(No Model.) 5 Sheets—Sheet 1.

E. D. SWIFT.

SANDPAPERING MACHINE.

No. 444,155. Patented Jan. 6, 1891.

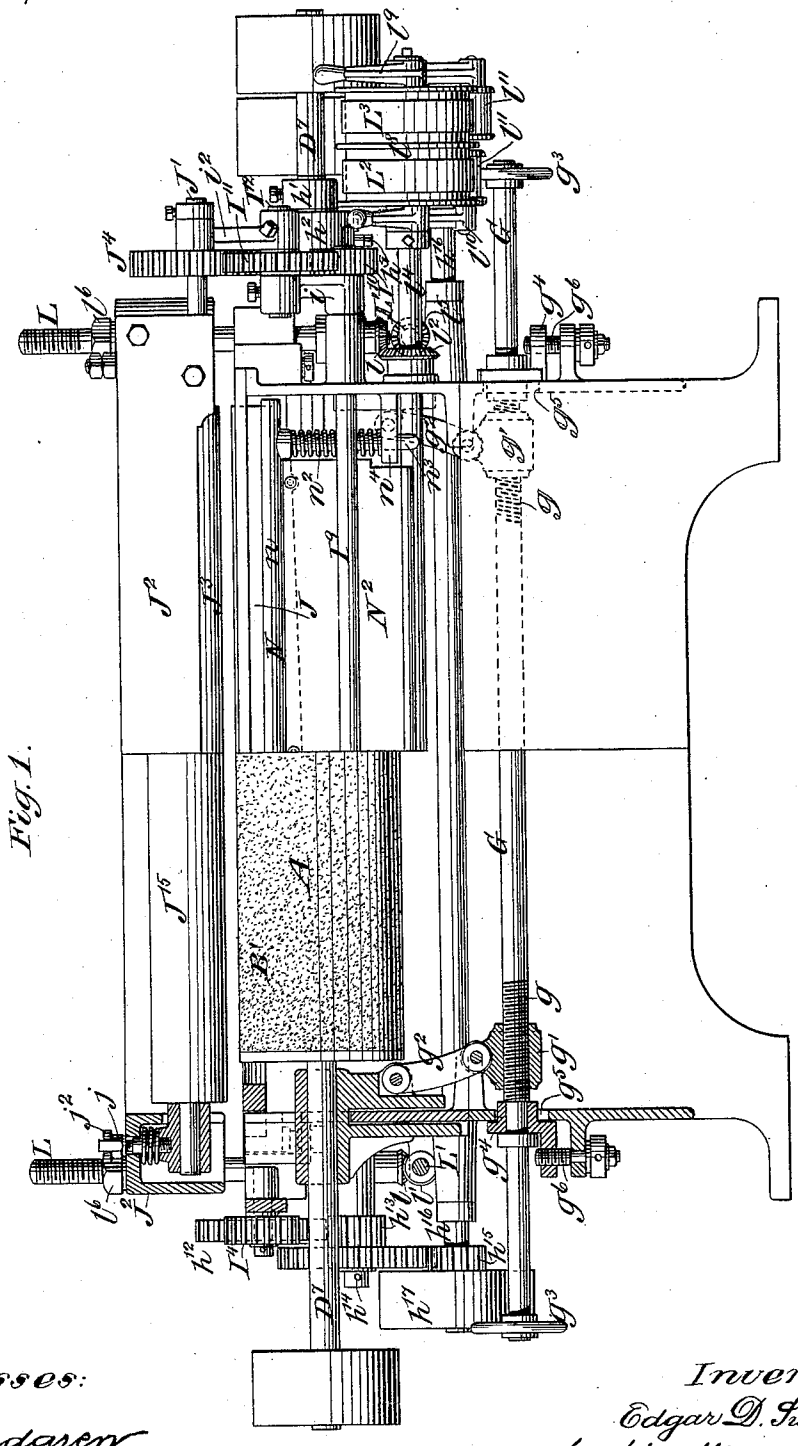


Fig. 1.

