No. 771,677. PATENTED OCT. 4, 1904.

A. C. SQUIRES.

MACHINE FOR MAKING DRESS SHIELDS.

APPLICATION FILED JUNE 22, 1904.

NO MODEL. 3 SHEETS—SHEET 1.

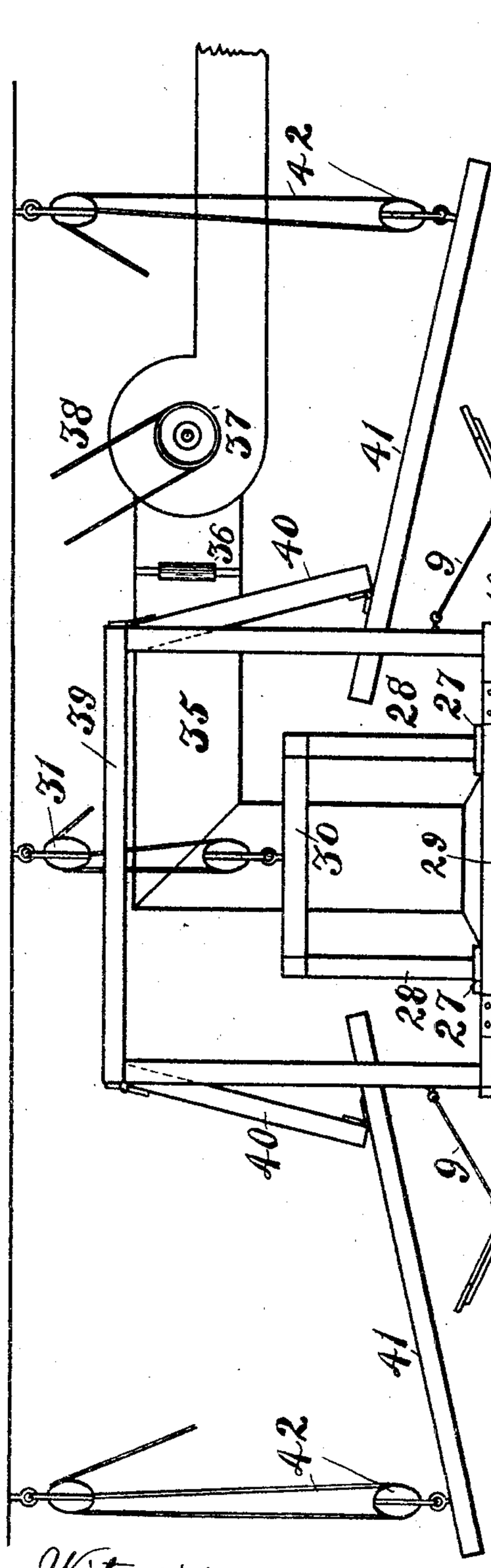

Fig. 1.

