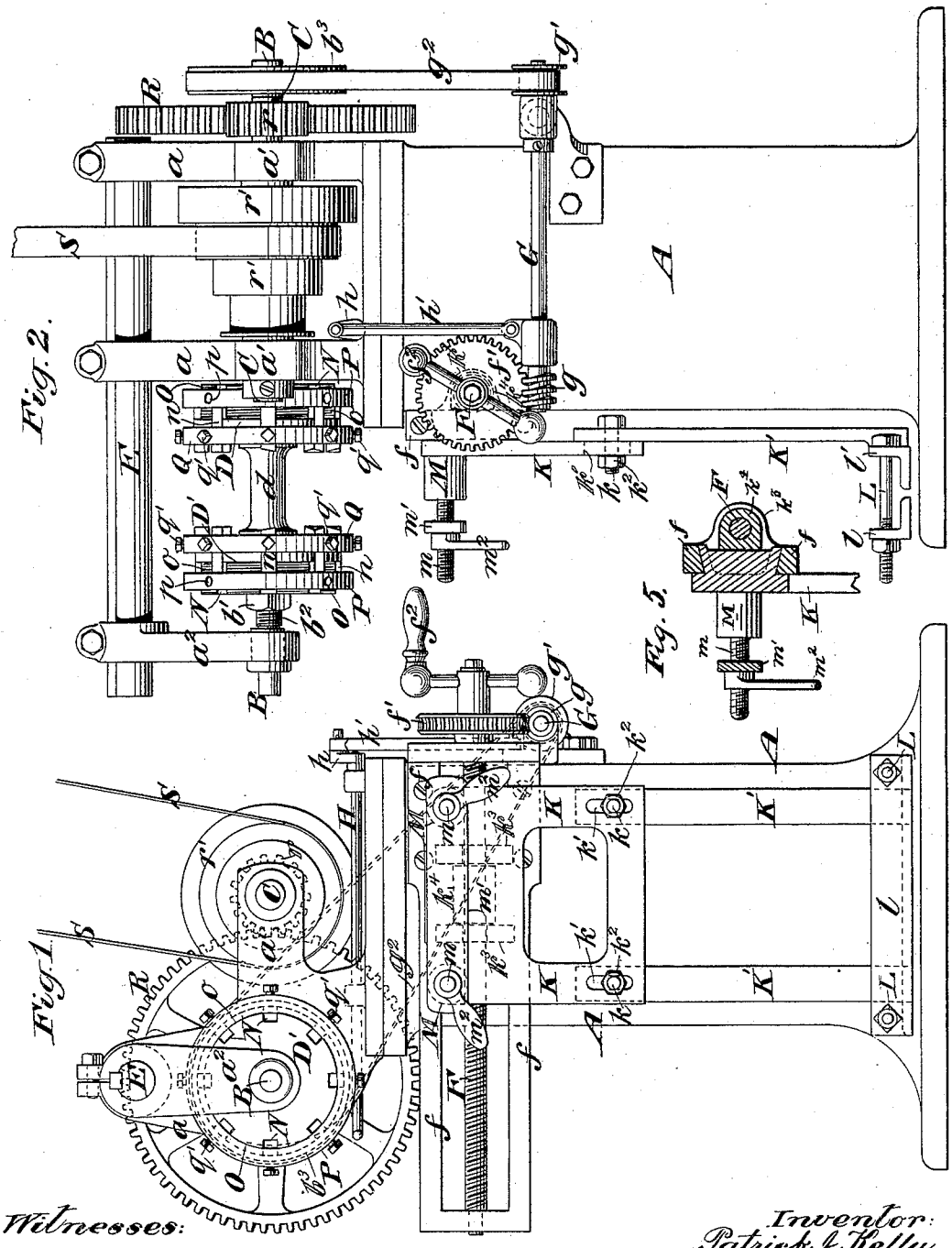
(No Model.) 2 Sheets—Sheet 1.

P. J. KELLY.

MILLING MACHINE.

No. 462,050. Patented Oct. 27, 1891.



Witnesses:
C. L. Sundgren
D. H. Hayward

Inventor:
Patrick J. Kelly
by attorneys
Brown & Seward

(No Model.) 2 Sheets—Sheet 2.

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Fig. 4.