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Inventor:
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by his attorneys
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(No Model.) 5 Sheets—Sheet 2.

E. D. SWIFT.

SANDPAPERING MACHINE.

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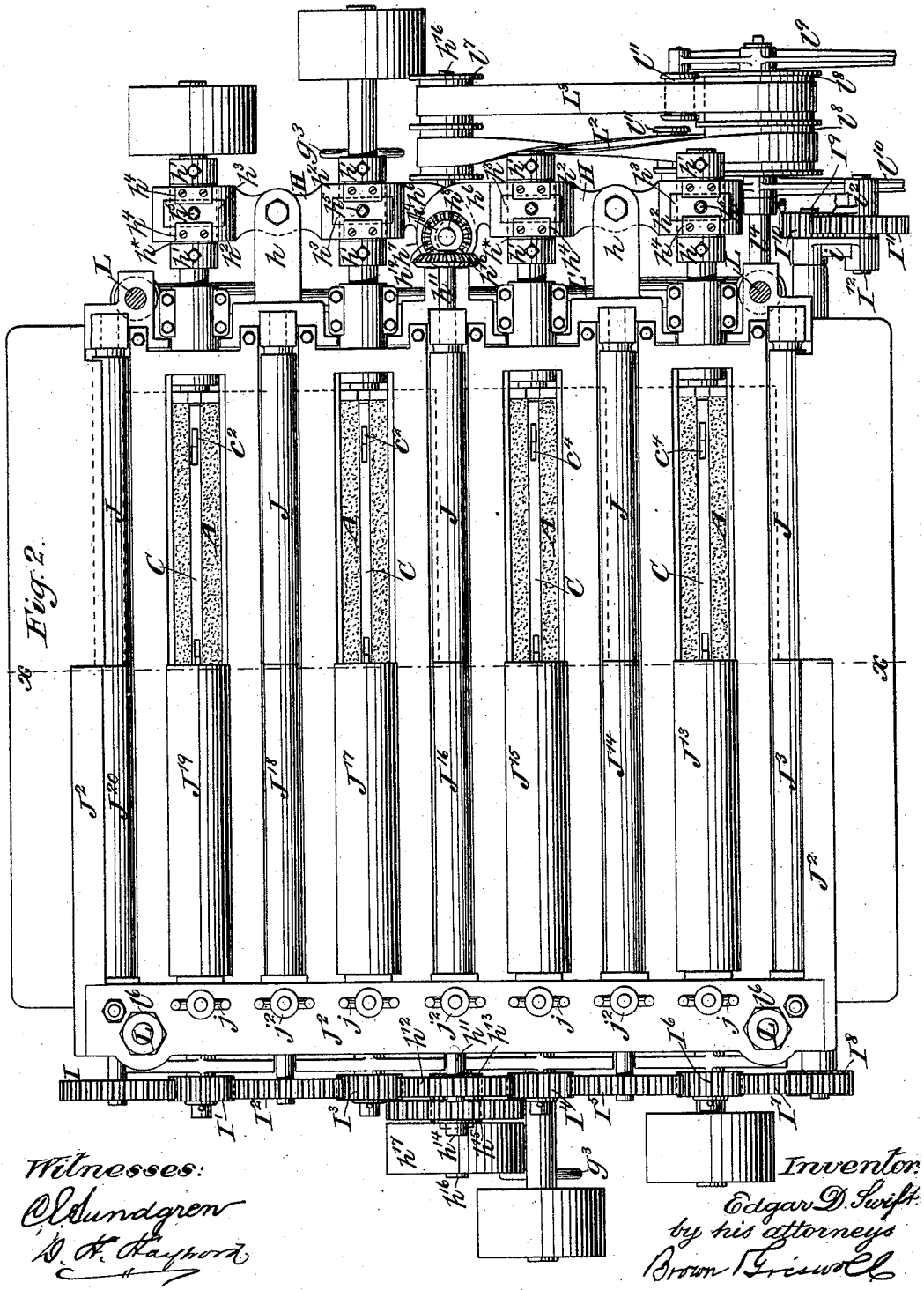


Fig. 2.