Witnesses,
W. F. Surgeon
A. R. King

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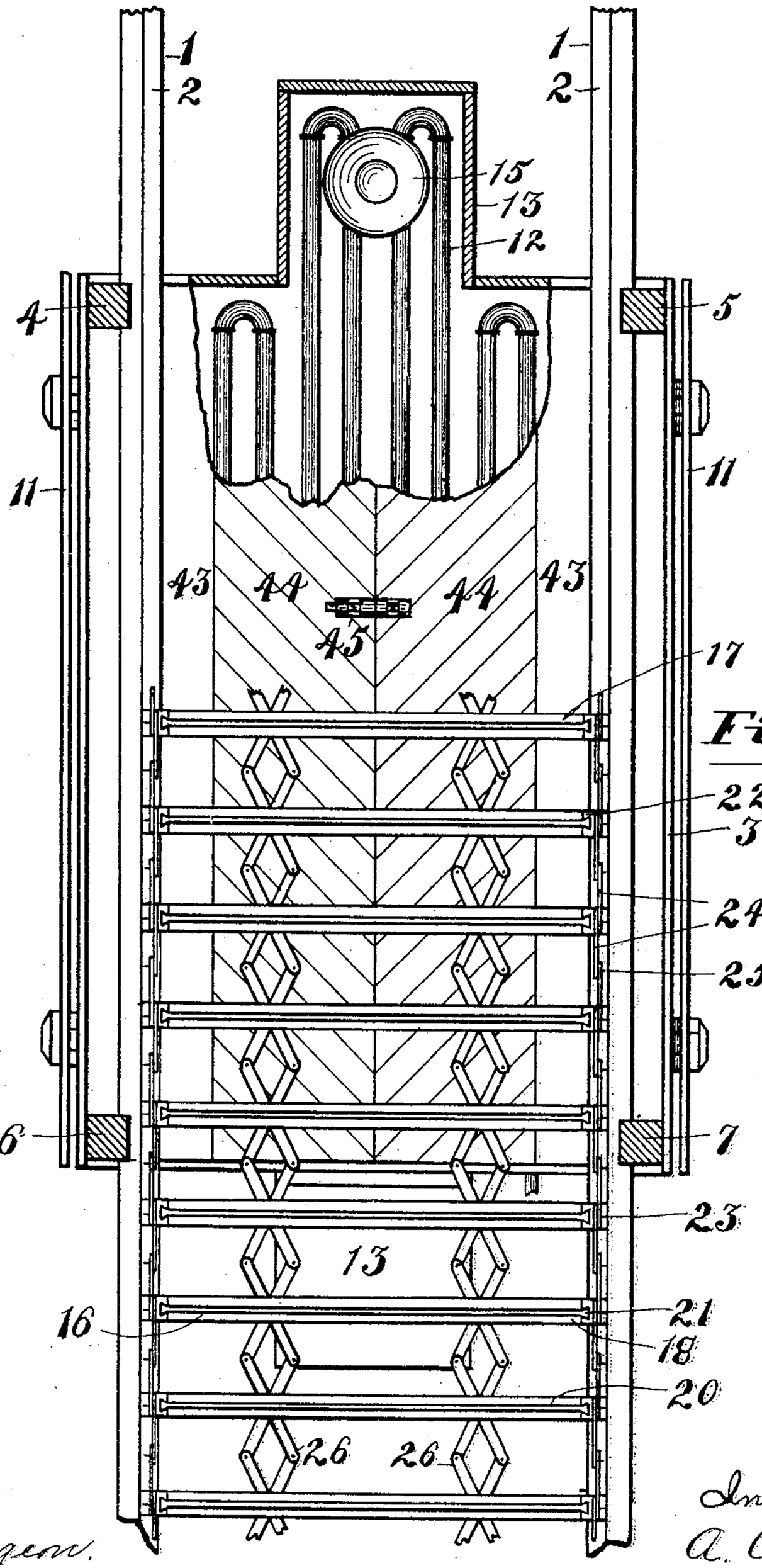

Fig. 2.

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NO MODEL. 3 SHEETS—SHEET 3.

