(No Model.) 2 Sheets—Sheet 1.

H. BORCHARDT.

SPEED REGULATING DEVICE.

No. 246,366. Patented Aug. 30, 1881.

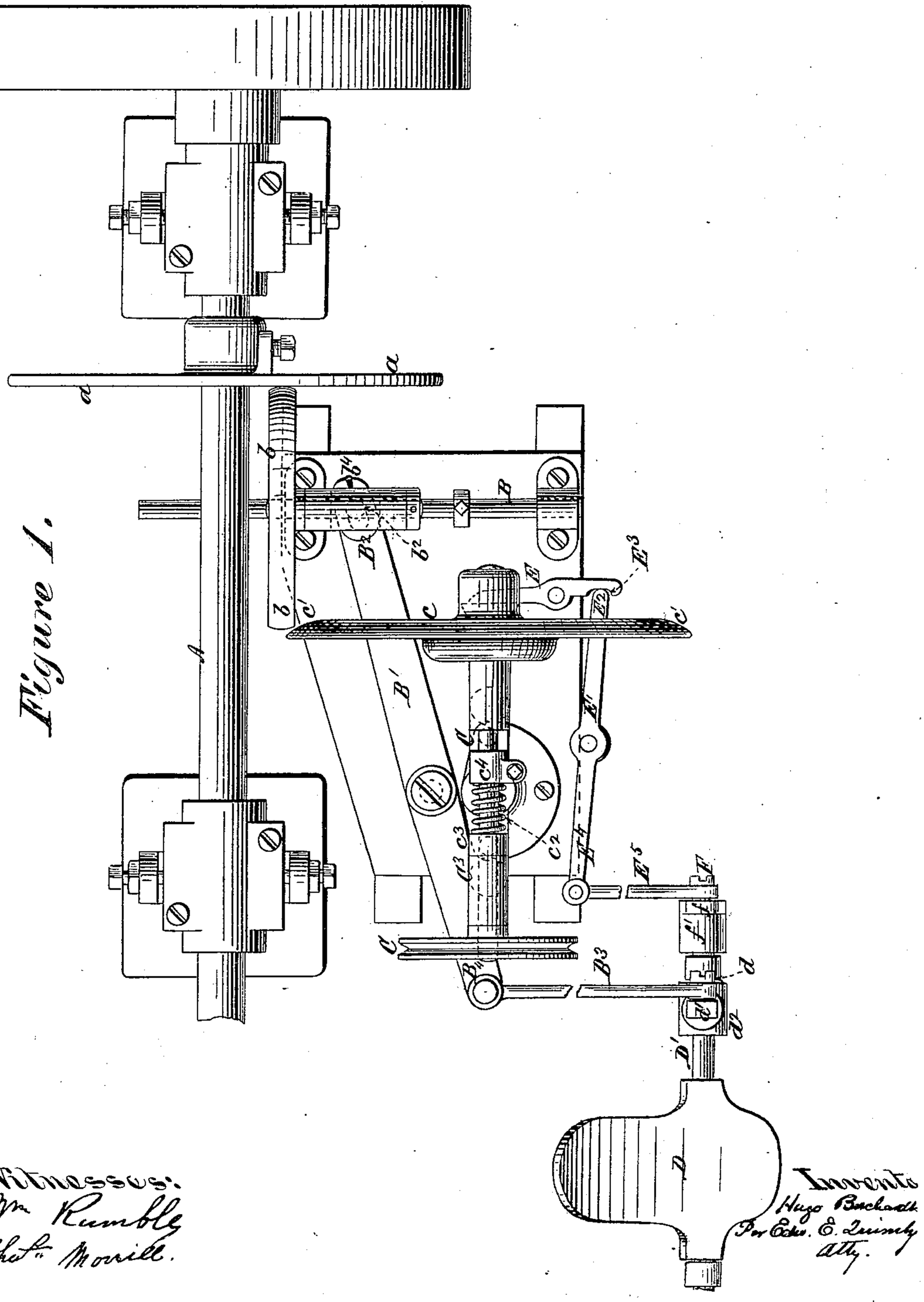

Figure 1.

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(No Model.) 2 Sheets—Sheet 2.

