(No Model.) 4 Sheets—Sheet 1.

R. WESTPHAL.

MACHINE FOR POLISHING PAPER, TEXTILE FABRIC, &c.

No. 274,685. Patented Mar. 27, 1883.

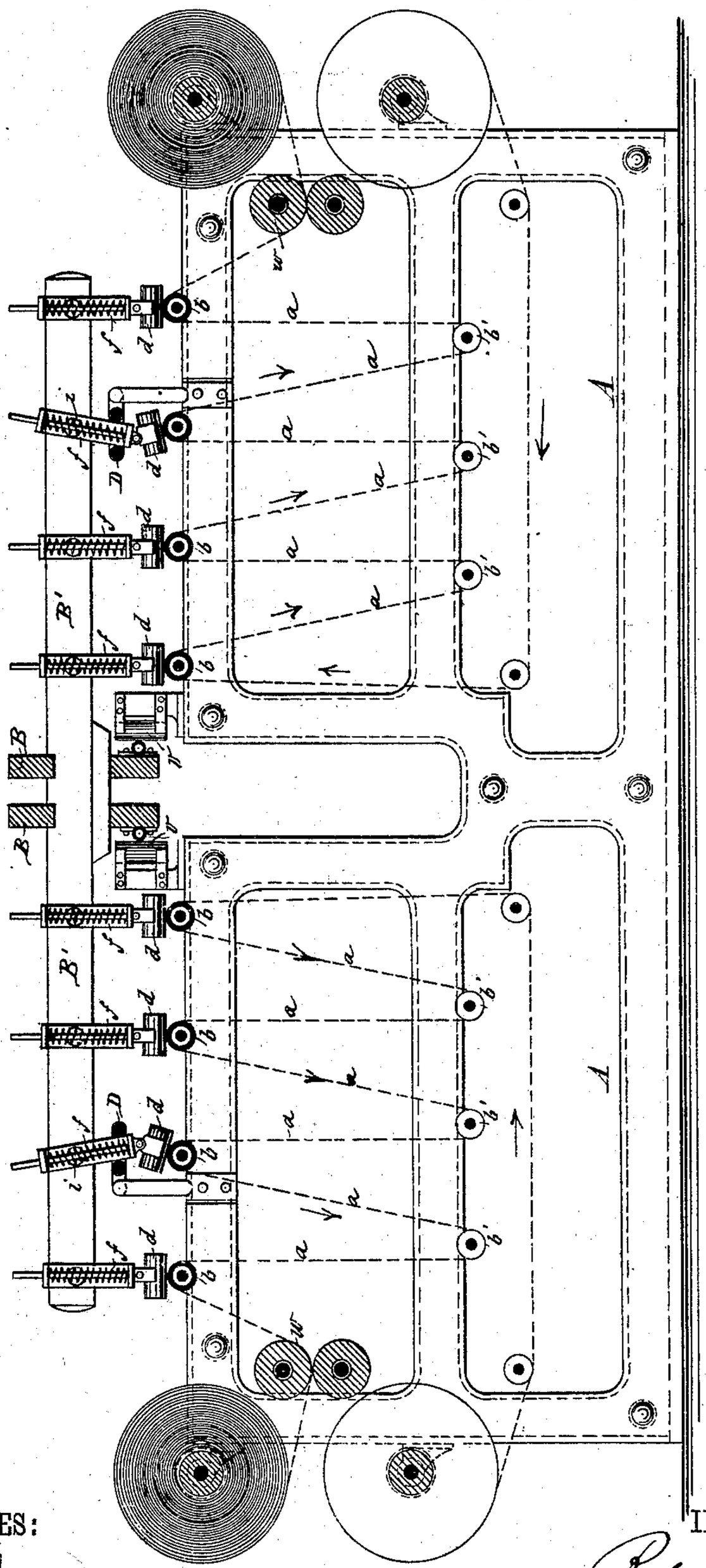

Fig. 1.

