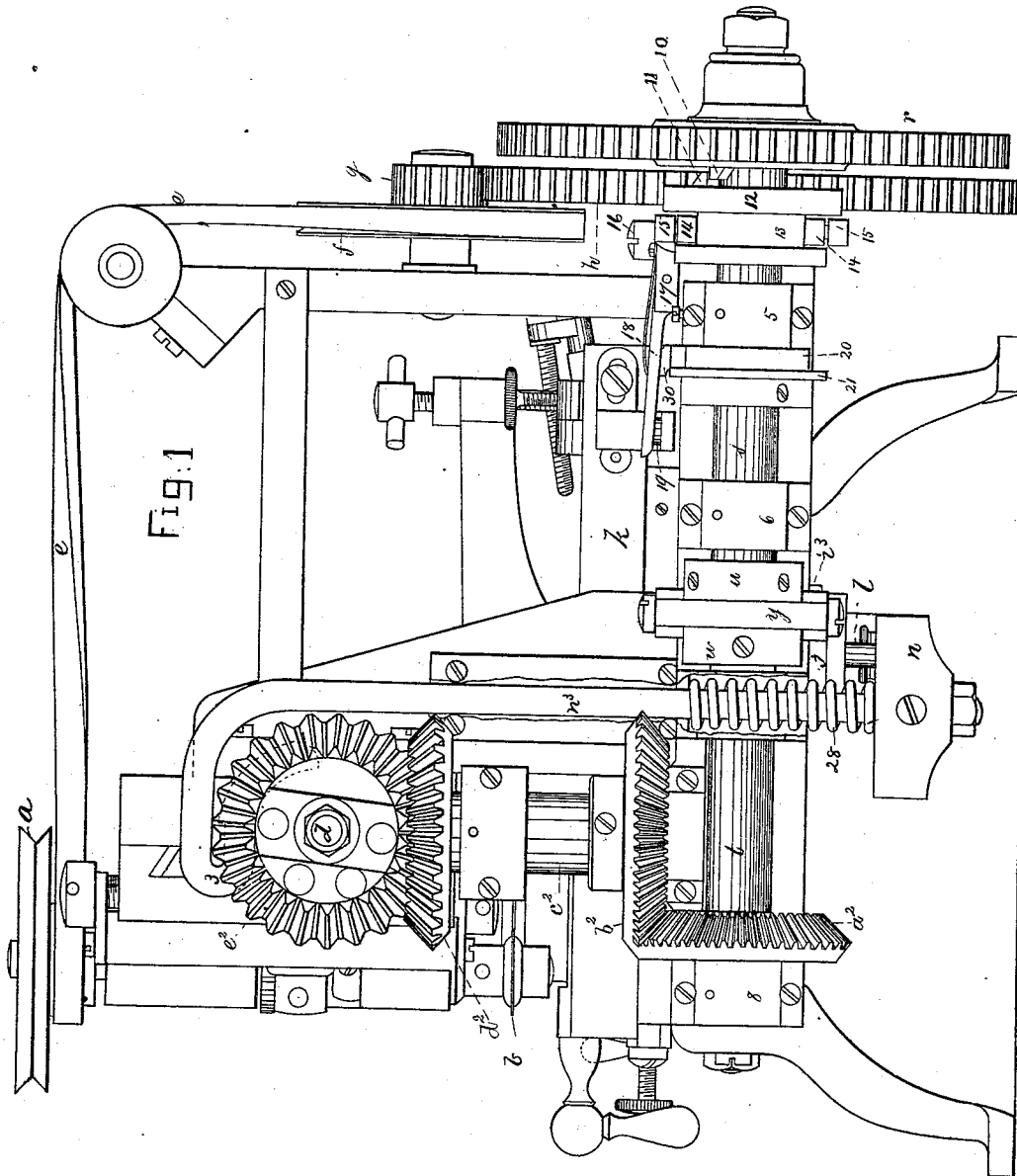


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