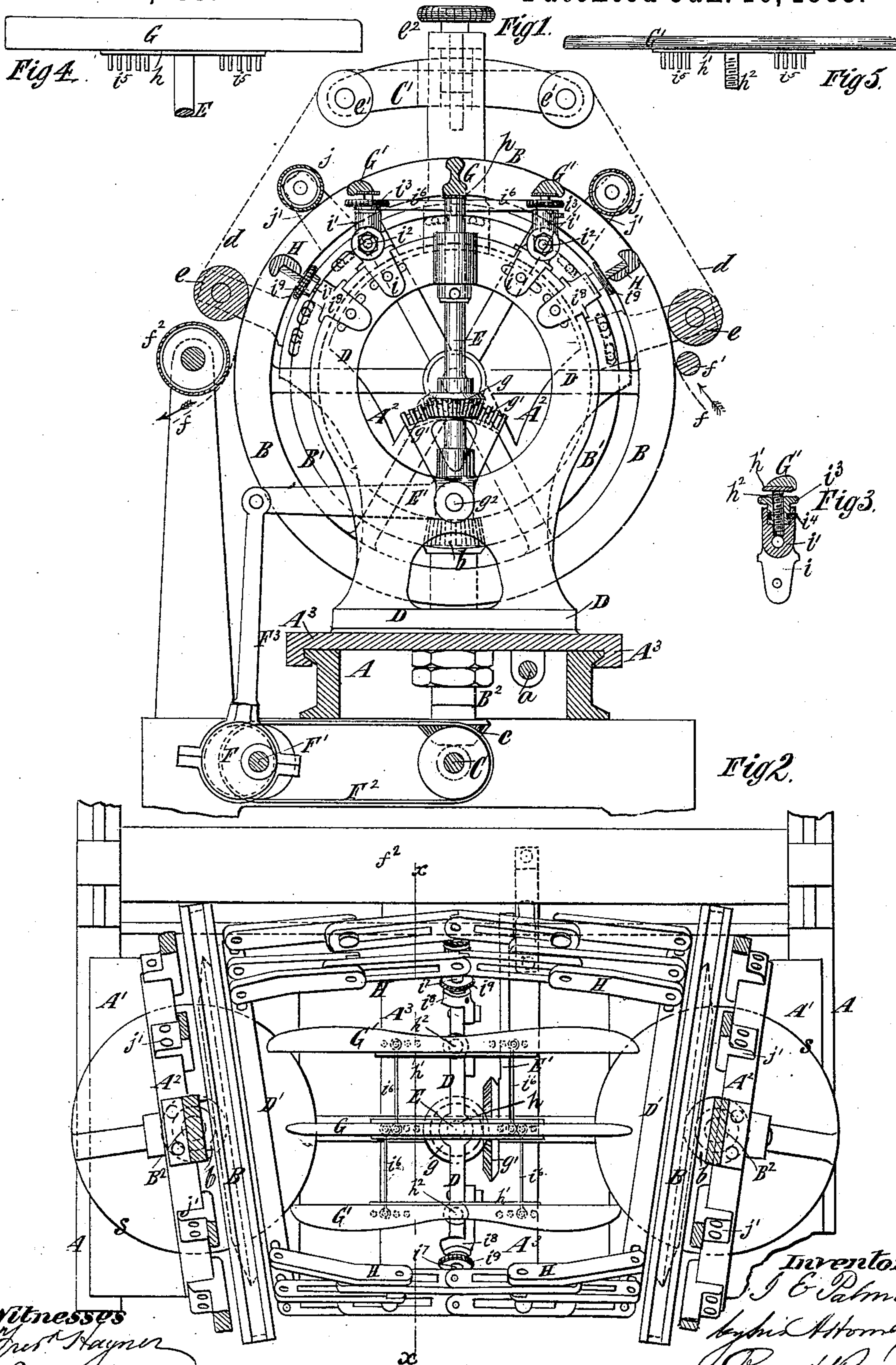


2 Sheets—Sheet 1.

# MACHINE FOR STRAIGHTENING AND FINISHING FABRICS.

Patented Jan. 16, 1883.



Witnesses  
 Fred W. Hays  
 George H. Batts

*Inventor*  
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*Hybrid Attorney*  
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(No Model.)