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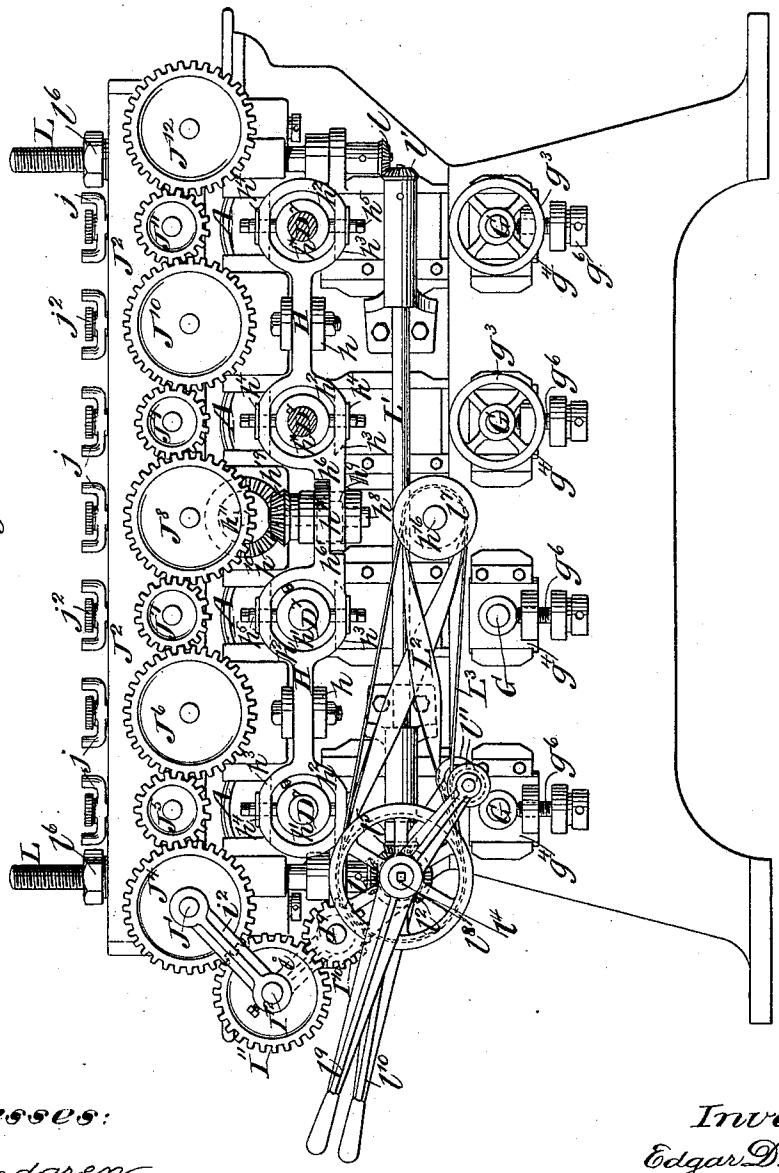
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Fig. 3.