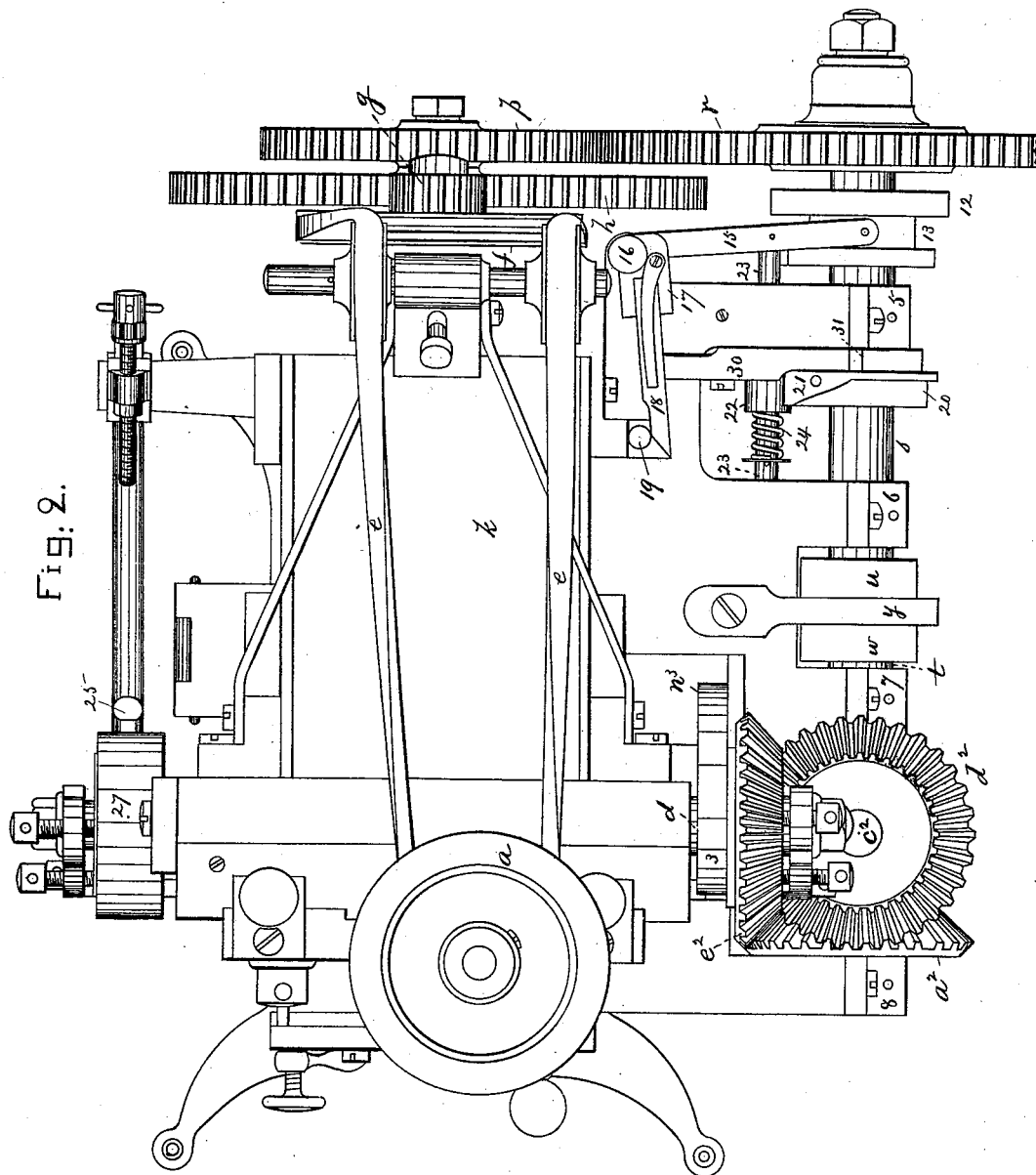
Patented July 29, 1879.



Witnesses.
A. E. Whitney
L. F. Connor.

