

(No Model.)

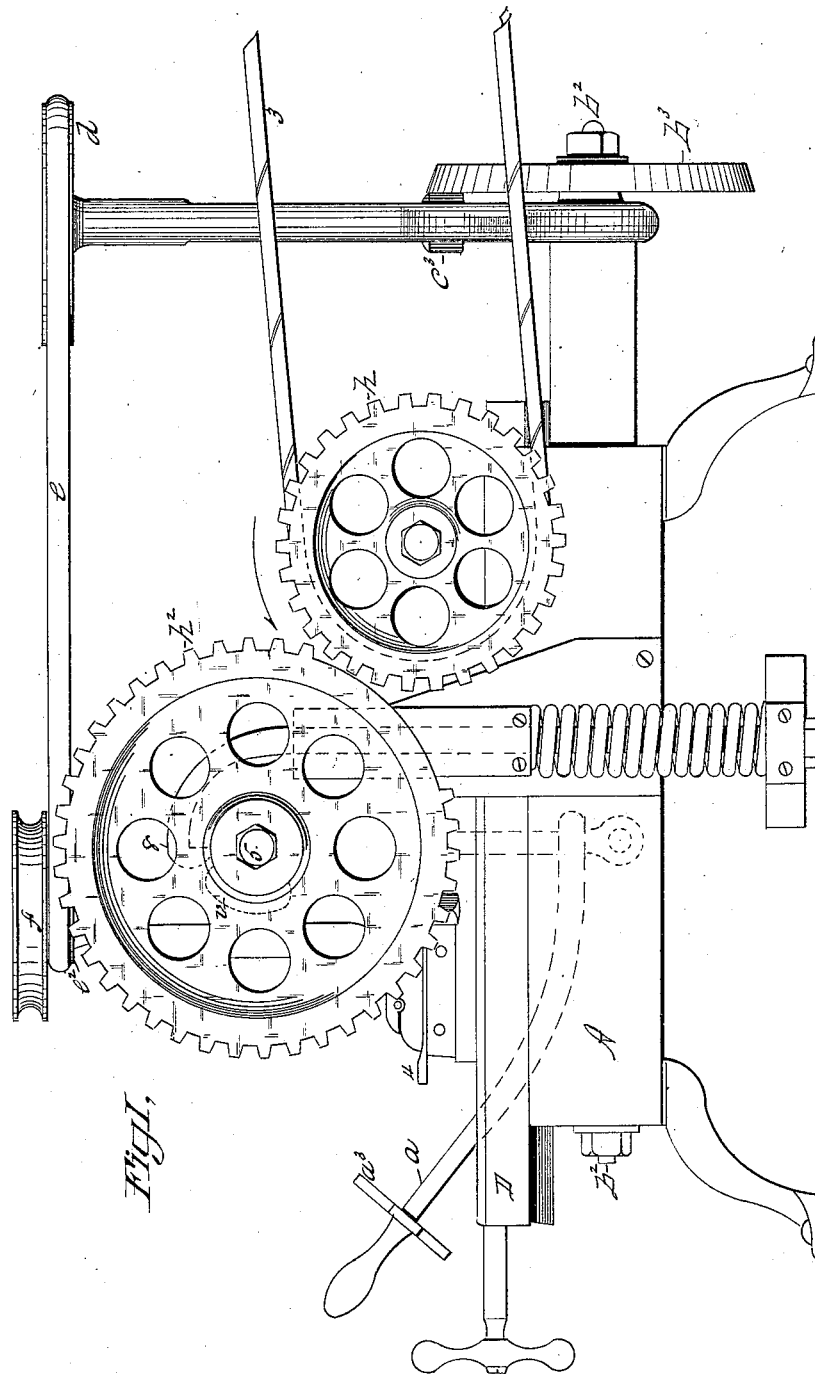
3 Sheets—Sheet 1.

J. BERRY.

NEEDLE GROOVING MACHINE.

No. 307,001.

Patented Oct. 21, 1884.



Witnessed,
R. F. Hyde
Wm. A. Chapin

Inventor,
John Berry
by Henry A. Chapin

(No Model.)