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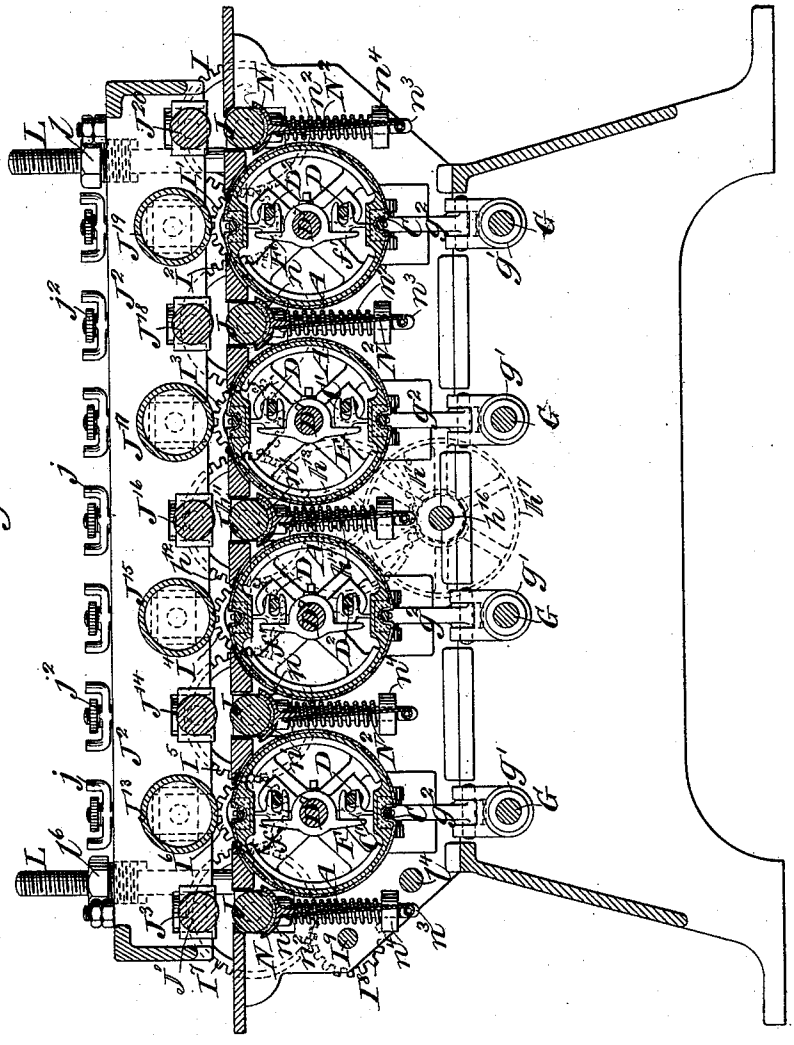
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Fig. 4.



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(No Model.) 5 Sheets—Sheet 5.