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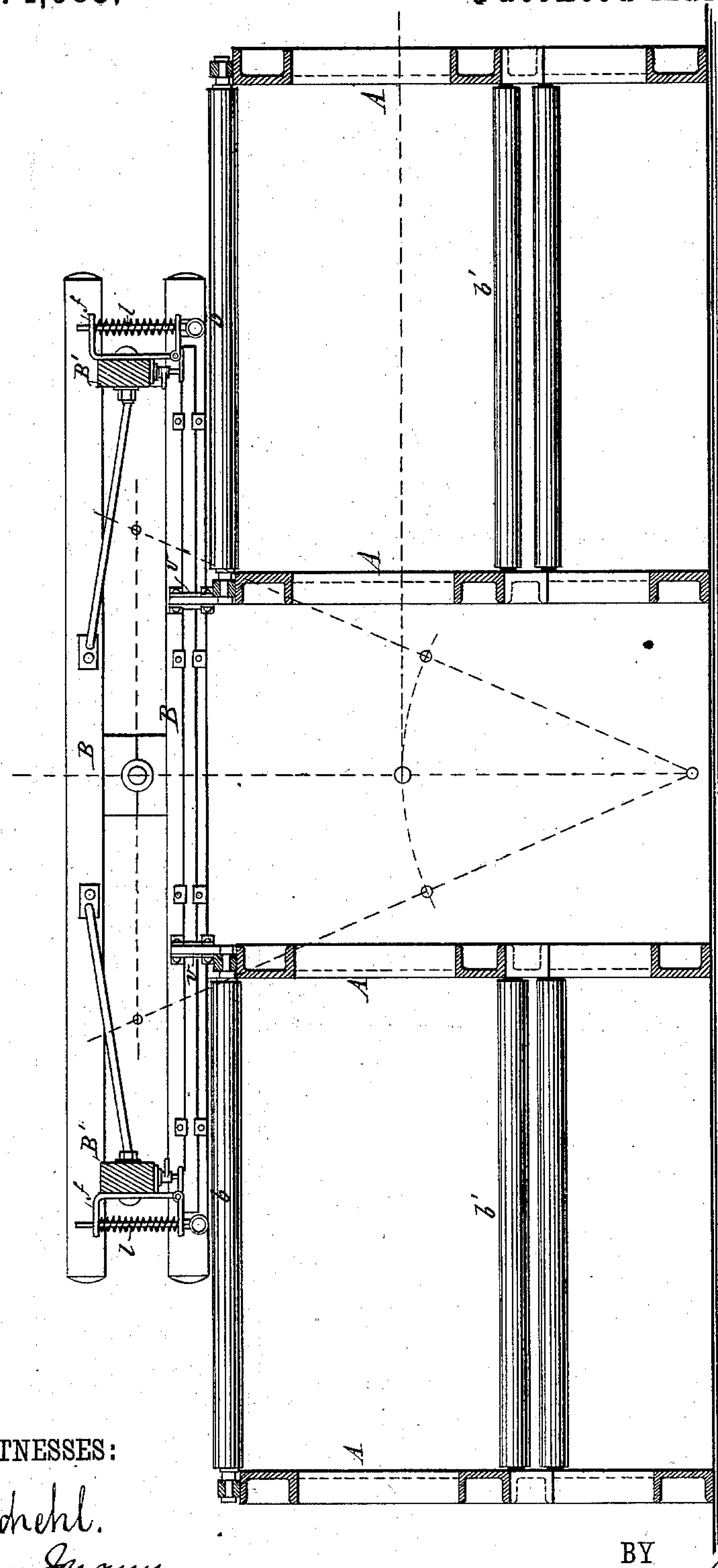
Fig. 2.