Inventor.
Philo. M. Beers,
by Crosby & Longory Attys

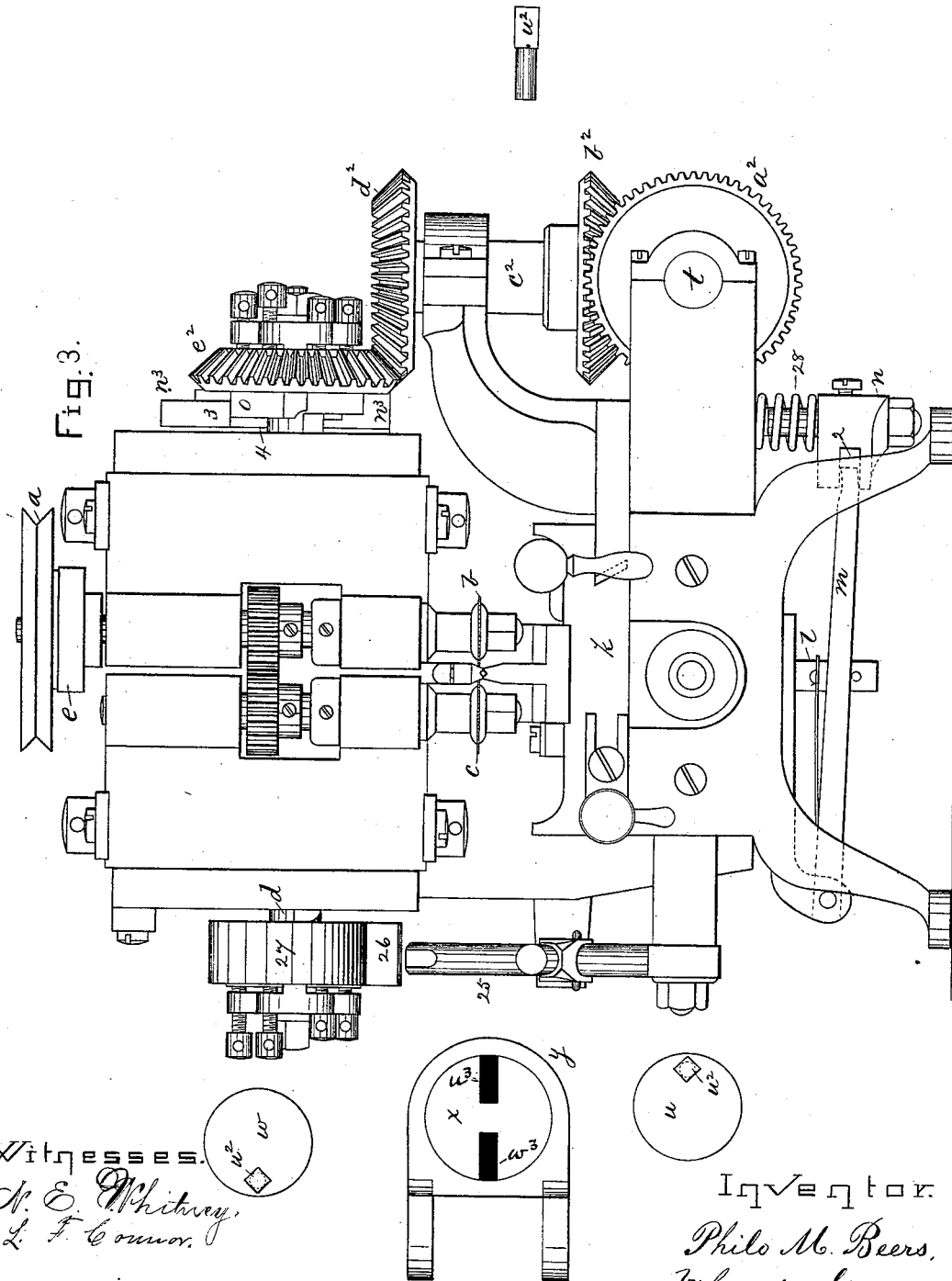
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UNITED STATES PATENT OFFICE

PHILO M. BEERS, OF BRIDGEPORT, CONNECTICUT.

IMPROVEMENT IN MACHINES FOR GROOVING SEWING-MACHINE NEEDLES.

Specification forming part of Letters Patent No. **217,921**, dated July 29, 1879; application filed February 3, 1879.

To all whom it may concern:

Be it known that I, PHILO M. BEERS, of Bridgeport, county of Fairfield, State of Connecticut, have invented an Improvement in Machines for Grooving Sewing-Machine Needles, of which the following description, in connection with the accompanying drawings, is a specification.

This invention relates to mechanism for grooving sewing-machine needles. In this machine, as in others now in use, the needle to be grooved is held between clamps attached to a longitudinally-movable bed, fed forward by a screw engaged by a half-nut attached to the bed, and the cutters for grooving the needle are thrown in contact with the needle at the proper times by projecting surfaces set in motion by a cross-shaft, the said shaft having a cam upon it to lift the half-nut of the bed into engagement with the screw which moves the bed. The said cross-shaft, being first operated far enough to throw the cutter into operation to form the long groove, is permitted to remain at rest until acted upon and moved by a lever turned by the moving bed, when the second cutter to form the short groove is thrown into operation, and the continued movement of the cross-shaft releases the devices which lift the half-nut. Such a machine is fully shown and described in United States Patent No. 184,347, to which reference may be had; but in said patented machine each time the cross-shaft which throws the cutters in contact with the needle is to be started, the operator has, by hand, to move a segment into engagement with a rotating pinion.