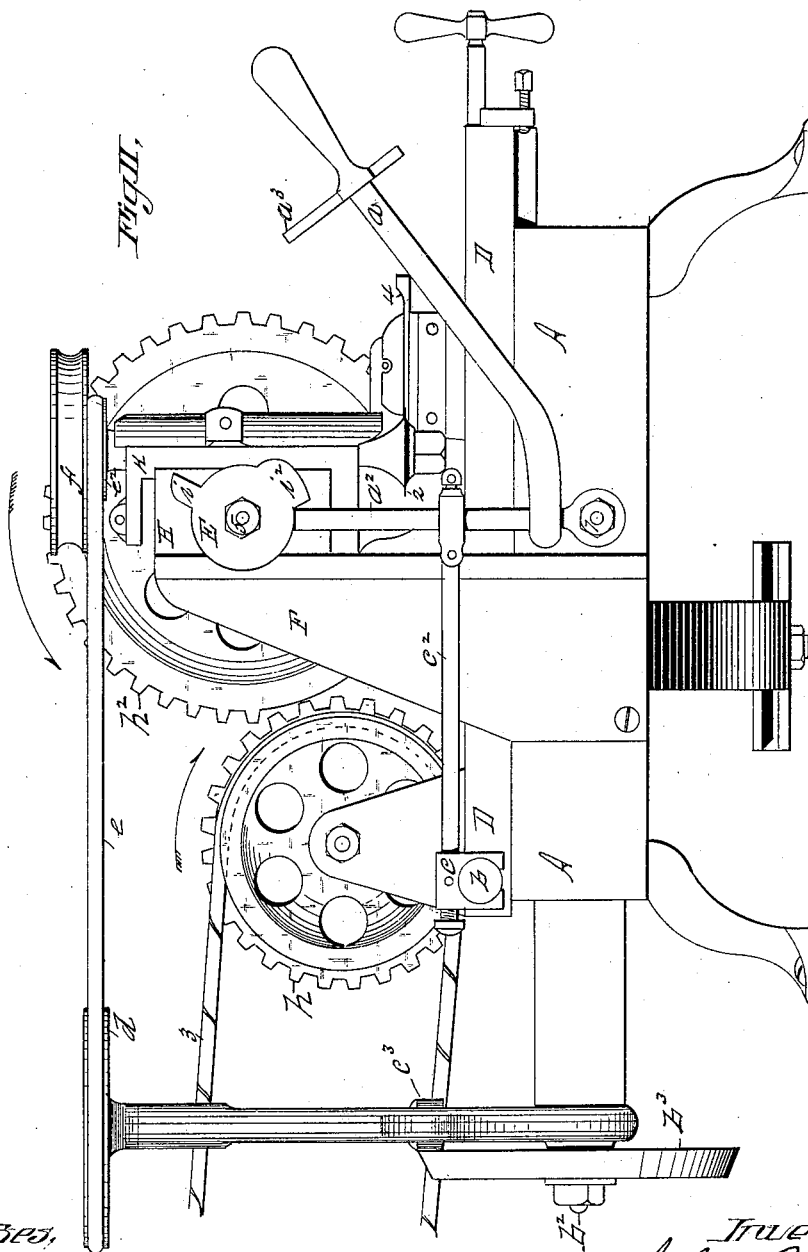
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J. BERRY.

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Patented Oct. 21, 1884.



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John Perry
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Att.

(No Model.)

3 Sheets—Sheet 3.

J. BERRY.
NEEDLE GROOVING MACHINE.

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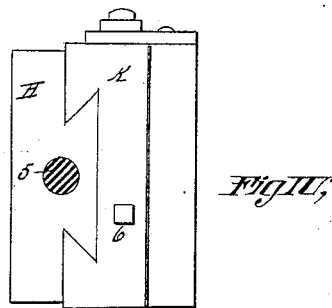


Fig. II.