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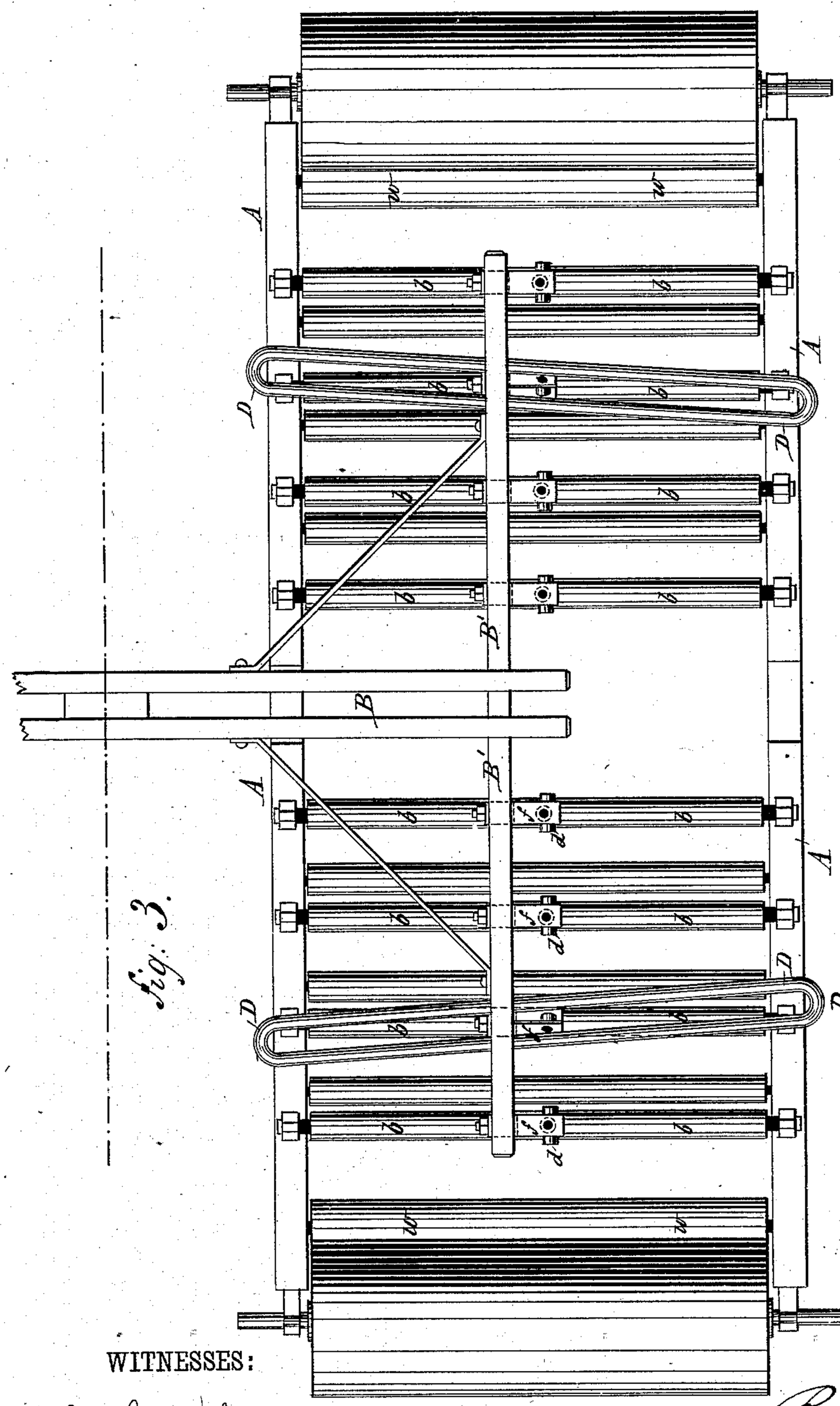

Fig. 3.