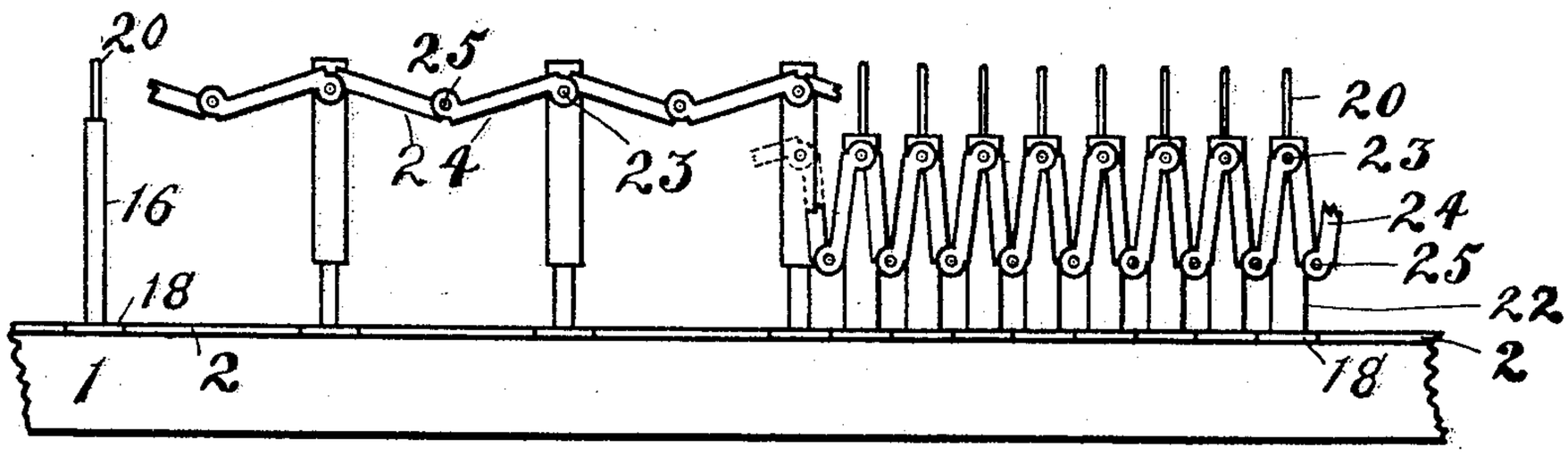
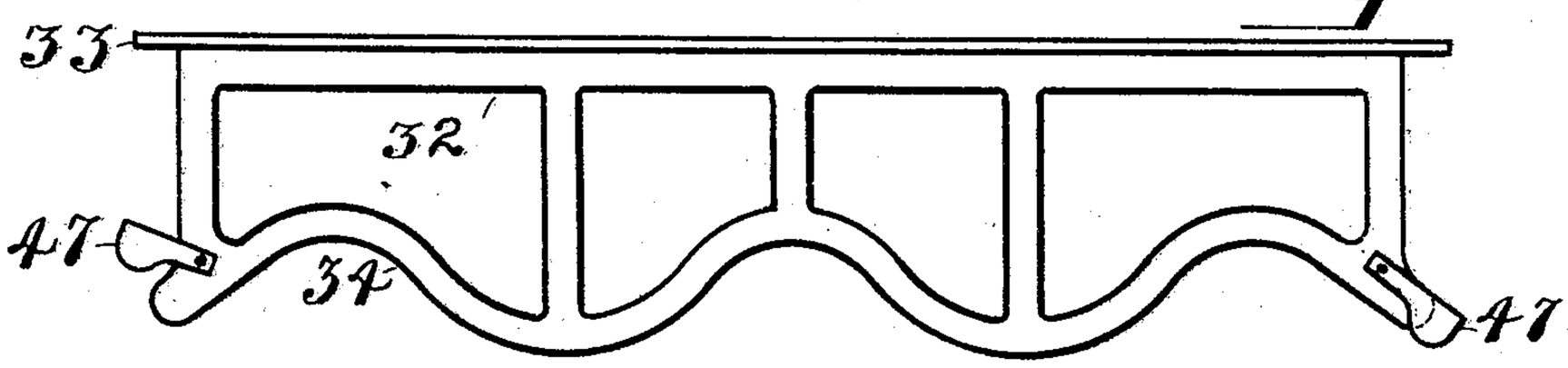


Fig. 3.

Fig. 4.



