

(No Model.)

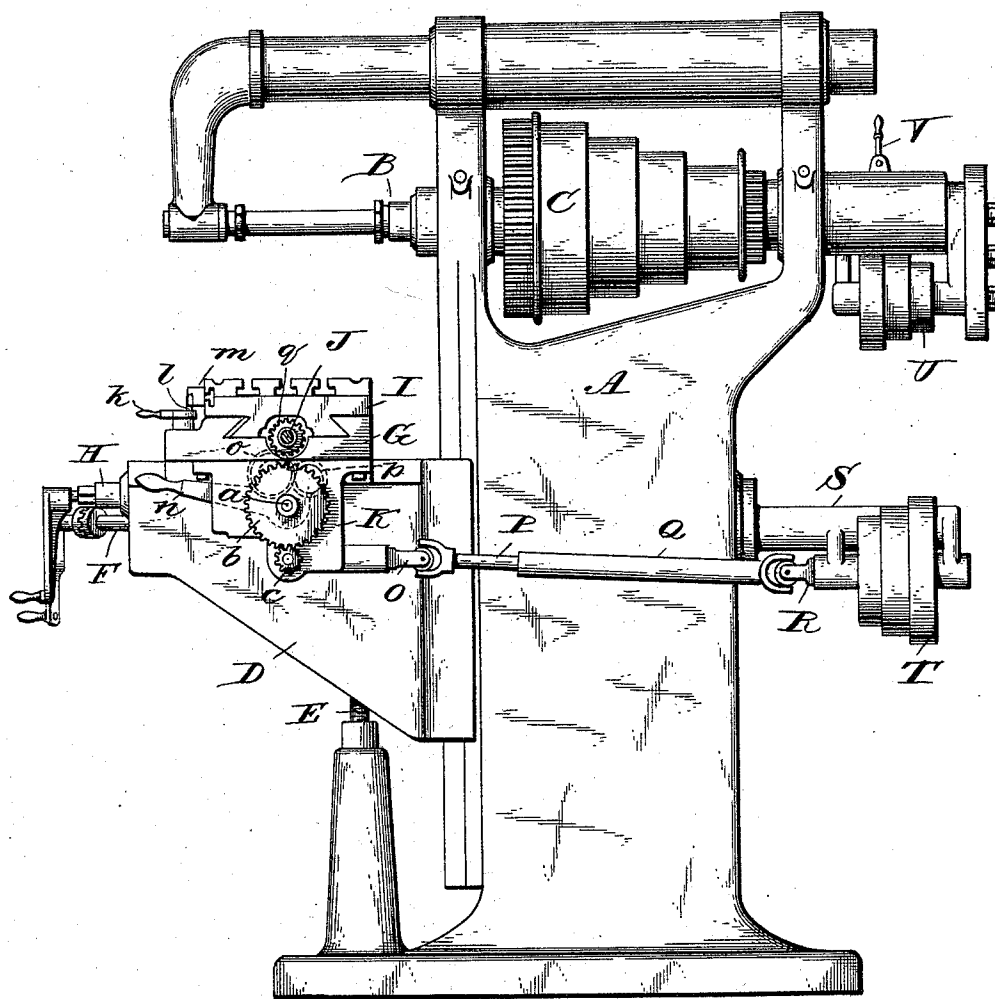
2 Sheets—Sheet 1.

F. HOLZ.
MILLING MACHINE.

No. 554,423.

Patented Feb. 11, 1896.

Fig. 1.