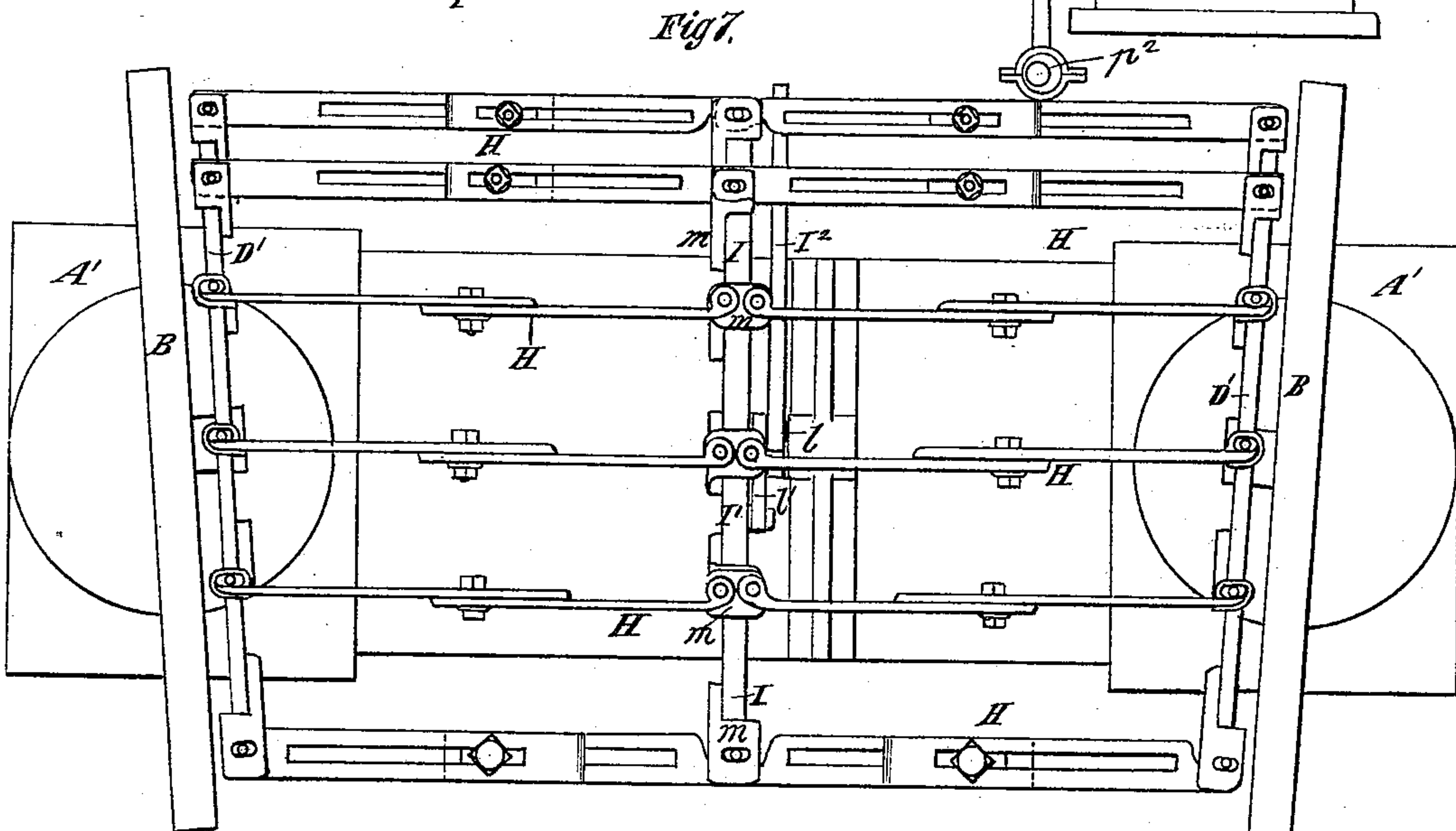
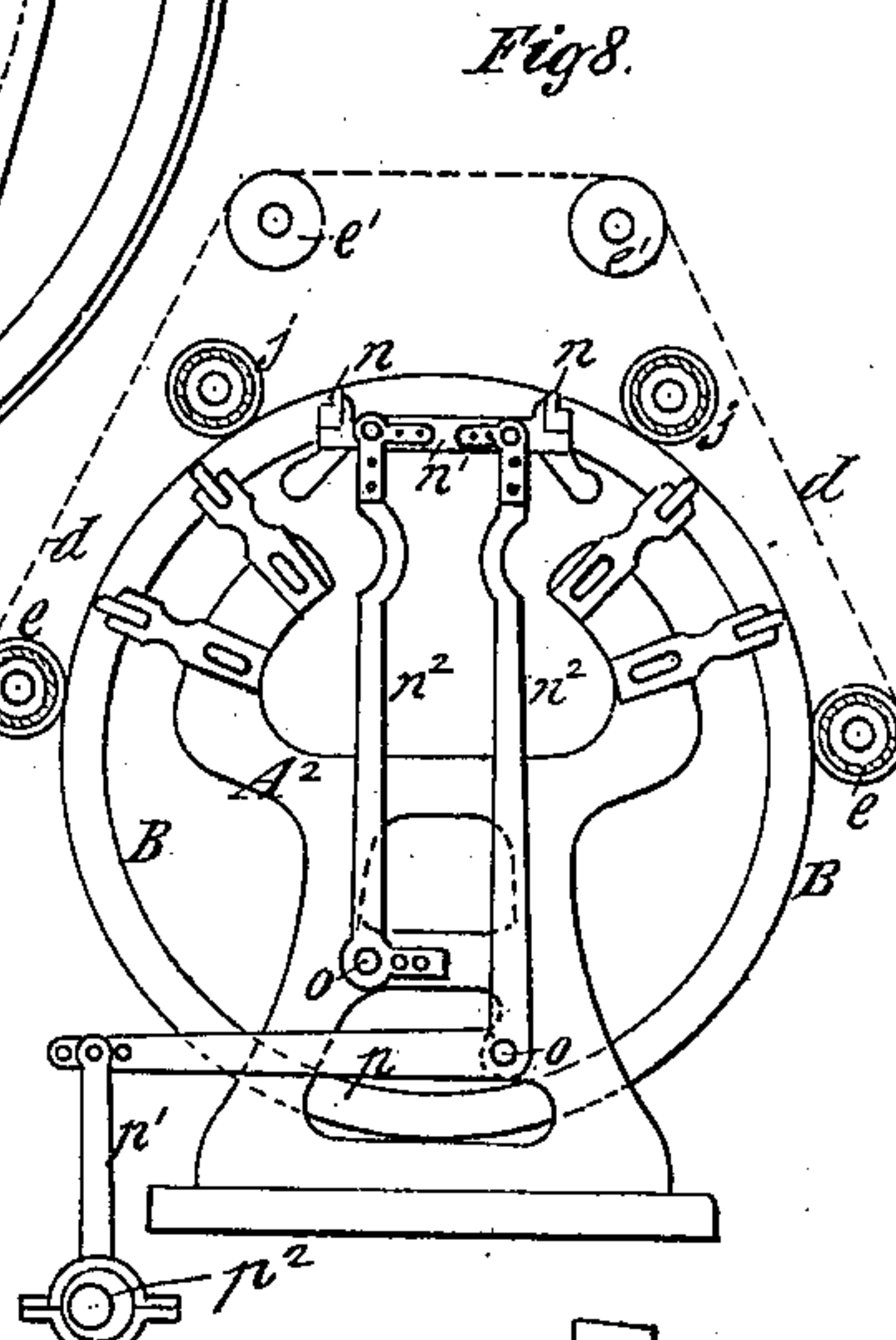