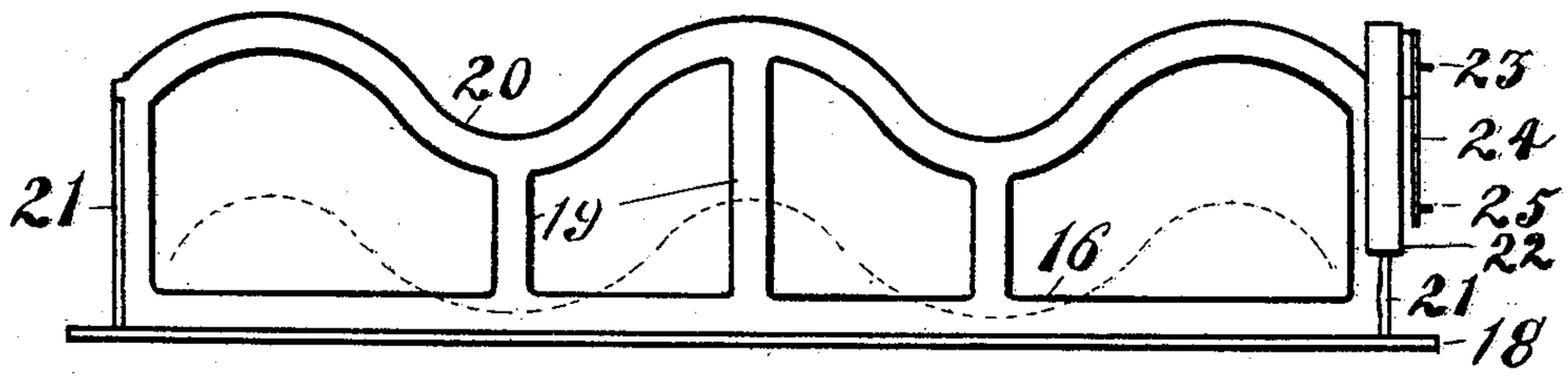


Fig. 5.

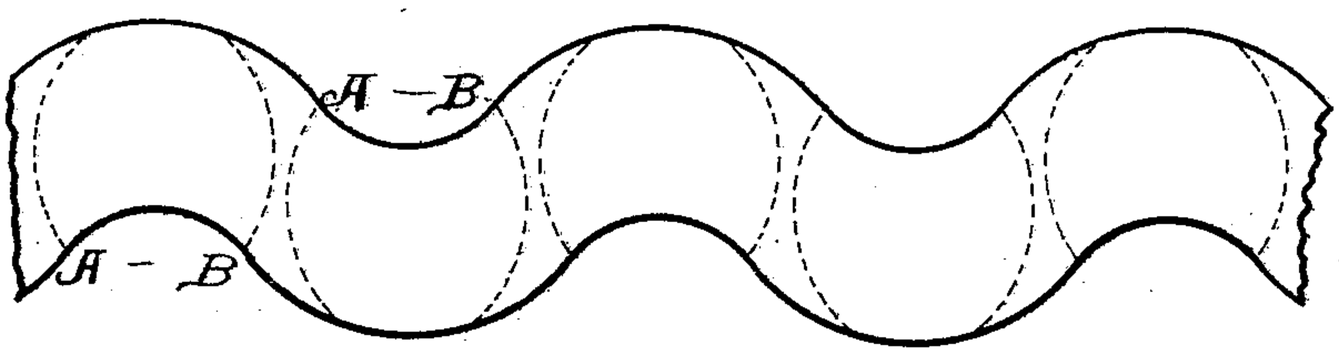


Fig. 6.

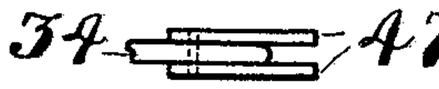


Fig. 7.

Witnesses:
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A. E. Kling

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PHOTO-LITHOGRAPHED BY SACKETT & WILHELMS LITHO. & PTG. CO. NEW YORK.

No. 771,677. Patented October 4, 1904.

UNITED STATES PATENT OFFICE.

ARTHUR C. SQUIRES, OF AKRON, OHIO.

MACHINE FOR MAKING DRESS-SHIELDS.

SPECIFICATION forming part of Letters Patent No. 771,677, dated October 4, 1904.

Application filed June 22, 1904. Serial No. 213,684. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR C. SQUIRES, a citizen of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented a certain new and useful Improvement in Machines for Making Dress-Shields, of which the following is a complete specification.

My invention relates to machines for making dress-shields.

The object of my invention is to produce an improved machine of unusual simplicity, cheapness, and ease of operation for making dress-shields from a relatively rigid or non-stretchable material without seams. Heretofore dress-shields of an elastic fabric, such as stockinet, have been made in a similar way; but the manufacture of seamless dress-shields from a rigid material has not been successful, and hence my object is to provide, as aforesaid, a machine capable of accomplishing this result.

To the accomplishment of the aforesaid object my invention consists in the peculiar and novel arrangement, construction, and combination of the various parts hereinafter described, reference being had to the accompanying drawings, forming a part hereof.