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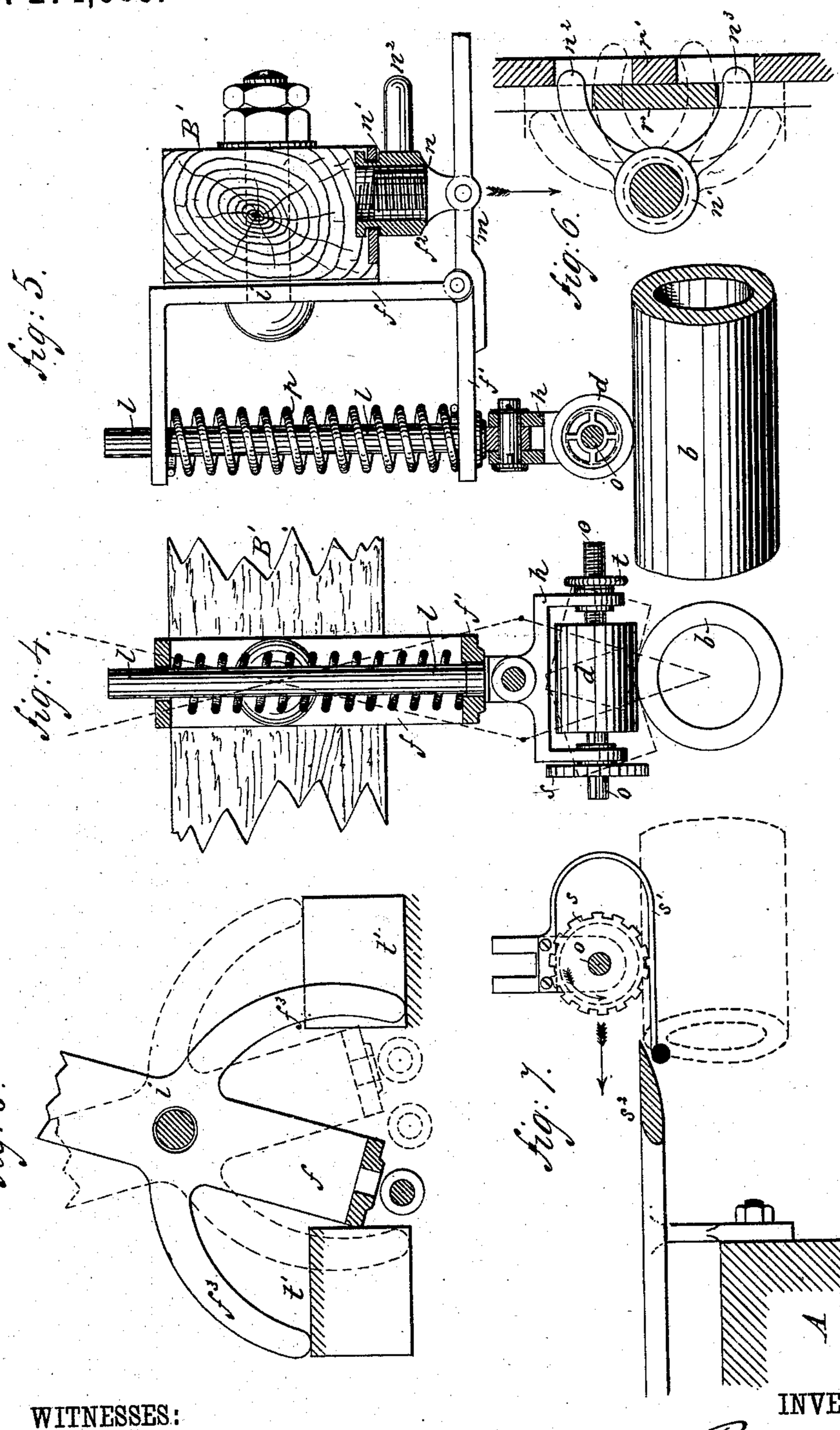

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UNITED STATES PATENT OFFICE.

ROBERT WESTPHAL, OF BERLIN, GERMANY.

MACHINE FOR POLISHING PAPER, TEXTILE FABRIC, &c.

SPECIFICATION forming part of Letters Patent No. 274,685, dated March 27, 1883.

Application filed January 29, 1883. (No model.)

To all whom it may concern:

Be it known that I, ROBERT WESTPHAL, a subject of the Kingdom of Prussia, residing at the city of Berlin, in the Kingdom of Prussia, German Empire, have invented certain new and useful Improvements in Machines for Polishing Paper, Textile Fabrics, &c., of which the following is a specification.

This invention has reference to a machine for polishing the surface of paper, textile fabrics, &c., in a rapid and uniform manner; and it consists of a number of guide-rollers, of glass or other suitable material, over which the fabric is successively drawn, and of small polishing-rolls, of similar hard material, which are passed transversely to the direction of motion of the fabric and pressed down upon the same by the weight of their supporting-frame. The polishing-rolls are supported in forks pivoted to the lower ends of spring-acted shanks, which are guided in oscillating brackets secured to the supporting-frame. Some of the brackets are guided along transverse rails that are placed at a slight angle of inclination to the guide-rollers, so that the polishing-rolls are moved in inclined position over the paper or other fabric.

The invention consists, further, of certain details of construction, which will be more fully pointed out hereinafter.