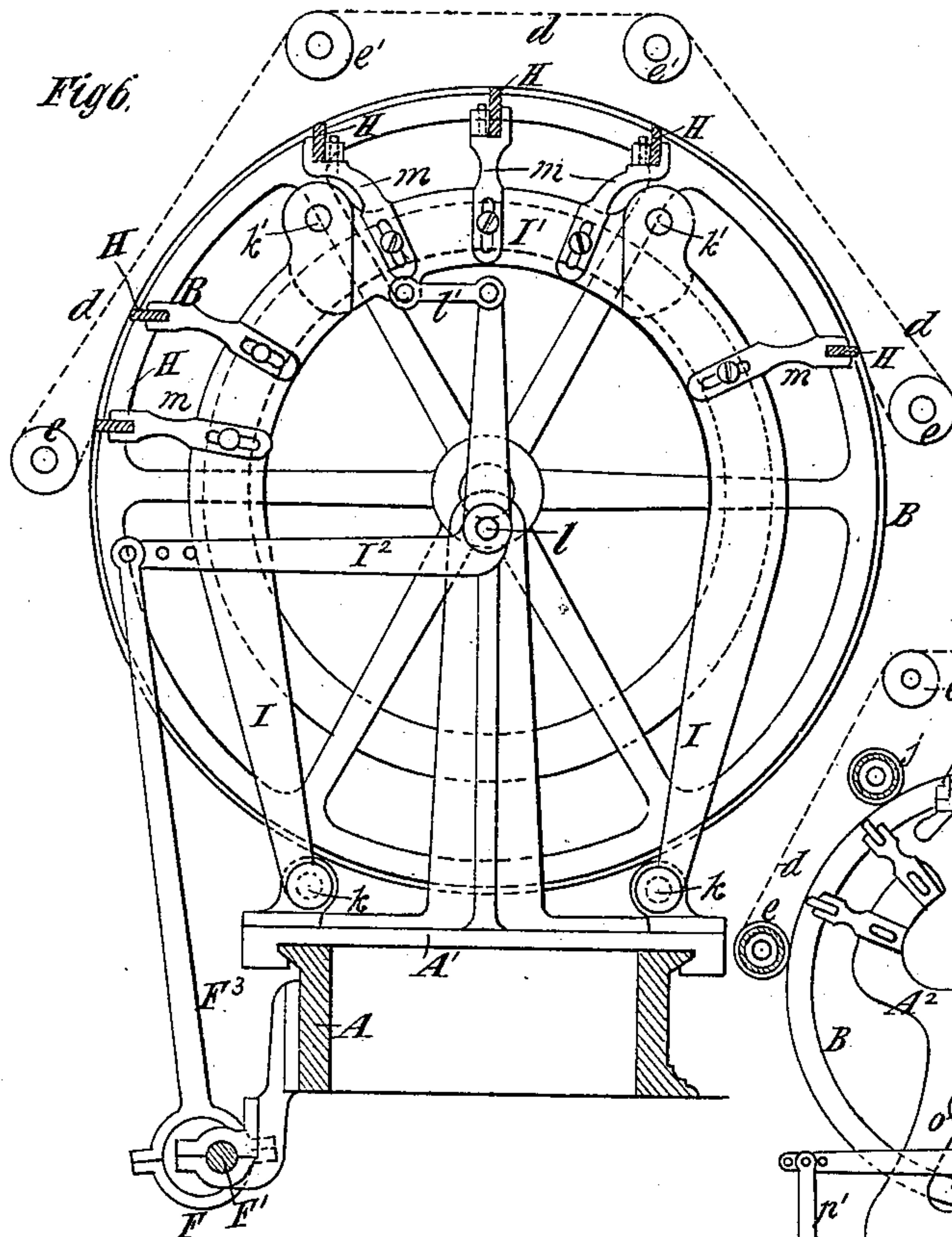
2 Sheets—Sheet 2.