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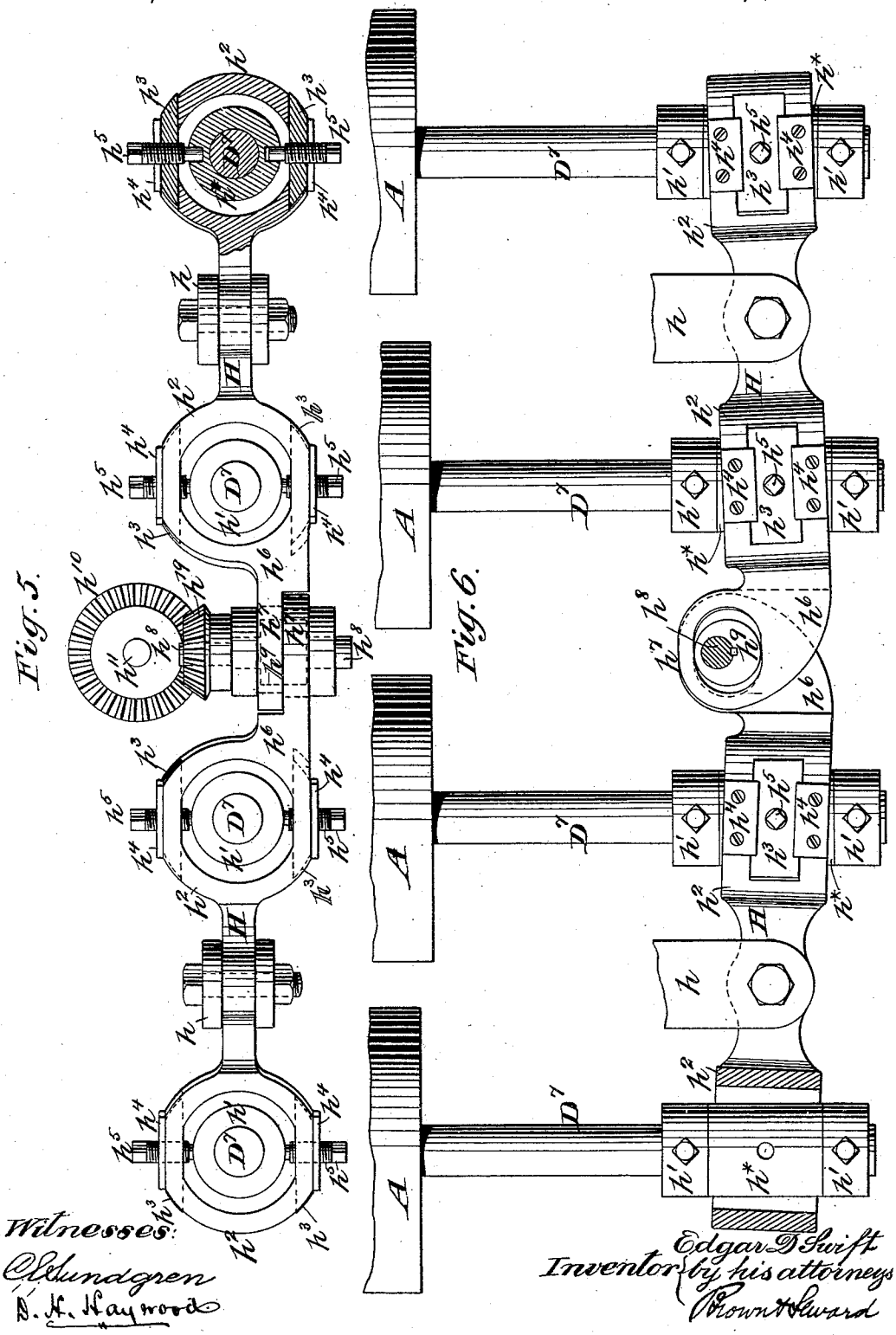


Fig. 5.

Fig. 6.

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UNITED STATES PATENT OFFICE.

EDGAR D. SWIFT, OF NEW YORK, N. Y.

SANDPAPERING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 444,155, dated January 6, 1891.

Application filed November 20, 1889. Serial No. 330,989. (No model.)

To all whom it may concern:

Be it known that I, EDGAR D. SWIFT, of the city and county of New York, in the State of New York, have invented a certain new and useful Improvement in Sandpapering-Machines, of which the following is a specification.

My improvement relates to that class of machines designed for smoothing pieces of wood by means of sand-paper, and is particularly one of that class of machines in which rotary cylinders covered with sand-paper are employed.

I will describe my improvement in detail, and then point out the novel features in claims.

In the accompanying drawings, Figure 1 is an end elevation, partly in section, of a machine embodying my improvement. Fig. 2 is a plan or top view of the same, also partly in section. Fig. 3 is a side elevation. Fig. 4 is a vertical section taken on the line *x x*, Fig. 2. Figs. 5 and 6 represent, respectively, a side elevation and an end view, upon an enlarged scale, of means employed for giving the cylinders their longitudinal movements.

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

In the present example of my improvement I have shown a machine organized to use four sandpapering-cylinders A. Each of the cylinders is vertically adjustable, and the mechanism by which such adjustment is effected is also vertically adjustable.

Referring more particularly to Fig. 1, G designates a screw-shaft provided with reversely-threaded screw portions *g* near opposite ends. Engaging these screw-threaded portions are hollow nuts *g'*. Pivotally connected near one of their ends to the nuts *g'* are links g^2, the other ends of which are pivotally connected to the journal-boxes, in which the shaft D^7 of the cylinder is carried. Each of the shafts G is provided with a hand-wheel g^3. By rotating these shafts the links g^2 will be raised or lowered, due to the movement of the nuts *g'* along the shaft G. Such movement will operate to raise and lower the bearing for each of the cylinders. As the shaft G is reversely screw-threaded and the links g^2 are connected with journal-boxes at both ends of the cylinder, the rotation of the shaft G will cause both ends of the cylinder to be raised or lowered in unison.

