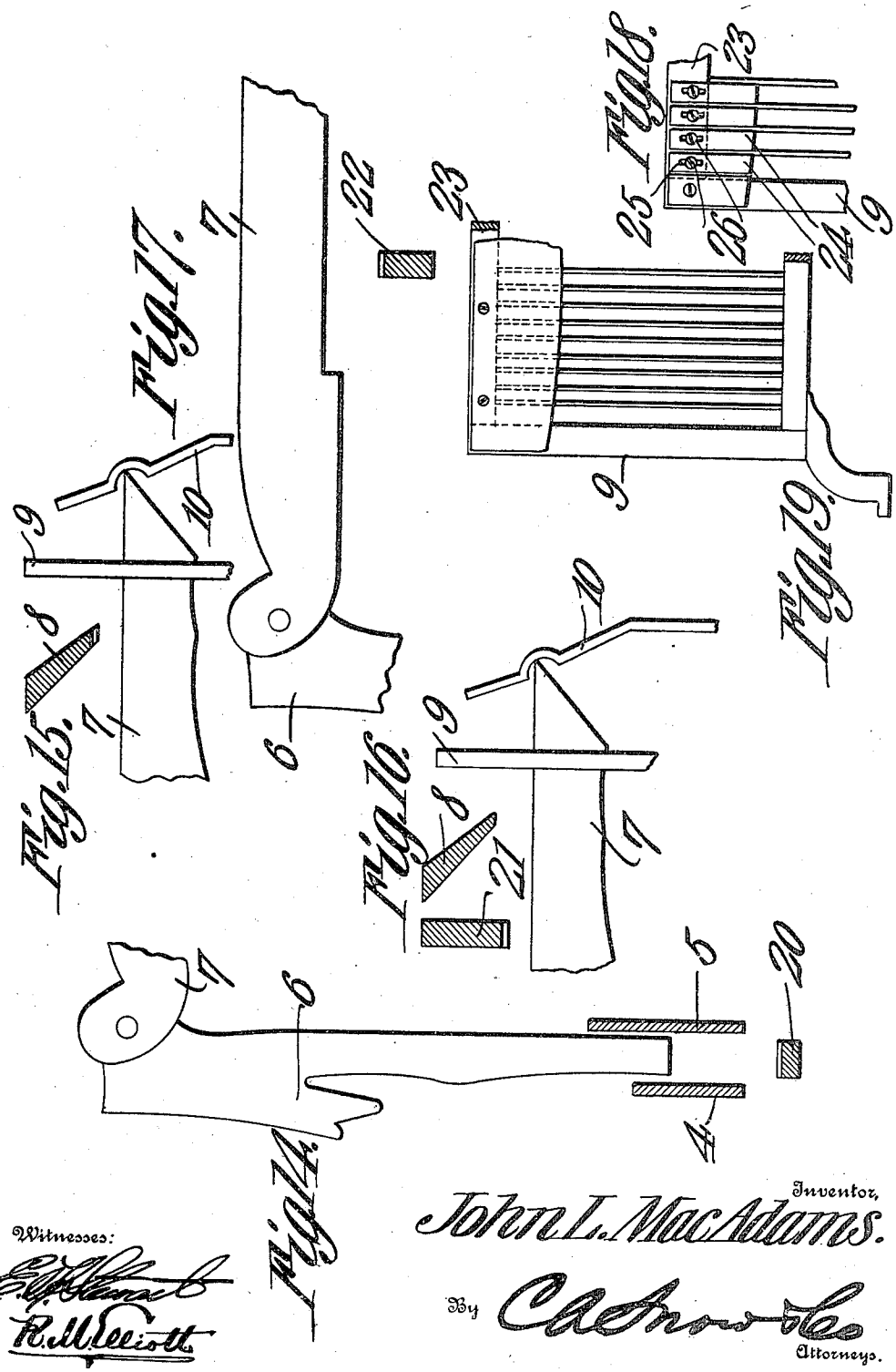
5 SHEETS—SHEET 5.