In the accompanying drawings, Figure 1 represents a vertical longitudinal section through one-half of my improved machine for polishing paper, textile fabrics, and similar fabrics. Fig. 2 is a vertical transverse section through the entire machine; Fig. 3, a plan of one-half of the machine; and Figs. 4, 5, 6, 7, and 8 are details of some of the working parts of the same.

Similar letters of reference indicate corresponding parts.

A represents the supporting-frame of my improved machine for polishing paper and other fabrics, which is constructed of two symmetrical parts, upon each of which a number of guide-rollers, *b b*, of glass or other suitable hard material, are supported, that turn in bearings at the top part of the supporting-frame A. The guide-rollers of each half of the frame A are arranged in two groups, each group working in connection with a set of guide-rollers, *b′ b′*, that are arranged so that the paper or other fabric, *a*, which is to be polished can be conducted simultaneously from four different unwinding-rollers over the four groups of glass rollers *b* and guide-rollers *b′*, arranged on frame, and then between the drawing-rolls *w* to the winding-up rollers, as shown by the arrows in Fig. 1. A polishing action is imparted to the surface of the paper or other fabric that is passed over the glass rollers *b* by means of small cylindrical rolls *d*, which are supported in bearings of fork-shaped frames *h*, pivoted to the lower ends of vertical rods *l*. The rods *l* are guided in bracket-frames *f*, that are applied by pivot-bolts *i* to longitudinal beams B′ B′, which are rigidly connected to transverse beams B B. To the beams B B′ lateral reciprocating motion is imparted by an oscillating lever, as shown in Fig. 2, or by any other suitable mechanism. The polishing glass rolls *d* are moved transversely across the fabric *a*, that is stretched over the guide-rollers *b b′*, and as they are located transversely to the guide-rollers they exert a polishing action upon those parts of the fabric which are at that time at the upper parts of the rollers *b b*. The entire weight of the beams B B′ is thrown upon the polishing-rolls and utilized for exerting the required pressure upon the fabric to be polished. The polishing-rolls *d d* are preferably made of hollow glass cylinders, so that air can freely circulate in them and keep them cool. They are cushioned by spiral springs *p* in their bracket-frames *f* in such a manner that they can readily "give" when passing over uneven portions of the fabric.

By a fixed or pivoted connection with the rods *l*, they can assume either a horizontal or an inclined position to the guide-rollers *b*, and can pass either transversely or obliquely over the paper. When an inclined position of the polishing-rolls *d d* is desired, the fork-shaped supports *h* of the rolls are pivoted to the lower ends of the rods *l*, which latter are guided by transverse parallel rods D, which are supported obliquely to the guide-rollers, as shown in Figs. 1 and 3. The polishing-rolls *d* of the rods *l*, guided between the parallel rods, assume an oblique and inclined position to the rollers *b* and impart a polishing pressure in oblique lines across the paper, while the fixed horizontal rolls exert a pressure along straight transverse lines. By the crossing of these different lines of pressure a perfectly smooth and uniform surface is finally obtained. By properly combining the different polishing-rolls a regular and

perfectly smooth appearance is imparted to the fabric.

The connection of the polishing-rolls *d* and their supports is clearly shown in Figs. 4 and 5. The hollow cylindrical roll *d* is secured by open beads to a shaft, *o*, which revolves in bearings of the fork-shaped support *h*. The latter is pivoted to the rod *l*, which is guided in the upright bracket-frame *f*, that oscillates on the pivot-bolt *i* of beam B′. The lower leg, *f′*, of the bracket-frame *f* is connected by a hinge-joint, f^2, with the vertical part of the bracket. The hinge-joint f^2 serves also as a fulcrum for a lever, *m*, which is pivotally connected to a screw, *n*. This latter engages a threaded sleeve, *n′*, that is capable of axial motion by an annular groove and a bottom plate of the beam B′. The fulcrumed lever *m* is extended below the leg *f′* of bracket *f*, and serves thereby as a support for the leg *f′*. The pressure of the spiral spring *p* upon the lower leg, *f′*, and upon the polishing-roll *d* is adjusted by the screw *n* or entirely dispensed, whenever, for instance, a greater unevenness or a defective portion occurs in the fabric. To remove the pressure from the rolls *d* it is only necessary to exert on the pivoted end of the lever *m* a downward pressure, as indicated by the arrow in Fig. 5, which causes the lifting of the leg *f′* and the raising of the spring *p*. The described motion of the lever *m* is accomplished by simply turning the sleeve *n′*, which, for this purpose, is provided with two fingers, n^2 n^3. (Shown in Figs. 5 and 6.) One of these fingers n^2 n^3 is engaged by a slide-piece, *r*, when the beam-frame B B′ arrives at the end of its laterally-reciprocating motion, so that an axial motion of the sleeve *n′* in one or the opposite direction takes place, as shown in Fig. 6. If the slide-piece *r* is in its central position, the position of the sleeve *n′* is not affected thereby. Consequently it is possible by the simple shifting of the slide-piece *r* on its way *r′* to accomplish an axial turning of the sleeve *n′*. The guide plate or way *r′* is rigidly secured to the frame A of the machine, while the shifting of the slide *r* takes place by hand, as required.