It sometimes becomes necessary to give a different adjustment vertically to the cylinder than that provided for by the means just described. In such case I cause the raising and lowering of the shaft G. It will be observed that the shaft G is journaled in boxes g^4, which boxes extend through slots g^5 in the main frame of the machine. Engaging the boxes g^4 are screws g^6. By rotating the screws g^6 the boxes g^4 may be raised or lowered, thus carrying with them the shaft G and elevating or lowering the cylinder with which they operate. By employing two screws g^6, one near each end of the shaft G, either end of the cylinder may be adjusted independently of the other end. These different adjustments provide for bringing the cylinder always to the proper "cutting-point."

The cylinders A not only have a rotary motion, but they also have a longitudinally-reciprocating motion. This is imparted to them by longitudinally moving the shafts D^7, which are permitted for this purpose to slide freely through their journal-boxes. In order to accomplish the longitudinal movement of said shafts and cylinders, I employ levers H, which levers are fulcrumed upon arms *h*, extending from the main frame of the machine. Each lever engages two of the shafts D^7, and when the lever is rocked the two shafts with which it engages are alternately moved in and out. The engagement between the levers and the shafts is effected as follows: Surrounding each of the shafts and rigidly secured thereto are two collars *h'*. The arms of each of the levers are provided with ring-shaped portions h^2, the internal diameter of which is considerably in excess of the diameter of the collars *h'*. Upon the ring-shaped portions h^2 are mounted sliding pieces h^3, adapted to be moved transversely to the axes of said ring-shaped portions through guideways h^4, secured upon the ring-shaped portions. Extending through the sliding pieces h^3 and engaging a loose collar h^* between the collars *h'* are pins h^5. This construction and arrangement provides for the longitudinal movement of the shafts without any binding or friction on the part of the levers. The arms h^6 of the levers are provided with ring-shaped portions h^7, which

ring-shaped portions surround a vertically-extending shaft h^8. Upon this shaft is an eccentric h^9, which rotates within the ring-shaped portions h^7 of the levers. The rotation of this eccentric causes the rocking of the levers H upon their fulcrums, and thus the reciprocation of the cylinders.

The shaft h^8 is rotated as follows: Upon said shaft is a bevel gear-wheel h^{10}, which bevel gear-wheel meshes with another bevel gear-wheel h^{10}, keyed upon a horizontally-extending shaft h^{11}, extending widthwise of the machine. The shaft h^{11} bears upon its other end a gear-wheel h^{12}, which gear-wheel derives motion from a pinion h^{13}, mounted upon a stub-shaft h^{14}, and deriving motion from a pinion h^{15}, mounted upon a shaft h^{16}, which latter shaft derives motion from a pulley h^{17}, driven by a belt in the usual manner. The pulley h^{17}, through the pinions h^{12} h^{13} h^{15}, operates to transmit motion to a train of gear-wheels I, I′, I², I³, I⁴, I⁵, I⁶, and I⁷. The gear-wheels I, I², h^{12}, I⁵, and I⁷ are keyed upon the shafts of a set of lower feed-rolls J, which shafts are journaled in suitable bearings in the lower portion of the frame of the machine. The gear-wheels I′ I³ I⁴ I⁶ are only intermediate gears to make the gear-wheels on the feed-roll rotates in the proper direction. The gear-wheel I⁷ meshes with a gear-wheel I⁸, mounted upon one end of a shaft I⁹, which shaft is journaled in suitable bearings in the frame of the machine and extends from side to side thereof. At its other end said shaft bears a gear-wheel I¹⁰, which gear-wheel meshes with a compensating-wheel I¹¹, loosely mounted upon a shaft I¹², secured in arms i i^2. The arm i is hung near one end upon the shaft I⁹. The arm i^2 is hung near one end upon a shaft J′, which shaft is journaled in an upper presser-roll frame J³ and bears upon it one of a series of feed-rolls J³. Upon the shaft J′ is a gear-wheel J⁴, with which the gear-wheel I¹¹ meshes. When the shaft I⁹ is rotated, motion is transmitted to the gear-wheel J⁴, and from thence to a train of gears J⁵, J⁶, J⁷, J⁸, J⁹, J¹⁰, J¹¹, and J¹² to a series of upper idler and feed rolls J¹³, J¹⁴, J¹⁵, J¹⁶, J¹⁷, J¹⁸, J¹⁹, and J²⁰. All of these rolls are journaled in suitable bearings in the upper presser-roll frame J³. The journal-boxes for said rolls are arranged in vertically-extending slideways and are spring-actuated, as shown more clearly in Fig. 1, so that the rolls will bear with a yielding pressure upon the material being fed through the machine. Hand-nuts j may be rotated to increase or decrease the pressure exerted by said rolls. When adjusted to a proper position, said hand-nuts may be clamped by means of clamping-nuts j^2.