In the accompanying drawings, in which similar reference-numerals indicate like parts on the different figures, Figure 1 is a side elevation of my improved machine; Fig. 2, a section of Fig. 1 at the line *x;* Fig. 3 a side elevation of the formers and the mechanism by which the cloth is folded; Fig. 4, a side elevation of one of the upper formers; Fig. 5, a similar view of a lower former; Fig. 6, a side elevation of a strip of the material after being shaped by this device, and Fig. 7 an enlarged view of the holding device used on the upper former for sustaining the cloth during the forming process.

In the drawings, 1 1 are two parallel timbers composing the main frame of the machine, and these timbers are provided with rabbets 2 on their upper inner faces, and these form in conjunction with each other ways for the passage thereover of the lower formers to be hereinafter fully described. These timbers 1 1 are supported on legs on any suitable foundation, such as the floor of a shop or building. Surrounding the central portion of the timbers 1 1 is a hollow box or chamber 3, having upright corner-posts 4, 5, 6, and 7. This box 3 is closed at the top and bottom and is provided on its ends with doors 8, held open when desired by hooks 9 and has on its sides two doors 10 and 11, which when closed serve to close the sides of the box. On the floor of this box is a pipe-coil 12, through which is passed a heating medium, such as live steam, at intervals as desired. At both ends of the lower portion of the box and communicating therewith are extension-boxes 13, into the lower portion of each of which one or more convolutions of the pipe-coil 12 extend. These boxes 13 are closed on all sides, excepting the side toward the main box 3, and this communication is shut off at any time by means of gates 14. The bottoms of the boxes 13 and the pipe-coil therein are covered by a fine quantity of sand (not shown on the drawings) and on which are placed dishes or cups 15, in which is placed a solution of chlorid of sulfur to act as a vulcanizing or curing medium. The fumes thereof are allowed to pass into the main box 3 after being generated by the heat in the pipe-coil 12.

Extending across between the timbers 1 1 and arranged to slide in the rabbets 2 2 therein are a series of formers 16. (Shown best in Fig. 5.) These formers 16 are all slidable along these ways formed by the rabbets 2, with the exception of the central former 17, which is held permanently in place by being screwed or otherwise fastened to the timbers 1 1. The formers 16 are provided with a flat heavy base 18, from which rise supporting-posts 19, on the ends of which and integral therewith is the former edge 20. This edge has a conformation such as it is desired to impart to the upper portion of the folded fabric after being acted upon by this machine. At each end of the formers 16 is a dovetailed ridge 21, on which vertically slides a traveler 22, and on the upper portion of these travelers are pins 23, on which are pivoted links 24, the free ends of which are united by bolts 25, provided with sharp pin-like heads. These sliding travelers 22 are placed at both ends of the

formers 16 and are united with links 24 in the same manner at each end. Extending across between the timbers 1 1 and slidable in the rabbets 2 are cross-bars 46, to the outer ends of which are pivotally attached the ends of links similar to links 24 and which connect with the next succeeding link 24 by pins in the same manner as the links 24 are connected together. To the under sides of the formers 16 are pivoted lazy-tongs 26, which serve to steady the sliding motion of the formers 16 on the rabbets 2.

Extending across the roof of the box 3 are a pair of heavy reinforcing-timbers 27, through which pass vertical posts 28 of a vertically-sliding frame having cross-bars 29 at their lower ends and at the top cross-bars 30, which form the hollow sides of a square. This frame is raised and lowered by a tackle and block 31, fastened to a support above the machine. On the lower timbers 29 of this frame are placed the upper formers 32, consisting of bases 33, which are bolted to the timbers 29 and provided with an outer forming edge 34 (best shown in Fig. 4) and having the shape which it is desired to impart to the bottom of the folds in the fabric on which the machine is to operate. On the outer ends of the upper formers 32 and in the edge portion 34 thereof are pivoted clamps 47, (shown in Figs. 4 and 7,) which consist of parallel pivoted plates which when swung down closely embrace the sides of the former, as shown to the right-hand end in Fig. 4. Their use will be referred to and described later.