The object of my invention is to make a machine of this class entirely automatic from the time the needle is clamped until it is completely grooved, and the half-nut is moved so as to permit the bed to be moved backward by hand. I have provided means to operate this cross-shaft automatically at the commencement and to the ending of its movements, and have arranged a clutch-moving arm to automatically engage a clutch on a compound shaft as the needle-holding bed is moved into its rearmost position, so that the compound shaft may be driven long enough to throw the half-nut into engagement with the continuously-moving screw-shaft which moves the bed, and during

this movement the clutch-disengaging mechanism is drawn back by a cam on the compound shaft, so that as the bed begins to move forward the clutch is disengaged and the said shaft stopped, as will be hereinafter fully described.

Figure 1 represents, in side elevation, a machine provided with my improvements; Fig. 2, a top view thereof, the needle-holding clamp being omitted from the bed; Fig. 3, a front-end view of Fig. 2, and the details near the said figure represent face views of the slotted disk, and the disks and their crank-pins to enter the slots of the disks, one of the loose crank-pins being shown detached.

Power to drive the machine is applied to the pulley *a* at the upper end of the shaft which carries the cutter *b*, which forms the long groove in the needle, it being connected by pinions with the parallel shaft which carries the cutter *c*, which forms the short groove in the needle. These two shafts and their cutters are operated in the usual time and order, and by the usual devices made movable with the cross-shaft *d*.

A small belt-wheel below the pulley *a* is connected by belt *e* with a belt-wheel, *f*, having a pinion, *g*, which engages toothed wheel *h* on the shaft *i*, having the usual screw-thread to be engaged by the half-nut *i*², guided by the bracket *j*, projected downward from the lower side of the movable bed *k*, on which the needle-blank to be grooved is held and clamped, as usual. This half-nut is raised by a pin, *l*, on an arm, *m*, the free end of which is entered into a slot, *2*, in a block, *n*, at the lower end of a rod, *n*³, which at the proper time is lifted by the cam *o* acting on the end *3* of the said rod, the nut when engaged with the screw-shaft causing the bed *k* to move forward. While the cam *o* on the cross-shaft *d* is so operating to lift the half-nut, the usual cam projection *4*, moved by the said shaft, throws and holds the cutter *b* in operative position. This screw-shaft *i* has attached to it the pinion *p*, which is the main source of motion for the mechanism of my invention, which mechanism, added to the said patented machine, makes it entirely automatic, except as to clamping and releasing the needle and sliding backward the bed. This pinion is smaller than, but en-

gages, the toothed wheel *r*, loose on the compound shaft, composed of two parts, *s t*, held in bearings 5 6 7 8, and connected by means of a variable-speed device, composed of two disks, *u w*, each provided with a crank-pin, *u²*, which enters a slot in a slotted disk, *x*, loosely held between the faces of the two disks *u w* by a yoke, *y*. This shaft *s t*, its crank-pins, and the slotted disk are shown in United States Patent No. 145,570 to drive the rotating hook of a Wheeler & Wilson form of sewing-machine.

These devices are shown in detail near Fig. 3, and permit one part of the compound shaft to move at one speed while the other part moves at another speed—as, for instance, when the part *s* is operating at the speed determined by the toothed wheel *r* the part *t* will be moved at a slower speed at the time the cutter *b* is being thrown in contact with the needle, such slow speed at that time preventing the cutter from being broken.

In operation, the crank-pin on the disk *u* enters the slot *w³* of the disk *x* and rotates it, causing the said slotted disk to rotate the part *t* of the compound shaft through the crank-pin of disk *w*, which rests in slot *w³*. As the disk *u* and its crank-pin drives the disk *x*, the crank-pin is made to approach toward and recede from the center of motion of the disk *x*, actuating it and the part *t* of the shaft at a variable speed.

The part *t* of the compound shaft is provided with a bevel-gear, *a²*, which engages a bevel-gear, *b²*, on a shaft, *c²*, having at its top a bevel-gear, *d²*, which engages the bevel-gear *e²* at one end of the cross-shaft *d*. At the rear side of this bevel-gear *e²*, and moving with it, is the cam *o*, before referred to.

The toothed wheel *r*, placed on the compound shaft loosely, as described, has at its inner face suitable teeth 10, which are adapted to be engaged by the teeth 11 of the clutching-hub 12, grooved annularly, as at 13, to receive the roller-studs 14 of a clutch-moving arm, 15, which, as it is moved, slides the clutching-hub splined upon the shaft, so as to engage or disengage teeth 10 11, as it is desired to rotate shaft *s t* or permit it to remain at rest.