Witnesses:

E. J. Clemmer

R. M. Elliott

Inventor,

John L. MacAdams.

By Church & Lee

Attorneys.

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN L. MacADAMS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO WILLIAM H. HORN, WILLIAM H. HORN, JR., AND WALTER J. HORN, COPARTNERS TRADING AS WILLIAM H. HORN & BROTHER, OF PHILADELPHIA, PENNSYLVANIA.

STITCH-LENGTH MECHANISM FOR STRAIGHT-BAR KNITTING-MACHINES.

1,030,100. Specification of Letters Patent. Patented June 18, 1912.

Application filed March 6, 1908. Serial No. 419,555.

To all whom it may concern:

Be it known that I, JOHN L. MacADAMS, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Stitch-Length Mechanism for Straight-Bar Knitting-Machines, of which the following is a specification.

This invention relates to knitting machines of the hand frame or straight bar type.

The object of the invention is, in a simple and ready manner, and without involving any radical changes in the structural arrangement of an ordinary knitting machine, to adapt it for knitting fashioned work, such as abdominal belts, fashioned insteps, knee-caps, and the like, without the use of partial courses.

With the above and other objects in view, as will appear as the nature of the invention is better understood, the same consists in a novel means for shortening and lengthening the stitches to any desired degree, whereby to impart the required shape to the article being knitted.

In the accompanying drawing forming a part of this specification, and in which like characters of reference indicate corresponding parts, Figure 1 is a view in vertical transverse section, in the nature of a diagram, displaying so much of a knitting machine as is necessary to an understanding of one embodiment of the invention. Fig. 2 is a view in front elevation, of the faller bar that constitutes the novel feature of this form of the invention. Fig. 3 is a diagrammatic view, exhibiting the contour of the fabric produced by the attachment shown in Fig. 2. Fig. 4 is a view similar to Fig. 1, displaying a modified form of the invention. Fig. 5 is a view in side elevation of the faller bar that constitutes the novel feature of the form of the invention shown in Fig. 4. Fig. 6 is a diagrammatic view exhibiting the contour of the fabric produced by the faller bar shown in Fig. 5. Fig. 7 is a diagrammatic view exhibiting a piece of fabric that can be produced by cutting the specimen shown in Fig. 6 in half, and then uniting by knitting or stitching the broader ends. Fig. 8 is a view similar to Fig. 1, displaying a further modified form of the invention. Fig. 9 is a front elevation, looking in the direction of the arrow in Fig. 8. Fig. 10 is a view similar to Fig. 5, of a further modified form of the invention. Figs. 11, 12, 13, 14, 15, 16, 17, 18 and 19 are views, somewhat in the nature of diagrams, of other modified forms of the invention.

Referring to the drawings, and to Figs. 1, 2 and 3 thereof, 1 designates the needle bar of a knitting machine, 2 one of the needle stocks or leads, 3 one of the needles, 4 the facing bar, 5 the hand bar, 6 one of the sinkers, 7 one of the jacks, 8 the locking bar, 9 the slay, and 10 a jack spring, and as these parts may be of the usual, or any preferred construction, further description thereof is deemed unnecessary. The novelty of this form of the invention, as well as those hereinafter described, resides in means for varying the fall or vibrations of the jacks, whereby to lengthen or shorten the stitches. This result can be secured in a large number of ways, as will hereinafter appear, that shown in the present embodiment of the invention being accomplished by a bar or plate 11 constituting a jack fall-limiting member that is supported by the faller bar 12, or it may constitute the bar itself. As will be seen by reference to Fig. 2, the upper surface of the bar 11, which may be made of any material suited to the purpose, is concaved, the lowest portion of the concavity being at the center of the member, although it may be located at any other point on the face. By this arrangement, it will be obvious that the jacks disposed at the ends of the member will not be permitted to have as great a fall as those at its center, and this will cause a shortening of the stitches at the first-named jacks, and a lengthening of those at the second-named jacks.