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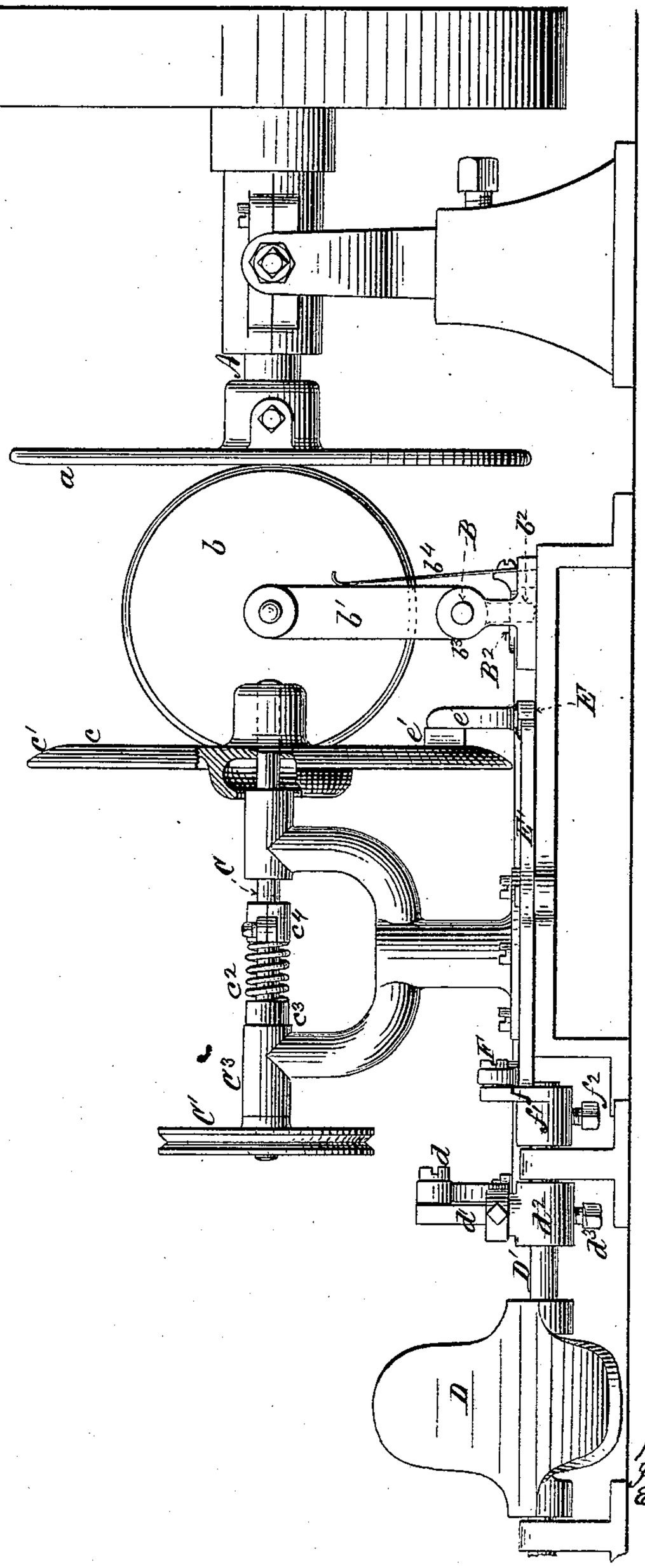
Fig ure 2.



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UNITED STATES PATENT OFFICE.

HUGO BORCHARDT, OF NEW YORK, N. Y.

SPEED-REGULATING DEVICE.

SPECIFICATION forming part of Letters Patent No. 246,366, dated August 30, 1881.

Application filed June 14, 1881. (No model.)

To all whom it may concern:

Be it known that I, HUGO BORCHARDT, of the city and State of New York, have invented certain Improvements in Speed-Regulating Devices for Sewing-Machines, of which the following is a specification.

My improvements relate to that class of speed-regulating devices heretofore extensively employed in connection with sewing-machines in which the operator is enabled to alter the speed of the machine without stopping it by holding a lever in variable positions.

In such devices heretofore the treadle has usually been provided with a retracting-spring, and the variability in the speed of the machine has been attained by pressing the treadle against the force of the spring with different degrees of force, so as to hold the spring in a more or less compressed condition.

One distinctive characteristic of the mode of operation of my improvement is that the treadle for altering the speed of the mechanism is not worked against a spring, and therefore keeps any position in which it may be placed, so that continued pressure upon the treadle is not required in order to preserve the speed of the machine at any given rate.