The upper presser-roll frame J³ may be adjusted vertically, so as to adjust all the upper feed and idler rolls in unison toward and from the bed of the machine, so as to accommodate material of different thicknesses under treatment. This adjustment is accomplished in the following manner: Near each corner of the said presser-frame is a vertically-extending screw L. The lower end of these screws are provided with bevel gear-wheels l, which bevel gear-wheels mesh with other bevel gear-wheels l' l^2. The bevel gear-wheels l' are arranged upon horizontal shafts L′, extending lengthwise of the machine and, as shown, upon the outer sides thereof. The bevel gear-wheels l^2 are arranged upon a shaft l^4, extending transversely of the machine. At one of the ends on the shafts L′ are keyed other bevel gear-wheels l^5, which bevel gear-wheels likewise mesh with the bevel gear-wheels l^2. When rotary motion is imparted to the shaft l^4, rotary motion will also be imparted to the bevel gear-wheels l, certain of which, as previously stated, mesh with the bevel gear-wheels l^2, and others with the gear-wheels l' upon the shafts L′. Such motion will cause the raising and lowering of the upper roll-frame, according to the direction in which the screws L are rotated, for the reason that such screws engage screw-threaded nuts l^6, which nuts engage suitably-formed screw-threaded apertures in the upper side of the roll-frame.

In order to cause movement of the frame J³ in different directions, I employ two belts L² L³. These belts pass over pulleys l^7 upon the shaft h^{16}. One of the belts, it will be observed, is crossed, while the other is uncrossed. The belts L² L³ also extend about pulleys l^8, arranged upon the shaft l^4. It will be quite clear that according as one or the other of the belts L² L³ is made to cause the rotation of the shaft l^4 so will the direction of rotation of said shaft be reversed. The reversal of the direction of rotation of such shaft will necessarily cause a reversal in the direction of rotation of the screws L, and consequently a raising or lowering of the upper roll-frame. Normally the belts L² L³ will run slack upon the pulleys l^7 l^8, and no motion will be imparted to the shaft l^4. In order to cause the one or the other of the belts to engage a pulley l^8, I employ belt-tighteners consisting of levers l^9 l^{10}, which levers are pivotally hung upon the shaft l^4. The other arms of these levers bear rolls l^{11}. An examination more particularly of Fig. 3 will show that when either of said levers is rocked in one direction its roll l^{11} will be caused to bind upon a belt L² or L³, as the case may be, and thus tighten the same to cause the rotation of its coacting pulley l^8.

It will be observed by an examination more particularly of Fig. 4 that the nuts l^6, with which the screws L engage, are externally screw-threaded and engage suitable apertures in the roll-frame. By rotating any of the nuts l^6 the roll-frame may be adjusted at its corners into different positions, so as to level it when desired. This adjustment is of course independent of the general adjustment which may be imparted to the roll-frame by the screws L rotating in the nuts l^6.