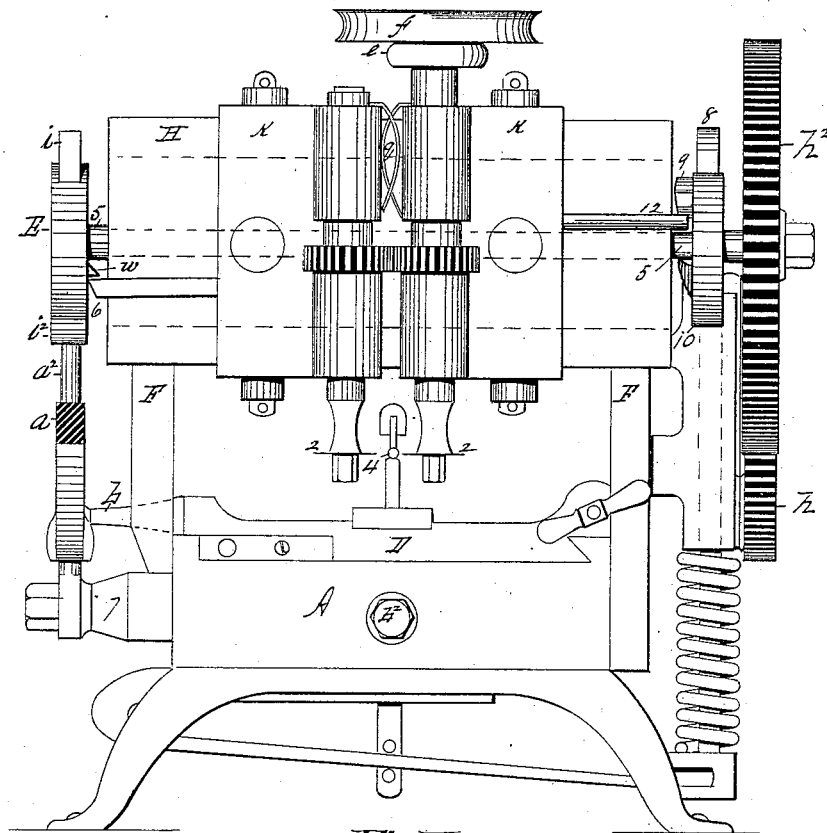


Fig. III.

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UNITED STATES PATENT OFFICE.

JOHN BERRY, OF SPRINGFIELD, MASSACHUSETTS, ASSIGNOR TO THE
NATIONAL NEEDLE COMPANY, OF SAME PLACE.

NEEDLE-GROOVING MACHINE.

SPECIFICATION forming part of Letters Patent No. 307,001, dated October 21, 1884.

Application filed March 23, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHN BERRY, a citizen of the United States, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Needle-Grooving Machines, of which the following is a specification.

This invention relates to improvements in machines for grooving needles, the object being to provide improved mechanism for operating the transverse cam-shaft, which in such machines is located above the sliding bed thereof, whereby the usual hand-crank on said shaft is dispensed with, and a steadier and more exact intermittent rotary motion is imparted to said shaft, whereby the cutter-shafts and feed-screw nut, which derive certain of their movements from said shaft, are caused to be actuated with greater precision.

Prior to my invention the cutters have been moved laterally up against a needle to groove the same, and a shaft with cams thereon has been used to act upon the sliding cutter-rests, and this shaft has been provided with a segment having a handle, whereby it may be brought into gear with a pinion for feeding the cutters against the needle.

My invention consists in providing the shaft controlling the cutter-rests with peculiar cams and with a broken gear-wheel, whereby a more exact intermittent motion is given to the shaft, and in the peculiar lever connected to the bed of the machine, and provided with arms for engaging with said broken gear-wheel for starting the machine and for bringing it into proper position for re-engagement with the driving gear-wheel, all as more particularly pointed out hereinafter.

In the drawings forming part of this specification, Figures I and II are side elevations, and Fig. III is an end elevation, of a needle-grooving machine embodying my improvements. Fig. IV is an end elevation of the cross-head and cutter-shaft heads, showing the transverse cam-shaft in section.