I. E. PALMER.

MACHINE FOR STRAIGHTENING AND FINISHING FABRICS.

No. 270,835.

Patented Jan. 16, 1883.



*Witnesses*  
*Geo. W. Hays*  
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# UNITED STATES PATENT OFFICE.

ISAAC E. PALMER, OF MIDDLETOWN, CONNECTICUT.

## MACHINE FOR STRAIGHTENING AND FINISHING FABRICS.

SPECIFICATION forming part of Letters Patent No. 270,835, dated January 16, 1883.

Application filed December 8, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, ISAAC E. PALMER, of Middletown, in the county of Middlesex and State of Connecticut, have invented certain new and useful Improvements in Machines for Straightening and Finishing Fabrics, of which the following is a specification.

My invention relates to machines for tentering, straightening, and finishing fabrics wherein the side edges or selvages of the fabric are grasped or held by selvage-carrying devices, which, as they move forward, tend to stretch the fabric laterally to bring or keep it to its full width.

The selvage-carrying devices in many machines of this class, and which may be used in carrying out this invention, consist of rotating wheels arranged so that they diverge in the direction in which they carry the fabric, and endless chains or bands which hold the selvages of the fabric upon the wheels; but the construction of these devices is immaterial to my present invention.

The invention consists in the combination, in a machine for finishing fabrics, with selvage-carrying devices and mechanism for operating them, of bars arranged transversely to the length of the fabric between the selvage-carrying devices and mechanism for reciprocating said bars in a direction approximately lengthwise of the fabric as the latter is moved over them, whereby the warp and weft threads are moved on each other and are caused to assume their proper relative positions.