My invention consists in the combination of a treadle with means for transmitting power to the counter-shaft, carrying the pulley to which the machine is belted, consisting of a friction-disk affixed to a longitudinally-movable shaft and rotating upon an axis at right angles to the axes of the counter-shaft and of the line-shaft, and bearing upon opposite sides of its periphery against the faces of two disks, respectively affixed to the counter-shaft and the line-shaft, the face of the disk of the counter-shaft being held against the periphery of the intermediate friction-disk by elastic pressure. The shaft upon which the intermediate or transfer disk is mounted is so connected with the treadle that it may be moved longitudinally in either direction by rocking the treadle. The movement of the transfer-disk toward the axis of the line-shaft diminishes the diameter of that part of the disk upon the line-shaft which drives the transfer-disk and increases the diameter of that part of the disk upon the counter-shaft which receives its motion from the transfer-disk. On the contrary, when moved in the opposite direction, the diameter of that part of the disk upon the line-shaft which acts upon the transfer-disk is increased, and, on the other hand, the transfer-disk acts upon the disk on the counter-shaft at a point nearer its center, and thus increases the speed of the counter-shaft. The transfer-disk remains in any position in which it may be placed, and the speed of the counter-shaft, and hence the speed of the machine, is therefore constant so long as the treadle is not moved. The frictional hold of the transfer-disk upon the disk on the counter-shaft is maintained by an expanding spiral spring on the counter-shaft, which constitutes a part of my invention. In case of a sudden strain upon the machine this spring will yield and allow the transfer-disk to slip over the surface of the counter-shaft disk. In connection with this spring, and to enlarge the capacity of the machine to which the apparatus is applied, I arrange a withdrawing-lever, which can be, if desired, connected with and operated by the treadle-shaft.

In doing a class of work in which no systematic variation in the speed of the machine is required, I may disconnect from the treadle the shaft of the transfer-disk and connect it with the withdrawing-lever, by the action of which the disk on the counter-shaft is withdrawn from contact with the periphery of the intermediate disk whenever it is desired to stop the machine.

My speed-regulator may be usefully employed for sewing-machines or for any other class of partially-automatic machines in which the services of an operator are required, and in which contingencies are liable to arise requiring variations in the speed of the machine.

The accompanying drawings, representing my speed-changing mechanism, are as follows: Figure 1 is a top view. Fig. 2 is a front elevation, partly in section.

The drawings represent a line-shaft, A, for rotating continuously at a given speed. The line-shaft is provided with a disk, *a*, the side of which engages the periphery of the transfer-disk *b*, the shaft of which is seated in an arm, *b'*, affixed to the longitudinally-sliding bar B. The periphery of the transfer-disk *b* is preferably covered with leather or some other par-

tially-elastic material. The transfer-disk is rotated by the engagement of its periphery with the face of the driving-disk *a*.

The counter-shaft C is provided with the disk *c*, which, it will be seen, has a dished edge, *c'*. The object in dishing the edge of the disk *c* is to release it from engagement with the periphery of the transfer-disk *b* when the transfer-disk is pushed inward to a point opposite the dished part of the disk *c*. When the position of the transfer-disk *b* is such that it engages both the disk *a* and the disk *c* the counter-shaft C is rotated with greater or less speed according to the ratio of the distances of the axes of the disks *a* and *c* from the points of their engagement respectively with the transfer-disk *b*. The counter-shaft is provided with the pulley C' for engaging the belt which drives the machine. The expanding spiral spring c^2, surrounding the counter-shaft C, bears at one end upon the washer c^3, supported against the end of the journal C^3, and at the opposite end bears against the clamp-collar c^4 and thrusts the disk *c* into the position in which it is represented in the drawings, in which, as will be seen, the transfer-disk is pushed inward to a point opposite the dishing part *c'* of the disk *c*, and is not in contact therewith. When the transfer-disk is pulled outward, so as to engage the face of the disk *c*, the spring c^2 yields, allowing the disk *c* to move back.

The sliding movement of the transfer-disk is effected by moving the slide-bar B, to which the arm *b'* is affixed. This is effected by means of the rocking lever B', the slotted end B^2 of which loosely engages the pin b^2, projecting downward from the hub b^3 of the arm *b'*, in the upper end of which the shaft of the transfer-disk *b* is journaled. A spring, b^4, attached to the end B^2 of the lever B', tends to push the arm *b'* over, so as to remove the transfer-disk from contact with the driving-disk *a* when the transfer-disk is opposite the dished edge of the counter-shaft disk *c*, and the machine is not in use.