From the top or roof of the box 3 rises a ventilator-pipe 35, in which is a gate 36 and provided with an exhaust-fan 37, operated by any preferred means, such as a belt 38 from a suitable source of power. The top of the frame formed by the upright posts 4, 5, 6, and 7 is strengthened by connecting-timbers 39. To these timbers on the ends of the frame are hinged fulcrums 40, to the lower ends of which are hinged vertically-movable levers 41, the outer ends of which are raised by tackles and blocks 42. Within the lower portion of the box 3 are parallel longitudinal strips 43, abutting against the timbers 1 1 and held firmly in place by nails or screws, as desired. To the inner faces of these strips 43 are hinged downwardly-swinging doors 44, arranged to be held in place by a bolt 45.

In using this device several different styles of dress-shields may be produced. For instance, dress-shields of plain fabric without being waterproof may be made, or dress-shields made from fabric covered on one or both sides with a waterproofing material which will be subsequently vulcanized in the machine during the process of forming the fabric into shape from which the dress-shields can be cut, the only difference in the processes being that where the fabric is to be made waterproof it is coated with a vulcanizable compound which will require a curing agent introduced into the vulcanizing-chamber 3 during the process of forming the fabric, and in the process where the fabric is made without being made waterproof heat will be used to free the material from the moisture in the sizing compound to which it must be subjected previous to being shaped. With this difference the general operation of the device is as follows:

The parts of the device will be placed in exactly the position shown in Fig. 1—that is, the doors 8, 10, and 11 will be opened and the frame bearing the upper formers raised and the lower formers 16 separated, so as to extend out along the ways formed by the rabbets 2 to nearly their outer ends, and a strip of material of sufficient width to extend across the tops of the formers 16 and touch the upper convolutions of the forming edges 20 is stretched the whole distance of the timbers 1, and the sides of the cloth are folded down and fastened onto the pins 23 on the travelers 22, as well as onto the pins 25, which form the pivots for the free ends of the links 24. This fabric extends in substantially a flat plane and may have been coated with a vulcanizable compound or simply saturated with a proper sizing. The operator then grasps the cross-timbers 46, to which the links 24 are pivoted, and by shoving them toward the center former 17 the formers 16 are driven together, the links bending down in precisely the same manner as the edges of a bellows or the sides of an accordion. As the pins 25, which form the pivots for the links 24, move downward and the links fold up toward each other they draw the cloth or fabric down between the formers 16 and fold it properly at equidistant points evenly and smoothly, thereby drawing the cloth snugly over the tops of the forming edges 20. This sliding movement of the blocks 46 toward the center is kept up until all the formers 16 are within the normal outlines of the vulcanizer-chamber 3. The vertically-moving frame bearing the upper formers 32 is then lowered, and as these formers are closely placed together at such intervals as to pass squarely between the upright portions of the formers 16 they force downward the fabric between the formers 16 with sufficient force as to crease the fabric bearing on the forming edges 34 of the upper formers. As soon as this frame bearing the upper formers is lowered the levers 41 are pushed in by hand to rest upon the end timbers 30, forming the top of the vertically-sliding frame, and the outer ends of the levers 41 raised by means of the tackles and blocks 42 sufficiently to bring any desired pressure on the upper formers 32. During the lowering of the upper formers 32 the clamps 47 are in position shown in the left end of Fig. 4, and as soon as they have reached the point of their lowest descent the fabric between the lower formers