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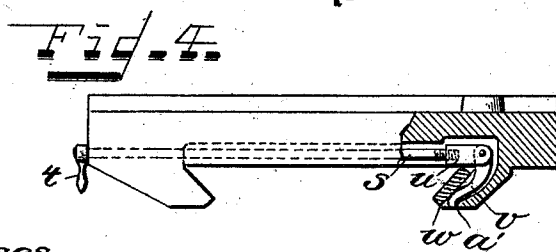
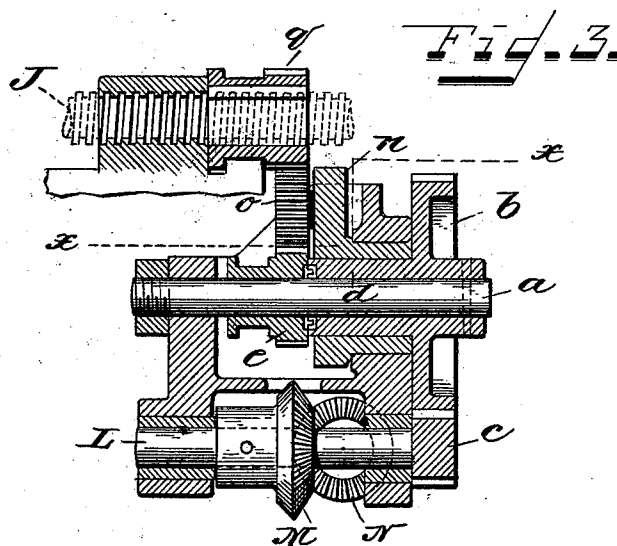
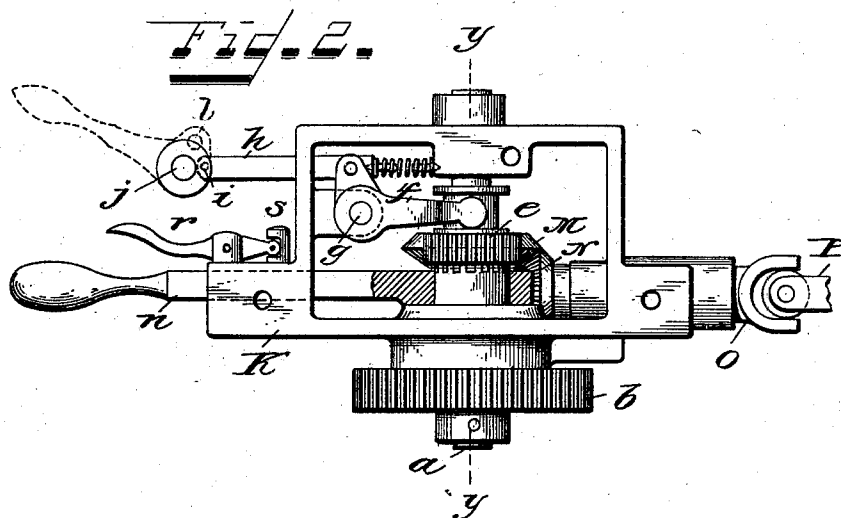
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2 Sheets—Sheet 2.

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MILLING MACHINE.

No. 554,423.

Patented Feb. 11, 1896.



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UNITED STATES PATENT OFFICE.

FREDERICK HOLZ, OF CINCINNATI, OHIO, ASSIGNOR TO THE CINCINNATI MILLING MACHINE COMPANY, OF SAME PLACE.

MILLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 554,423, dated February 11, 1896.

Application filed October 11, 1894. Serial No. 525,606. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK HOLZ, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Milling-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to that class of milling-machines in which the work-carrying table is operated automatically and in either direction by the machine, and it has for its object the improved construction of this class of machines.

The novelty of my invention will be hereinafter set forth and specifically pointed out in the claims.

In the accompanying drawings, Figure 1, Sheet 1, is a side elevation of a milling-machine embodying my invention. Fig. 2, Sheet 2, is an enlarged plan view of the automatic feed mechanism, partly in section, on the dotted line *xx* of Fig. 3. Fig. 3, Sheet 2, is a front elevation in section on the dotted line *yy* of Fig. 2 and including part of the work-carrying-table feed-screw. Fig. 4, Sheet 2, is an enlarged front elevation, partly in section, of the saddle and its clamping mechanism.

The same letters of reference are used to indicate identical parts in all the figures.

The machine proper may be of the usual or any suitable construction and it is only necessary in describing it to say that A is the upright or column; B, the live-spindle journaled therein; C, the cone-pulley for driving the live-spindle; D, the knee dovetailed to the front of the column and given vertical movement and adjustment by the usual screw E operated by the handle-shaft F.

G is the saddle dovetailed on the knee and given horizontal movement thereon toward and from the column by the usual handle screw-shaft H, and I is the work-carrying table dovetailed on the saddle and given horizontal movement at right angles to that of the saddle by the usual feed-screw shaft J, operated at one end by a hand-wheel in the usual manner and at another point automati-

cally by the machine by the following novel mechanism forming part of my present invention:

On the under side of a projecting part of the saddle and by the side of the knee is secured a housing K, Fig. 1, in the lower part of which is journaled at right angles to the side of the knee a shaft L, having fast thereon between the walls of the housing (see Fig. 3) a bevel-gear M with which a small gear N, fast on a stub-shaft O, driven in any suitable manner by the machine, meshes. The mechanism for driving the shaft O, in this instance, is represented to be substantially that of my prior application, Serial No. 524,604, filed October 1, 1894, and which may be briefly described as follows:

A shaft P, feathered and telescopically fitting in a tubular shaft Q, is connected by a gimbal-joint to the shaft O, while the shaft Q is connected by a similar joint to a shaft R journaled in a bracket S, secured to the column, and carrying a cone-pulley T belted to a cone-pulley U, Fig. 1, driven by the live-spindle through a series of intermeshing gears controlled by a hand-lever V in connection with an index for varying the rate of speed of the feed or stopping it altogether, as described in my prior application above referred to. Any other mechanism, however, driven by the machine, may be employed for communicating motion to the shaft O.

Just above the shaft L and parallel thereto is journaled a shaft *a*, on the outer end of which is made fast a gear *b* meshing with a small pinion *c* on the outer end of the shaft L. The inner side of the gear *b* has a projecting hub *d* extending within the space between the walls of the housing and having its inner end formed with clutch-teeth to engage clutch-teeth on the side of a small pinion *e*, journaled loosely on the shaft *a*.