In the drawings, A is the frame of the machine. D is the sliding bed. F F are cross-head supports. H is the cross-head. K are cutter-shaft supports on head H. 5 is the transverse cam-shaft. E is a cam-wheel on one end of shaft 5, and 10 is a cam-wheel on

the opposite end thereof. a^2 is a vertical lever pivoted to the end of a stud, 7, on frame A. a is a hand-lever secured to lever a^2 , and having an arm, a^3 , thereon. i and i^2 are short arms on wheel E. b is a stud on the bed D. c is a stud-block, to which is connected the rod c^2 , and the latter is pivotally connected with lever a^2 . f c^2 d are driving-pulleys. e and 3 are driving-bands. b^2 is a feed-screw gear. c^2 is a pinion. h^2 is a broken gear-wheel on one end of shaft 5. h is a driving-gear. 9 is a cam on the inner face of the cam-wheel 10. 12 is a cam-pin. 8 is a cam-hook. 6 is a cam-pin. 2 2 indicate groove-cutters, and 4 the needle. b^2 is the feed-screw.

The above-mentioned transverse shaft 5 in this machine (looking at the front elevation) has secured to its end at the left the cam-wheel E, and to its opposite end, between the gear h^2 and the cross-head H, the cam-wheel 10. A half-elliptic spring, g , between the slides K, forces the slides apart and the pins 6 and 12 against their cams. The inner face of the cam-wheel E is, in the usual manner, provided with a cam-like lug, w , (shown in Fig. III,) to strike the end of the cam-pin 6, which is rigidly secured to slide K, when said lug comes before the end of pin 6, and by acting against said pin, when wheel E revolves, to cause the slide K to move inward for the well-known purpose of forcing the cutter-shaft and cutter, which it supports, toward the needle 4, and letting the cutter recede from the needle when the lug passes from under said pin to the position shown in Fig. III. The cutter 2 upon the side next to wheel E makes the short groove in the needle, and therefore such devices as are above described are employed to secure a contact of the cutter with the needle of only short duration, or while the lug w moves in contact with the end of pin 6 to the position shown in Fig. III.

The direction in which shaft 5 turns is indicated by the arrow over gear h^2 in Fig. II.

The aforesaid cam-wheel 10 on shaft 5 is, like the "cam c " in my Patent No. 259,262, of 1882, provided with a cam on its periphery, which operates the cam-hook 8 and the feed-screw nut of this machine substantially in the same manner as said "cam c " operates the "cam-hook c^2 " and feed-screw in said patent.

Said cam-wheel 10 has upon its inner face a cam projection, 9, which, when said wheel rotates, is carried under or against the end of pin 12, which, like pin 6, is rigid on slide K, whereby the cutter and its shaft, which are supported by said slide, are moved toward the needle 4, and said cutter is thereby caused to engage with the needle to cut the long groove therein, and after both the long and the short grooves are cut the cam 9 passes from under the end of said pin, as shown in Fig. III. The said cam-wheel E is provided with the short arms *i* and *i'*. The vertical lever *a* is pivoted to the end of the stud 7 on the side of the frame A, and to lever *a* is secured, near its pivoted end, the hand-lever *a*, so that said two levers swing together, or with a common vibratory motion, on said stud, and the arrangement and relations of wheel E and said levers are such that when lever *a* is swung upward toward said wheel the end of arm *a* strikes the arm *i* and rotates said wheel and shaft 5 to a certain extent, and when the free end of lever *a* is swung against arm *i'* wheel E and said shaft are returned to the position shown in Fig. II. Through the connection of lever *a* with the sliding bed D by the rod *c*, box *e*, and stud *b* the aforesaid upward movement of lever *a* causes said bed to be moved back on frame A to bring the needle to a proper position for the cutters (first the long and then the short groove one) to operate upon it.

The arrangement of the parts herein shown for driving the cutter-shafts and the feed-screw *b* is substantially that shown in my said Patent No. 259,262, to which reference may be had, and wherein is shown a crank, *c*, for turning the transverse shaft there shown.

As above described, by the rotation of shaft 5 the feed-nut is brought into engagement with the feed-screw and the long-groove cutter is made to engage with the needle.

The sudden movement of shaft 5, by a careless operator, by means of a crank, as heretofore practiced, often results in injury to the cutter or to the needle, or both, and may result in bringing the feed-nut against the feed-screw out of exact time, and thereby injuring one or both of those parts; but said inconveniences are obviated by the use of the below-described improved devices for giving the requisite intermittent rotary movements to said shaft 5.