Referring again to the lower feed-rolls J, it

will be observed that they rotate in suitable apertures formed in the bed of the machine. These rolls are liable to accumulate quantities of dust and dirt during the operation of the machine, and I therefore employ wipers or scrapers, which bear against these rolls and operate to remove the dust and dirt. Such wipers and scrapers are illustrated more particularly in Fig. 4 and are designated by the letter N. They comprise semi-cylindrical portions n, upon the inner sides of which are arranged any suitable elastic wiping material n'. These wipers or scrapers are held in constant contact with the feed-rolls by means of coil-springs n^2, which coil-springs surround spindles n^3, at one end secured to or formed integral with the portions n of the wipers and scrapers and at their other end extending through sockets in arms or projections n^4, extending from the frame of the machine. The rolls, while thus being enabled to yield, will have the wipers or scrapers N constantly forced into contact with them.

Extending downwardly from each of the portions n of the wipers or scrapers are aprons or plates N^2, which aprons or plates are between the sand-paper cylinders. They operate as deflectors or stops to prevent the dust or dirt from one cylinder being thrown upon the surface of another and are advantageous in that they tend to keep the sand-paper cylinders clean.

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

1. In a sandpapering-machine, the combination, with a cylinder for sand-paper, of vertically-movable journal-boxes for said cylinder, links having one of their ends connected to said journal-boxes, a reversely-screw-threaded shaft, and nuts engaging the screw-threads on said shaft and to which said links are connected near their other ends, whereby when said shaft is rotated the said cylinder will be raised or lowered, substantially as specified.

2. In a sandpapering-machine, the combination, with a cylinder for sand-paper, of vertically-movable journal-boxes for said cylinder, links having one of their ends connected to said journal-boxes, a reversely-screw-threaded shaft, and nuts engaging the screw-threads on said shaft and to which said links are connected near their other ends, whereby when said shaft is rotated the said cylinder will be raised or lowered, and independent adjusting devices for raising and lowering said shaft, substantially as specified.

3. In a sandpapering-machine, the combination, with two sandpapered cylinders, of shafts upon which said cylinders are mounted and which are capable of longitudinal movement, a lever fulcrumed between said shafts and having its arm connected to said shafts, a cam for imparting a rocking motion to said lever, so that said cylinders will be reciprocated alternately in opposite directions, and a rotary shaft upon which said cam is mounted, substantially as specified.

4. In a sandpapering-machine, the combination, with two sandpapered cylinders, of shafts upon which said cylinders are mounted and which are capable of longitudinal movement, a lever fulcrumed between said shafts and provided with ring-shaped portions h^2, sliding pieces h^3 on said ring-shaped portions, the collars h', secured upon said shafts, collars h^*, loosely surrounding said shafts, and the pins h^5, extending through said sliding pieces and engaging the collars h^*, substantially as specified.

5. In a sandpapering-machine, the combination, with an upper presser-roll frame in which feed-rolls are journaled, of screw-shafts arranged near the corners of said presser-roll frame, shafts provided with gear-wheels for imparting rotary motion to said screw-shafts to raise and lower said presser-roll frame, a main shaft, pulleys on said main shaft, pulleys on one of the shafts for transmitting motion to the screw-shafts, belts extending between the pulleys on the main shaft and said last-named pulleys, one of which belts is crossed, and two belt-tighteners for bringing either of said belts into operation to cause the rotation of said screw-shafts to raise or lower the presser-roll frame, substantially as specified.

6. In a sandpapering-machine, the combination, with feed-rolls, of spring-actuated wipers acting upon the under sides of said feed-rolls and having an extended contact therewith to remove dust and dirt therefrom, substantially as specified.

7. In a sandpapering-machine, the combination, with an upper presser-roll frame, of externally-screw-threaded hollow nuts engaging said presser-roll frame near the corners thereof, and screw-shafts engaging said nuts internally, substantially as described, whereby when said nuts are rotated said presser-roll frame may be adjusted independently of the screw-shafts, substantially as specified.

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