The oscillation of the lever B' is effected by means of the treadle D, through the pitman B^3, affixed at one end to the end B^4 of the lever B', and at the other end to the pin *d*, inserted transversely in the arm *d'*, projecting upward from the hub d^2, through which the treadle rock-shaft D' passes, and which is provided with a set-screw, d^3, by which it may be fastened to and made to move with the rock-shaft D'.

In some classes of work in which it may not be necessary to vary the position of the transfer-disk from that in which it imparts a prescribed speed of rotation to the counter-shaft, and in which the spiral spring c^2 affords all the necessary protection against a sudden strain on the machine, the hub d^2 may be loosened from the treadle rock-shaft D' by unscrewing the set-screw d^3, and the motion of the machine may be arrested, when required, by means of the withdrawing-lever E, provided at its inner end with the upward projection, *e*, carrying the brake-block *e'*, which is made to bear upon the face of the disk *c*, and to push the disk backward out of engagement with the transfer-disk by means of the rocking-lever E', one end, E^2, of which is seated in the curved recess E^3, formed in the edge of the withdrawing-lever E, while the other end, E^4, of the rocking-lever, E', is connected by means of the pitman E^5 with the pin F, inserted transversely into the arm *f*, projecting upward from the hub *f'*. The treadle-shaft D' is inserted through the hub *f'*, which is provided with the set-screw f^2, by means of which it can be fastened to and made to move with the treadle-shaft D'.

It will, of course, be understood that when the transfer-disk is to be used for varying the speed of the machine the set-screw f^2 will be loosened, so that the rocking of the treadle-lever will have no effect upon the train of mechanism which actuates the withdrawing-lever; and, vice versa, when the withdrawing-lever is to be used, the set-screw d^3 will be loosened, in order that the treadle-lever may not act upon the hub d^2, which actuates the system of levers for changing the position of the transfer-disk.

I claim as my invention—

1. In a speed-regulator for sewing-machines and other purposes in which power derived from a disk affixed to the line-shaft is transmitted to a disk affixed to a parallel shaft having the capacity of endwise movement, a transfer-disk rotating upon an axis perpendicular to the axis of the other disks, and in the same plane, and having the capacity of axial movement in a path midway between the other two disks, in combination with a rocking-lever, and a treadle connected with the rocking-lever, for the purpose of imparting axial movement in either direction to the transfer-disk, thereby varying the position of its points of engagement, respectively, with the disk on the line-shaft and the disk on the counter-shaft, substantially as for the purposes set forth.

2. The counter-shaft C, provided with the spiral spring c^2, and having affixed to it the disk *c*, in combination with the transfer-disk *b* and the driving-disk *a*, substantially as and for the purposes set forth.

3. The disk *c*, upon the counter-shaft C, provided with the dished edge *c'*, in combination with a transfer-disk *b*, and means for moving the transfer-disk *b* in a path perpendicular to the axis of the counter-shaft C, substantially as and for the purpose set forth.

4. The transfer-disk *b*, journaled in the upper end of the arm *b'*, affixed to the slide-bar B, in combination with the spring b^4, and means for moving the transfer-disk *b* into or out of a position opposite the dished edge of the counter-shaft disk *c*, as and for the purpose set forth.

5. The counter-shaft C, having the capacity of endwise movement, and provided with the spring c^2, in combination with the withdrawing-lever E, carrying the brake-block *e'*, and means, substantially such as described, for operating the withdrawing-lever for the purpose of disengaging the face of the disk *c* from the

periphery of the transfer-disk *b*, substantially as described.

6. The hub d^2, provided with the set-screw d^3, and connected with the rocking-lever B′, for imparting longitudinal movement to the axis of the transfer-disk, in combination with the treadle-shaft D′, inserted through the hub f', provided with the set-screw f^2 and connecting with the rocking-lever E′, for operating the withdrawing-lever E, substantially as described.

7. In a speed-regulator consisting of an axially-movable transfer-disk driven by the engagement of its periphery with a constantly-rotating disk, and operating to drive a counter-shaft by the engagement of its periphery with the disk affixed to such counter-shaft, a spring for holding such counter-shaft disk against the periphery of the transfer-disk with a yielding pressure, substantially as and for the purpose set forth.

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Witnesses:
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