The forked clutch-moving arm or lever 15, having its fulcrum at 16, has a short arm, 17, upon which is pivoted a movable or hinged section, 18, which, as the bed is moved backward by hand after grooving each needle, is acted upon at its forward end by an adjustable pin or projection, 19, on the bed, and turned to engage the clutch pins or teeth, which engagement causes the shaft *s t* to commence rotating and set in motion the pinion *e²* and cam *o*, to engage the half-nut and screw and start the bed forward; and while the shaft *s t* is being so rotated a hub, 20, having a cam-shaped annular rib or projection, 21, acts against the loose collar 22 on a rod, 23, joined at one end with the yoke 15, and gradually moves the collar away from toothed wheel *r*, and compresses the spring 24 on the said rod, to accu-

mulate or store up power sufficient to turn the clutch-moving arm and disengage the teeth of the hub from the teeth 10 of toothed wheel *r*, when, by reason of a stop or shoulder, 31, on hub 20, the lever 30 is permitted to rise at its outer end by the action of a strong spring, which causes the said lever to lift the movable or hinged section 18 from engagement with the pin 19 on the bed *k*, thus stopping the rotation of shaft *s t*, while the cam *o* holds the half-nut elevated and the bed *k* is being moved forward.

The shaft *s t* is permitted to remain at rest while the greater portion of the long groove at one side of the needle is being cut; but when the end of the lever 25, vibrated by the forwardly-moving bed, reaches the lug 26 on the hub 27 at the end of the cross-shaft *d*, the said shaft is rotated sufficiently to cause a projection on the hub 27 to (in the usual manner) throw into operation the cutter *c*, which operates to form the short groove in the needle, the said movement of the said shaft *d* from the lever 25 being also sufficient to turn it far enough to remove the cam *o* from below the end 3 of the rod *n³*, and permit the spring 28 to depress the lever and disengage the half-nut from the screw-shaft.

It will be noticed that the lever 25 actuates the shaft *d* but for part of a rotation, and in the same direction as the said shaft *d* was rotated by the compound shaft *s t*; but during said rotation the timing of the parts is not affected, and the shaft *s t*, then disconnected from the toothed wheel *r*, is free to be partially turned by the shafts *d* and *c²*.

The rotation of the compound shaft *s t*, in common with the cross-shaft by the lever 25, is depended upon to disengage the lever 30 from the stop 31 of the hub 20.

The shaft *s t* is rotated once for each needle grooved in the machine. When started the movement of the part *t* is quite rapid for about half a rotation of the part *s*; then for part of a rotation it runs slower, and then remains at rest until the lever 25 strikes lug 26, and completes its rotation through cross-shaft *d*.

I claim—

1. In a needle-grooving machine, a continuously-operated toothed wheel and a clutching and unclutching hub, to be positively engaged with the said toothed wheel while the needle-carrying bed is in its backward position, combined with the cross-shaft *d* and the shaft which carries the clutching and unclutching hub, and with gearing, substantially as described, between them, to operate the shaft *d*, and cause it by its cam projections to automatically lift the half-nut into engagement with the screw-shaft and throw the grooving-cutter into contact with the needle, and with mechanism to automatically throw the clutching-hub from engagement with the continuously-rotated toothed wheel which moves it, substantially as described.

2. In a needle-grooving machine, the needle-carrying bed and its pin, combined with

the movable or hinged section, and mechanism for disengaging the said hinged section and clutch-moving arm, hub, and continuously-rotating toothed wheel *r*, adapted, when engaged by the hub, to rotate the shaft with which the hub is splined, substantially as described.

3. In a needle-grooving machine, the compound moving shaft *s t*, combined with the gear *e*² on the cross-shaft *d* by means of intermediate gearing, substantially as described, to throw the cutter *b* into contact with the needle slowly, substantially as described.

4. In a needle-grooving machine, the shaft which positively rotates the cross-shaft *d*, a cam, 21, thereon, and a rod, and a collar, and a spring, combined with the clutch-moving arm,

to draw the clutching and unclutching hub from engagement with the toothed wheel *r*, loosely mounted on the said shaft, substantially as described.

5. The shaft and its hub 20, provided with a shoulder, a lever, and a spring to move the lever, combined with the pivoted finger of the clutch-moving arm, to disengage it from the needle-carrying bed as the latter is being moved outward, substantially as described.

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

PHILO M. BEERS.

Witnesses:

G. W. GREGORY,
N. E. WHITNEY.