The invention also consists in the combination, in a machine of the kind above described, with selvage-carrying devices and mechanism for operating them, of an upright shaft and mechanism for oscillating it or rotating it alternately in opposite directions, and a bar or bars arranged transversely to the length of the fabric between said selvage-carrying devices and operated by said shaft. The oscillation of said shaft causes the end portions of the bars to move or reciprocate in arc-shaped paths of large radius, and although this reciprocation is not rectilinear it may be considered as in a direction approximately lengthwise of the fabric.

The invention also consists in details of construction hereinafter described.

In the accompanying drawings, Figure 1 represents a transverse vertical section on the dotted line *xx*, Fig. 2, of a machine embodying my invention, certain of the parts, which are immaterial so far as my invention is concerned, being omitted. Fig. 2 represents a plan of the machine, certain parts of the frame being in section. Fig. 3 represents a detail sectional view, hereinafter referred to. Figs. 4 and 5 represent two forms of reciprocating bars which constitute part of my invention. Fig. 6 represents a transverse vertical section of a machine embodying a modification of my invention, certain parts being omitted. Fig. 7 represents a plan of the machine shown in Fig. 6, and Fig. 8 represents a diagram view of a machine embodying another modification of my invention.

Similar letters of reference designate corresponding parts in all the figures.

Referring first to Figs. 1 to 5, inclusive, A designates a bed, and A' base-plates, which are adapted to be adjusted toward and from each other along the bed A by means of a screw, *a*, to suit fabrics of different widths. Upon the base-plates A' are mounted frames A<sup>2</sup>, in which are journaled selvage-carrying wheels B, and which have a turn-table connection, S, with the base-plates, so that the wheels B can be adjusted to any desired angle of divergence, as shown in Fig. 2. Each of the selvage-carrying wheels B comprises a bevel-wheel, B'; and *b* designates bevel-pinions engaging with the bevel-wheels B', and mounted on vertical shafts B<sup>2</sup>, to which motion is imparted by bevel-gearing *c* from a main driving-shaft, C. The construction of the frame-work and the selvage-carrying wheels, and the mechanism for driving and adjusting the latter, is all similar to that shown in Reissue Letters Patent No. 9,452, granted to me November 9, 1880, and no further description thereof is necessary.

Above each wheel B is an endless chain or band, *d*, (shown only in dotted lines in Fig. 1,) which passes around or in contact with nearly the whole upper half of the periphery of the wheel, and around pulleys *e e'*. The pulleys *e* are mounted in stationary bearings; but the pulleys *e'* have their bearings in a frame, C', which may be adjusted up or down by a regulating-



screw,  $e^2$ , to put more or less tension on the chain or band. The fabric  $f$  passes under a bar or roller,  $f'$ , as seen in dotted lines in Fig. 1, and its selvages pass between the wheels B and their adjacent chains or bands  $d$ , which give the wheels a hold on the fabric and cause it to move forward at a speed corresponding to the peripheral velocity of the wheels. The fabric  $f$  in leaving the machine passes under a roller,  $f^2$ , and thence may be carried to a beam or roller or to a drying-cylinder, (not here shown,) whereon it is wound; or it may pass over drying-cylinders. The manner of constructing and arranging the chains or bands  $d$ , and adjusting the tension of the same, as above mentioned, is similar to that shown and described in Letters Patent No. 164,026, granted June 1, 1875, to William H. Palmer, Jr., and needs no further description here; but in lieu of chains or bands the selvage-carrying wheels B may be provided with pins or teeth or be covered with card clothing to give them a hold on the fabric, or indeed any other equivalent selvage-carrying devices may be employed in place of the wheels B.

I will now describe the mechanism whereby a positive reciprocating motion is given to the fabric between the selvages, and which embodies my invention.

D designates an arch or frame erected midway between the wheels B and supported on a base-plate,  $A^3$ , which rests on the bed A; and E designates a vertical shaft, having a bearing therein, as shown clearly in Fig. 1. Upon this shaft is fixed a bevel-pinion,  $g$ ; and  $g'$  designates a toothed sector, engaging with said pinion and forming one arm of a bell-crank lever,  $E'$ , which is fulcrumed at  $g^2$  to the frame or arch D.