On the side of frame A is hung in proper bearings the gear-wheel *h*, provided with a suitable band-groove to receive the band 3, by which it is driven independent of the aforesaid parts of the machine, and on the end of said shaft 5 is fixed the broken gear *h'*, the teeth on which engage with those on gear *h* to give it nearly a revolution.

The parts of the machine in the several figures are shown in the positions to which they are brought after the grooving of a needle is completed.

Figs. I and II show a needle placed in the

ordinary clamp on bed D, preparatory to grooving it.

The operation of my improvements, in conjunction with a needle-grooving machine, is as follows: The gear *h* runs continuously. The operator seizes the lever *a* and swings it upward, thereby first swinging the free end of lever *a* away from cam-wheel E, and by means of the above-described connection, by rod *c* of the said lever *a* and bed D, the latter is made at the same time to slide back, carrying the needle between the cutters. Arm *a* on lever *a* then strikes arm *i* on wheel E, turning the latter, shaft 5, and the broken gear *h'* sufficiently to bring that part of its geared portion nearest to wheel *h*, as shown in Figs. I and II, into engagement with the teeth of the latter. Wheel *h'*, shaft 5, and the cam-wheels E and 10 now rotate to the extent of the toothed portion of the gear *h'*, and leaving the latter stopped with its untoothed part standing above gear *h*, instead of opposite and below the latter, as shown in Fig. I. The above-described rotary movement of gear *h'* causes shaft 5 and the cam-wheels thereon to be rotated in like manner. The rotation of wheel 10 carries the face of cam 9 against the end of pin 12, causing the cutter at the right to be carried against the needle, and the movement of the cam V on the periphery of wheel 10, Fig. I, under the hook 8, lifts up the latter and the feed-screw nut, as described in said Patent No. 259,262, and brings said nut into engagement with the feed-screw *b*, thereby causing the bed D to move (looking at Fig. II) from left to right, carrying the needle along, while said cutter forms a long groove on one side of it. While cam 9 is acting on pin 12, as just described, wheel E rotates before the end of pin 6, and by the time wheel *h'* comes to a stop the cam-socket in said wheel is brought around opposite the end of said pin, and the latter drops into said socket, where it rests, while said long groove is being nearly completed. When the gear *h'* comes to a stop, as above described, the pin 12 is bearing against the thick part of cam 9, just back of its end, pin 12 occupying said position, and pin 6 being in the position shown in Fig. III, at the same time, and until that part of the needle in which the short groove is to be cut comes opposite to the cutter at the left. By this time the movement of bed D has brought the end of lever *a* against arm *i'* on wheel E, rotating the latter, shaft 5, and the gear *h'* sufficiently to carry its untoothed portion before gear *h* to the position shown in Fig. I, but not to engage it therewith, and at the same time so turning wheel E as to cause the cam-lug *w* to act on pin 6, and by the latter to give the said short groove-cutter a contact with the side of the needle for an instant, and meanwhile turning wheel 10 to carry cam 9 from opposite pin 12, and the cam on wheel 10 from under hook 8, so that simultaneously the latter drops, carrying the feed-screw nut away from the feed-screw, stopping bed D and pins

6 and 12, and the cam-wheels E and 10 are brought to the positions shown in Figs. II and III, and the grooved needle may now be removed and another needle-blank be secured to the bed and said operations be repeated.

What I claim as my invention is—

1. The combination, with the bed D and the shaft 5, of the cam-wheel E, having the arms i i^2 thereon, the rod c^2 , the lever a^2 , and hand-lever a , having arm a^3 thereon, substantially as set forth.

2. In combination, bed D, the cam-shaft 5, the driving-gear h , and broken gear h^2 , and the mechanism, substantially as described, for

rotating gear h^2 , to engage it with said gear h , to start the machine and to bring said gear h^2 to a proper position for re-engagement with gear h after a needle has been grooved, substantially as set forth.

3. In combination, the bed D, gears h and h^2 , shaft 5, the cam-wheel E, lever a^2 , connected with said bed, and lever a , having arm a^3 thereon, and connected to said lever a^2 , substantially as set forth.

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Witnesses:

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