With a jack fall-limiting or controlling member constructed as shown in Fig. 2, the article produced will have the general contour of that shown in Fig. 3, and will be employed as an abdominal supporter, in which the knitted fabric is widest at the center and tapers gradually toward each end. As will be obvious, the design of the article may be varied by changing the face of the jack fall-limiting member that opposes the jacks, that is to say, it may be

made a true curve, as shown, or an irregular one, and as this will be readily understood, detailed illustration of such obvious change is omitted.

In the operation of the machine, no special attention will be required, as the addition to it of the jack fall-limiting member will not in any way increase its complexity, nor will it, in any way, necessitate any change in the structural arrangement of the machine. The member 11 may be held assembled with the falling bar in any preferred manner, as by being screwed or riveted thereto, or it may be held in place by the employment of a suitable adhesive.

In the form of the invention shown in Figs. 4 and 5, the only difference over that just described is that the jack controlling member 13 has its upper face convex, the highest portion of convexity being shown at the center of the member, although it may be arranged at any other preferred point in its length.

In Fig. 6 is shown a piece of fabric produced by the employment of the jack controlling member 13, wherein the opposite edges of the fabric are shown as inwardly curved, and to produce the article shown in Fig. 3, it will only be necessary to cut the article in half and assemble its wider ends by knitting or stitching.

In the form of the invention shown in Figs. 8 and 9, the shortening and lengthening of the stitches is secured by making the upper face of the needle bar 14 concaved, although it may be convexed, this arrangement causing the needles to be arranged on a curved, instead of on a straight, line as usual.

In the form of the invention shown in Fig. 10, the shortening and lengthening of the stitches are produced by making the upper face of the needle bar 15 straight and arranging the needles 3 in the leads 16 at different heights relatively to the upper face of the needle bar.

In the form of the invention shown in Fig. 11, the shortening and lengthening of the stitches are secured by varying the position of the jack locking seats 17 of the jack springs 10.

In the form of the invention shown in Fig. 12, the shortening and lengthening of the stitches are secured by varying the widths of the heads 18 of the jacks 7, and by this arrangement it will be seen that contact between the jack heads and the falling bar 12 will secure the object sought.

In the form of the invention shown in Fig. 13, the shortening and lengthening of the stitches are secured by adding extra width to the under sides of the heads 18 of the jacks, and by disposing below the jacks a stop bar 19 which will limit their downward movement.

In the form of the invention shown in Fig. 14, the lengthening and shortening of the stitches are secured by arranging a jack fall-controlling member 20 in the line of the sinkers and below the facing bar 4 and the hand bar 5, the upper face of the member 20 being either concaved or convexed, as may be preferred.

In the form of the invention shown in Fig. 15, the shortening and lengthening of the stitches are secured by concaving or convexing the under face of the locking bar 8.

In the form of the invention shown in Fig. 16, the shortening or lengthening of the stitches is secured by disposing a supplemental stop bar 21 above the jacks 7 at any preferred point in their length, that is, at any point between the locking bar 8 and the jack wire, the under face of the bar 21 being concaved or convexed, as may be desired, or of an irregular contour.

In the form of the invention shown in Fig. 17, the shortening or lengthening of the stitches is secured by disposing a supplemental stop bar 22 beneath the jacks, at any point in their length between their heads and the jack wire, the upper face of the bar being either concaved, convexed, or of an irregular form.

In the form of the invention shown in Fig. 18, the shortening or lengthening of the stitches is secured by combining with the upper rail 23 of the slay frame a plurality of plates 24, there being one for each of the jacks, and each plate is provided at its upper end portion with a longitudinal slot 25 through which passes a screw 26 that serves to hold the plate, which constitutes a jack controlling member, at the desired adjustment.