F designates an eccentric upon a counter-shaft,  $F'$ , which is driven by a belt,  $F^2$ , from the main shaft C, and the said eccentric is connected by a rod,  $F^3$ , with the bell-crank lever  $E'$ , so as to operate it. The counter-shaft  $F'$  is arranged slightly below and at the back of the bed A. By this or any other suitably-arranged and equivalent mechanism the vertical shaft E has a short rotary motion imparted to it alternately in opposite directions, or is oscillated. Upon the upper end of the shaft E is secured a plate or T-shaped head,  $h$ , (shown best in Fig. 4,) and upon this is secured a bar, G, of wood or other material, which is swung back and forth in a horizontal plane as the shaft E is oscillated. On each side of the bar G is arranged a bar,  $G'$ , which may have a curved profile, as shown in Fig. 2, or may be straight, like the bar G, and it is secured to a plate,  $h'$ , which has a screw-threaded shank,  $h^2$ .

To the arch or frame D are secured brackets  $i$ , which are bolted thereto, and the bolts preferably pass through slots in the frame, to enable the brackets to be adjusted slightly toward or from the shaft E.

To each bracket  $i$  is pivoted a socket-piece,

$i'$ , and the bolts  $i^2$ , on which the socket-pieces may be swiveled, serve to clamp them at any angle relatively to the brackets  $i$  to which they may be adjusted. In each socket-piece  $i'$  is a nut,  $i^3$ , which is secured in place by a pin,  $i^4$ , in the socket, entering a circumferential groove in the nut, as best seen in Fig. 3, thereby holding the nut in the socket so that it may be freely turned therein. Each nut  $i^3$  receives the stem or shank  $h^2$  of the plate  $h'$ , on which the bar  $G'$  is fastened; and it will be readily seen that by turning these nuts the bars  $G'$  may be adjusted up or down, while by swinging the socket-pieces  $i'$  on the bolts  $i^2$  the bars may be brought nearer to or moved away from the middle bar, G, and made to operate in a plane at a greater or less angle to the horizontal.

On the plates  $h$   $h'$  of the bars G  $G'$  are a number of downwardly-projecting studs or pins,  $i^5$ , and both the bars  $G'$  may be connected with the bar G by leather straps  $i^6$  or other connections, as clearly seen in Fig. 2, so that they will derive motion from said bar.

It will be seen from the above that all three bars G  $G'$  may be oscillated in a horizontal plane; or the bar G may be oscillated and the bars  $G'$  and any additional similar bars oscillated in a plane at any desired angle to the horizontal.

I deem it desirable to give the bars  $G'$  the curved profile, shown because they will present a greater length of surface for acting on the fabric than would a straight bar, and will be more effective in properly placing the warp and weft threads of the fabric relatively to each other after they have been displaced by starching or other operations.

The straps  $i^6$  may be adjusted on the pins or studs  $i^5$  nearer to or farther from the center of oscillation of the bars G  $G'$ , so as to transmit to the latter bars a greater or less movement as the fabric is carried over them. The selvage-carrying devices, which are divergent from each other, stretch the fabric in the direction of its width, as is common in machines of this class. The end portions of the bars are caused to reciprocate in a direction approximately lengthwise of the fabric, and as they move backward and forward they drag upon or over the fabric, and tend to produce in the fabric a corresponding reciprocating motion. This action on the fabric is very effective in straightening the threads and bringing the warp and weft threads into proper relation to each other, and as the bars are arranged transversely to the length of the fabric they act upon the fabric through or across a large part of its width.

In connection with the bars G  $G'$ , a stationary friction surface or drag over which the fabric is moved may be used. Such a drag is represented as composed of sectional bars H, connected at their outer ends to arches or frames  $D'$ , and slotted so that they may be adjusted in length to suit any angle of divergence of the wheels B or width of fabric. The meeting



ends of the bars H are connected or jointed to screws  $i^7$ , which are fitted in brackets  $i^8$ , bolted fast to the arch or frame D. The screws  $i^7$  are provided with nuts  $i^9$ , which may be adjusted to cause the screws to project more or less from the brackets  $i^8$ . Hence it will be seen that by adjusting these nuts the meeting ends of the bars H can be bowed out more or less, so that the fabric passing over them will be stretched more or less in the direction of its width or laterally.