The pinion *e* has a hub with a circumferential groove engaged by the fork of a crank-lever *f* pivoted, as at *g*, to the housing and connected by a pivoted link *h* to a crank-pin *i*, Fig. 2, on the lower end of a vertical shaft *j* journaled in the saddle and whose upper end is provided with a handpiece *k* carrying a pin *l* in the path of a wiper-block *m*, adjustably secured to the front face of the work-

carrying table by means of a bolt confined in a T-headed slot extending the length of the work-carrying table, the construction being such that the clutch between the gears *e* and *b* may be engaged or disengaged by hand from the handpiece *k* or may be disengaged automatically by the wiper-block *m* striking the pin *l* and thereby turning the handpiece to effect the disengagement of the clutch.

The arrangement of the parts is such that when the clutch is engaged the center of the shaft *j*, pin *i* and the pivot connecting the link *h* to the lever *f* are in a straight line to form a deadlock to prevent the accidental disengagement of the clutch.

Journalled upon the hub *d* of the gear *b* is a shifter-lever *n* having journaled thereon two intermeshing gears *o p*, (see Fig 1,) the former of which is in constant mesh with the pinion *e*, and either of which by swinging the lever *n* vertically can be made to engage with a pinion *q* feathered on the screw-shaft *J* of the work-carrying table. A spring hand-lever *r* pivoted to the hand-lever *n* actuates a locking-bolt *s* engaging perforations in the housing *K* to hold the lever *n* in its adjusted positions.

It will be seen from the foregoing description that all of the driving mechanism for the screw-shaft *J* is carried by and travels with the saddle and that the screw-shaft may be disconnected from said driving mechanism by turning the handpiece *k* and disengaging the clutch either by hand alone or automatically by the wiper-block *m* on the work-carrying table; also that the direction of revolution of the screw-shaft *J* can be reversed at will to feed the work-carrying table in either direction by shifting the lever *n* to cause either the gear *o* or the gear *p* to engage with the pinion *q*.

The remaining feature of my invention (illustrated in Fig. 4) consists in providing a hand-rod or rock-shaft *s* confined in a recess in the saddle and provided with an operating-handle *t*, which engages with a threaded link *u* pivoted to a knuckle-piece *v* in a recess behind the saddle-gib *w* and having a fulcrum, as at *a'*, so that by turning the handle *t* and rocking the shaft *s* it is screwed into the link *u* and pulls upon the knuckle-piece *v* in such manner as to cause it to be forced against the gib and to clamp the latter and the saddle to the knee. Turning the handle in the opposite direction the gib is unclamped and the saddle can then be adjusted upon the knee and can be reclamped in its adjusted position.

The purpose of this mechanism is to lock the saddle to the knee and prevent its accidental movement and disengagement while the machine is at work.

Having thus fully described my invention, I claim—

1. In a milling-machine, the combination with the saddle, and work-carrying table operated by a screw-shaft, of a driving-gear, as *b*, carried by the saddle, two intermeshing gears carried by the saddle and driven by the gear *b*, a pinion feathered on the said screw-shaft, a pivoted shifter for the two intermeshing gears, whereby either may be made to engage the pinion on the screw-shaft, and a clutch interposed between the intermeshing gears and gear *b*, whereby the former may be connected and disconnected at will from the gear *b*, substantially as described.

2. In a milling-machine, the combination with the saddle, and work-carrying table operated by a screw-shaft, of a driving-gear, as *b* carried by the saddle, two intermeshing gears carried by the saddle and driven by the gear *b*, a pinion feathered on said screw-shaft, a pivoted shifter for the two intermeshing gears, whereby either may be made to engage the pinion on the screw-shaft, a clutch interposed between the intermeshing gears and gear *b*, whereby the former may be connected and disconnected at will from the gear *b*, and automatic means controlled by the movement of the work-carrying table, to disconnect said clutch at any predetermined point, substantially as described.

3. In a milling-machine, the combination with a supporting-knee, of a saddle mounted thereon, a gib to lock said saddle to the knee, a clamping-lever fulcrumed between said saddle and gib, and means for operating said clamping-lever so as to force said gib into locking position and secure said saddle at any desired point on said supporting-knee, substantially as described.

4. In a milling-machine, the combination of the work-carrying table and its screw-shaft *J*, the gear *q* feathered thereon, the saddle and housing *K* carried thereby, the pivoted shifter *n* having the intermeshing gears *o, p* journaled thereon, the gear *e* with one part of a clutch and meshing with gear *o*, a shifter for gear *e*, gear *b* carrying the other part of the clutch, pinion *c* meshing with gear *b* intermeshing bevel-gears *M* and *N*, and driving mechanism for the latter gear, substantially as and for the purpose specified.

5. In a milling-machine, the combination with the saddle, knee and interposed gib, of the rock-shaft *s*, link *u*, and knuckle-piece *v*, substantially as and for the purpose specified.

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