For the purpose of bringing gradually every portion of the surface of the polishing-roll *d* into use the same receives, at the end of each motion of the reciprocating beam-frame B B′, a small turning motion around its axis. For this purpose a ratchet-wheel, *s*, is keyed to the shaft *o*, as shown in Figs. 4 and 7, and retained by a spring-pawl, *s′*, which prevents the turning of the roll *d*. The outer laterally-bent end of the spring-pawl *s′* is engaged at the end of the lateral motion of the beam-frame B B′ by a tapering cheek, s^2, secured to frame A. The cheek s^2 disengages the spring-pawl for a moment from the ratchet-wheel *s*, so that by the friction of the roll *d* on the paper the roll is turned around its axis until the projection of the pawl *s′* can engage the next indentation on the ratchet-wheel *s*. At the return motion of the frame B the bent end of the spring-pawl *s′* passes over the top of the cheek s^2, whereby the spring-pawl is bent, but not released from the ratchet *s*. Besides this axial shifting of the roll *d*, the same can be longitudinally shifted on its shaft *o* by a nut, *t*, applied to the threaded opposite end of the shaft.

It may be remarked that some of the rolls *d* may also be made to roll over the fabric to be polished in the direction of motion of the fabric, or in opposite direction thereto, so that the frictional or polishing action of the rolls is thereby either diminished or increased.

Fig. 8 shows a modified construction of the mechanism by which the brackets *f* may be set in inclined position in place of the transverse guide-rods D D. The bracket *f* is provided in this case with two arms, f^3 f^3, which move along transverse rails *t′*, that are inclined in opposite direction to each other. The beam-frame B B′ is guided in its laterally-traversing motion by glass cylinders *v v* in such a manner that as little friction as possible is produced. After the surface of the paper or other fabric over the rollers *b* is polished by the rolls *d*, the fabric is moved forward over the rollers *b* by the drawing-rolls *w*, and the next adjoining portions polished, and so on until the entire surface of the fabric has been polished.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a machine for polishing paper and other fabrics, the combination of the guide-rollers *b b*, of glass or other suitable hard material, with polishing-rolls *d d*, arranged transversely to the guide-rollers *b*, and with a laterally-traversing beam-frame, B B′, supporting the rolls *d d*, substantially as set forth.

2. In a machine for polishing paper and other fabrics, the combination of the polishing-roll *d* with the fork-shaped support *h*, bracket *f*, having hinged lower leg, *f′*, cushioning-spring *p*, and means for raising or lowering the hinged leg *f′*, so as to remove or apply polishing pressure to the roll, substantially as described.

3. The combination of the guide-rollers *b*, polishing-rolls *d*, fork-shaped supports *h*, pivoted to the rods *l*, bracket-frames *f*, pivoted to the beam B′, laterally-traversing beam-frame B B′, and fixed obliquely-arranged guide-rods D D, substantially as set forth.

4. The combination, with the guide-rollers *b*, of a laterally-traversing beam-frame, B B′, guided by glass cylinders *v v*, the supporting-brackets and the polishing-rolls being applied to the longitudinal beams B′ in such a manner that the entire weight of the beam-frame is used for exerting a polishing pressure on the fabric, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ROBERT WESTPHAL.

Witnesses:

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B. ROI.