In connection with the oscillating bars G', I may employ rollers  $j$  opposite each selvage of the fabric. These rollers are pivoted to brackets  $j'$ , bolted to the frames A<sup>2</sup>. The rollers  $j$  extend across from one frame A<sup>2</sup> to the other, and are telescopic, so as to accommodate themselves to the different degrees of divergence of the frames A<sup>2</sup>, as do the rollers shown and described in Letters Patent No. 164,026, granted June 1, 1875, to William H. Palmer, Jr. The fabric and the carrying or active portions of the bands or chains  $d$  pass between the rollers and the wheels B. The rollers  $j$  of course prevent the bulging or stretching of the fabric outward at the points where they are placed. As the ends of the bars G' approach the rollers  $j$  the fabric, is prevented by the rollers from bulging up or stretching in advance of the bars, and hence the bars, as they reach the end of their movement, exert a sharp pull on the fabric, which is very effective in straightening the warp and weft threads. In lieu of these bars G G', a single bar or any number greater than one may be used.

Referring now to Figs. 6 and 7, the construction and arrangement of the bed A, the selvage-carrying wheels B, the chains or bands  $d$ , and its rollers  $e e'$  are all similar to that first described with reference to Figs. 1 to 5.

Midway between the wheels B is an arch or frame composed of two end portions, I, and a center or top portion, I', as clearly seen in Fig. 6. The two portions I are fulcrumed at  $k$ , and the portion I' is pivoted to them at  $k'$ , so that the frame is adapted to be swung back and forth on the centers  $k$  in the direction in which the fabric is moved.

I<sup>2</sup> represents a bell-crank lever, fulcrumed at  $l$ , one arm of which is connected by a link,  $l'$ , with the portion I' of the arch or frame, while the other arm is connected by a rod, F<sup>3</sup>, with an eccentric, F, on a shaft, F', whereby the frame or arch I I' is reciprocated or swung back and forth.

H designates sectional bars, which are loosely connected at their outer ends with the frames or arches D' and at their inner ends to brackets  $m$ , secured to the arch or frame I I', and as said arch or frame is moved back and forth the connected ends of the sectional bars H are reciprocated and caused to act on the fabric. The bars H have an effect very similar to that of the bars G G', previously described.

In the modification of my invention shown

in Fig. 8 two bars,  $n$ , are fixed in a frame,  $n'$ , which is supported by arms or swinging uprights  $n^2$ , fulcrumed at  $o$  to the frame A<sup>2</sup>. The frame  $n'$ , with its bars  $n$ , is reciprocated by an arm or lever,  $p$ , which receives motion through a rod,  $p'$ , from an eccentric,  $p^2$ , as clearly shown.

It will be seen that in all the examples of my invention here shown the bars which are between the selvage-carrying wheels, or certain of them, have a positive reciprocating motion imparted to them in a direction which is approximately lengthwise of the fabric, and as the fabric is drawn tightly over them they tend to produce a corresponding motion of the fabric, and thereby are very effective in causing the warp and weft threads to assume their proper relative positions.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with selvage-carrying devices and mechanism for operating them, of bars arranged transversely to the length of the fabric between the selvage-carrying devices, and mechanism for reciprocating said bars in a direction approximately lengthwise of the fabric as the latter is moved over them, substantially as and for the purpose described.

2. The combination, with selvage-carrying wheels and chains or bands and mechanism for rotating said wheels, of bars arranged transversely to the length of the fabric between said wheels, and mechanism for reciprocating said bars in a direction approximately lengthwise of the fabric as the latter is moved over them, substantially as and for the purpose described.

3. The combination, with selvage-carrying devices and mechanism for operating them, of an upright shaft and mechanism for oscillating it or rotating it alternately in opposite directions, and a bar or bars arranged transversely to the length of the fabric between said selvage-carrying devices and operated by said shaft, substantially as and for the purpose described.

4. The combination, with the selvage-carrying wheels B, chains or bands  $d$ , and mechanism for operating said wheels, of the shaft E and mechanism for operating it, the bar G, fixed thereto, the bars G' on opposite sides thereof, and the connections  $i^6$ , all substantially as specified.

5. The combination, with the wheels B, mechanism for operating them, and the chains or bands  $d$ , of the shaft E, the bars G G' G', the connections  $i^6$ , the rollers  $j$ , and the frames A<sup>2</sup>, all substantially as specified.

6. The combination of the bar G' and its screw  $h^2$ , the bracket  $i$ , the socket-piece  $i'$ , swiveled thereto, and the nut  $i^3$ , substantially as specified.

ISAAC E. PALMER.

Witnesses:

FREDK. HAYNES,  
EDWARD GLATZMAYER.