16 is detached from the pins 25 and smoothly drawn over the projecting ends of the upper formers 32 and the clamps 47 pushed downward in the position shown in the right of Fig. 4, which produces a result substantially equivalent to the operation of a clothes-pin on a clothes-line, serving to hold the fabric tightly drawn around the ends of the upper formers, so as to fully shape the outer ends of the fabric into such shape as to render substantially its entire width available. The doors 10 and 11 are locked together by any suitable means, and the end doors 8, detached from their hooks 9, are allowed to fall and close the ends. In doing this provision is made by cutting out the lower or outer corner of these doors 8 to permit them to pass between the timbers 1 1. If the fabric to be formed is simply sized, heat in the form of steam is turned into the pipe-coil 12, the gate 36 in the exhaust is opened, and the fan 37 started, which carries off the moisture from the drying fabric. If the fabric to be treated contains a coating of vulcanizable compound, sufficient chlorid of sulfur or other curing material is placed in the cups 15 and the gates 14 raised, while the gate 36 is closed. The vapors rising from the curing solution fill the vulcanizing-chamber 33 by passing up the spaces between the outer edges of the timbers 1 1 and the sides of the box 3, the doors 44 being closed to cause as great a diffusion of these vapors as possible. As soon as sufficient time has elapsed to cause proper vulcanization the gates 14 are closed and the gate 36 opened and the fan 37 started, which rapidly carries away the very unpleasant odors arising from the curing agent. The frame bearing the upper formers 32 is raised by means of the tackle and block 31 after first releasing the levers 41 which of their own gravity swing out of the way, the doors 8, 10, and 11 are opened, the fabric is unfastened from the pins 23 and clamps 47, and the fabric carefully lifted out. If it is desired to remove more rapidly the fumes of the vulcanizing agent, the bolt 45 is released and the two doors 44 allowed to swing down to aid in removing any moisture or curing-vapor existing in the lower portion of the box 3. The fabric will be found to have assumed the form shown in Fig. 6. After it is removed from connection with the formers 16 and 32 it is cut on the lines indicated by dotted lines by means of a die or similar tool, leaving the portions A B uncut and with a curve appropriate to fit the armpit of the wearer without seam or any other rough or unsightly obstruction.

The upper former has its working face of concavo-convex curvature, the concaved portions being of shorter radius. The lower former is of substantially the same curvature as the upper former, and the convex portions thereof are alternately arranged with respect to the convex portions of the upper former. When the formers are in their operative positions, the curvilinear portions of greater radius of one former are alternately arranged with respect to the curvilinear portions of greater radius of the other former. The same arrangement is made in respect to the curvilinear portions of shorter radius. By such an arrangement cloth is stretched without tearing it in any manner at the fold-line, and it also enables the disposing throughout the stretched cloth sufficient material so that the shield can be alternately cut, as the curve for the armpit is alternately formed in the cloth at the upper and lower edge thereof.

What I claim is—

1. The combination with a heating or vulcanizing chamber, of two oppositely-disposed sets of fabric-shaping formers, the forming edges of which are upon undulating curves alternating with each other in the length of their radius, the units of each set arranged to alternate with and pass between the formers of the opposite set, said sets being located to cause the larger undulations of one set to encounter the fabric on a line with the smaller undulations of the opposite set and vice versa and means for causing the coöperation of the two sets of formers.

2. A machine for making dress-shields involving a pair of formers having their working faces provided with curvilinear portions of different radius, the portions of greater radius of the working face of one former arranged alternately with respect to the portions of greater radius of the working face of the other former.

3. A machine for making dress-shields involving a pair of formers having their working faces provided with curvilinear portions of different radius, the portions of smaller radius of the working face of one former arranged alternately with respect to the portions of smaller radius of the working face of the other former.

4. In a machine for making dress-shields, the combination with a fabric stretching and setting mechanism, of a pair of formers cooperating therewith and each having its working face provided with curvilinear portions of different radius, the portions of greater radius of the working face of one former arranged alternately with respect to the portions of greater radius of the working face of the other former.

5. In a machine for making dress-shields, the combination with a fabric stretching and setting mechanism, of a pair of formers cooperating therewith and each having its working face provided with curvilinear portions of different radius, the portions of smaller radius of the working face of one former arranged alternately with respect to the portions of smaller radius of the working face of the other former.

6. A machine for making dress-shields in-

volving a pair of formers having their working faces alternately curved upon the same radius, said curved portions upon the same radius of one working face alternately disposed with respect to the curvilinear portions upon the same radius of the other working face.

In testimony that I claim the above I hereunto set my hand in the presence of two witnesses.

ARTHUR C. SQUIRES.

Witnesses:

C. E. HUMPHREY,

MABELLE F. SURGEON.