The constructions shown in Figs. 18 and 19 are modifications of the same general form as shown in Fig. 16, where the supplemental stop bar 21 is mounted above the jacks 7 or independent of the jacks-supporting or slay frame 9. In Figs. 18 and 19 the supplemental plates instead of being independent of the frame 9 are attached to the frame 9; in some instances these latter modifications may be preferred because the jacks each being movable in a respective guideway in the slay will always strike its respective and prescribed portion of the plate contour when the slur raises their rear ends in the usual manner of straight frame knitting.

In the form of the invention as shown in Fig. 19 the shortening or lengthening of the stitches is secured by combining with the upper rail 23 of the slay frame a single plate 24′ having its lower edge describing a curve for controlling the jacks.

It will be seen from the foregoing description, that in each arrangement shown, means is provided that will operate, in a thoroughly feasible and practical manner, and

without any material change in the structural arrangement of the machine, to secure any desired change in the length of the stitches, whereby articles of different marginal contours may readily be manufactured.

I claim:—

1. A knitting machine including needles and a series of coöperating sinkers arranged to mesh with the needles, and means for causing a gradually varying depth of mesh throughout the series of sinkers from the ends toward the middle of a course of knitting.

2. A knitting machine including needles and a series of coöperating sinkers arranged to mesh with the needles, and means for causing a gradually increasing depth of mesh throughout the series of sinkers from the ends toward the middle of a course of knitting.

3. A knitting machine having a series of sinker-carrying jacks and means for relatively varying the extent of vibration of the jacks of the series comprising a faller bar the operative face of which is longitudinally curved.

4. A knitting machine having a series of sinker-carrying jacks and means for relatively varying the extent of vibration of the jacks of the series comprising a faller bar the operative face of which is longitudinally concaved.

5. The combination in a straight knitting machine of a series of sinker-jacks, means for operating said jacks, a series of sinkers actuated by the jacks, a series of needles arranged to coöperate with the jacks to form a fabric, and a design cam coöperative with the sinker jacks for varying the amount of intermesh between the sinkers and the needles.

6. The combination in a straight knitting machine of a series of sinker jacks, means for actuating said jacks, a series of sinkers, a series of needles coöperating with the sinkers to form a fabric, a supporting structure, and a bar of irregular contour forming a design cam mounted upon said structure and placed to limit to a different extent the possible movement of certain of the sinker jacks.

7. The combination in a straight knitting machine, of a frame having a movable carriage, a slur race thereon, a slur cock on said race, a series of sinker jacks pivotally mounted on the carriage and placed to be actuated by said slur cock, a sinker pivotally hung from the end of each sinker jack, a series of needles placed to coöperate with said sinkers to form a fabric, with a bar constituting a design cam mounted upon the frame of the machine and placed to be operative upon the various sinker jacks to vary the amount of intermesh of the sinkers and the needles.

8. The combination with a straight knitting machine having sinkers, sinker-jacks and needles, of a bar extending transversely of the sinker-jacks and adjacent thereto, and a plate adjustably mounted on said bar and coöperative with the sinker jacks for varying the amount of intermesh between the sinkers and the needles.

9. The combination with a straight knitting machine having sinkers, sinker jacks and needles, of a bar extending transversely of the sinker jacks and adjacent thereto with a plate adjustably mounted on said bar and having inclined surfaces to engage the sinker jacks for varying the amount of intermesh between the sinkers and the needles.

10. The combination in a straight knitting machine, of a series of needles; a series of yarn sinkers coöperative with the needles and a bar of irregular contour forming a design cam, and placed to limit to a different extent the possible movement of certain of the sinkers.

11. The combination in a straight knitting machine of a series of needles; a series of yarn sinkers operable to intermesh with the needles; and means placed to effect a gradual difference in the extent of intermesh between successive sinkers and their respective needles.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

JOHN L. MacADAMS.

Witnesses:
C. Frank Clare,
Thomas Harrison.