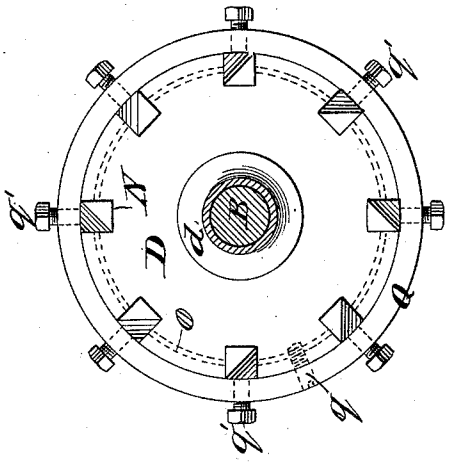
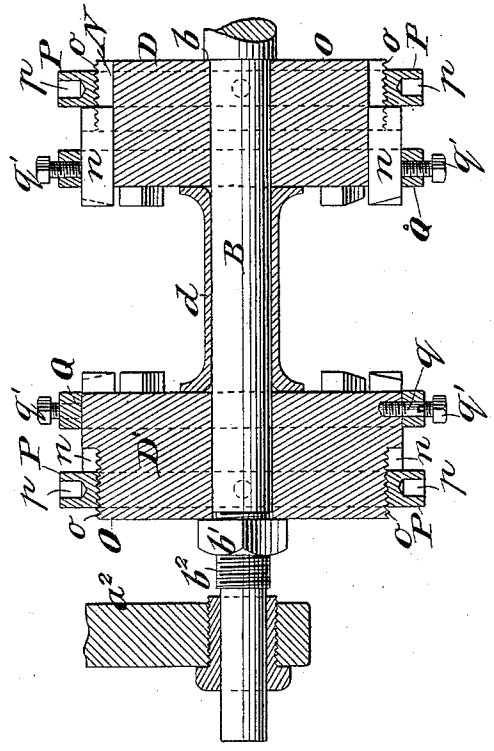


Fig. 3.



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UNITED STATES PATENT OFFICE.

PATRICK J. KELLY, OF ELIZABETH, NEW JERSEY.

MILLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 462,050, dated October 27, 1891.

Application filed December 16, 1890. Serial No. 374,868. (No model.)

To all whom it may concern:

Be it known that I, PATRICK J. KELLY, of Elizabeth, in the county of Union and State of New Jersey, have invented a new and useful Improvement in Milling-Machines, of which the following is a specification.

My invention relates to an improvement in milling-machines, and more particularly to means in connection with such machines for feeding the article or material to be operated upon to the cutters and to means for adjusting the cutters themselves.

A practical embodiment of my invention is represented in the accompanying drawings, in which—

Figure 1 is a view of the machine in side elevation. Fig. 2 is a view of the same in front or end elevation. Fig. 3 is an enlarged sectional view in detail of the cutter-heads and cutters. Fig. 4 is an enlarged end view in detail of one of the cutter-heads, with cutters in position; and Fig. 5 is a transverse section in detail through the feed-screw frame and upper portion of the work-support between the offsets which embrace the feed-screw.

A represents the pedestal or supporting-frame provided with upwardly-extending ears or standards a, in which the revolving cutter-shaft B is journaled. The said standards a are also conveniently provided with forwardly-extending arms a', in which the drive-shaft C is journaled, the two shafts B and C preferably extending parallel with each other, and in a direction transverse to that in which the article to be operated upon is to be fed. The shaft B has fixed thereon a pair of cutter-heads D and D′, spaced apart conveniently by means of an intervening sleeve d, and forced snugly against a shoulder b on the shaft B by means of an adjusting-nut b', working upon the threaded portion b^2 of the shaft B. The cutter-heads D and D′ are here shown as located on that portion of the shaft B to one side of the supporting-standards a, and the free end of the shaft B outside of the cutter-head D′ is supported in a hanger a^2, secured at its upper end to the connecting-bar E, fixed to the standards a.

The particular means for adjusting the cutters carried by the cutter-heads will be hereinafter more fully explained. Extending from front to rear in a direction transverse to that in which the cutter-shaft B extends is a feed-screw F, journaled in suitable bearings in a frame f, fixed to the side of the pedestal or main frame A. The position of the feed-screw F and its supporting-frame is a short distance to one side of the vertical plane of the inner cutter-head D, so as to leave a free space for the travel of the article or material being operated upon between the two cutter-heads. The feed-screw F is here shown as operated by means of a worm-wheel f', secured near its front end and adapted to intermesh with a worm g on a worm-shaft G, the latter being journaled in suitable bearings across the front of the machine and provided with a drive-pulley g', driven by a belt g^2, leading to a drive-wheel b^3, secured on the end of the shaft B. The worm-shaft G is so mounted that it may be swung into and out of gear with the worm-wheel f', the swinging of said shaft being accomplished in the present instance by means of a crank-rod H, provided with a crank h, the latter connected with the shaft G by a connecting-rod h'. A crank f^2, fixed on the end of the feed-screw shaft, enables the feed-screw to be rotated by hand when the worm G is thrown out of engagement with the worm-wheel f'.

A frame for supporting the material or article to be operated upon consists in the present instance of an upper section K and a lower section K′, the two sections being connected with each other in such a manner that the lower section K′ may be adjusted vertically to lengthen and shorten the frame as a whole. The adjustment is here shown as accomplished by means of bolts k, extending through the upper portion of the section K′ and through elongated slots k' in the lower portion of the upper section K, the bolts being provided with clamping-nuts k^2. The upper section K has a sliding engagement with the frame f and is provided with a pair of lugs or ears k^3, extending laterally from its upper portion and embracing the feed-screw F and forming abutments for moving the frame K K′ thereon. Between the lugs or ears k^3 a nut k^4 is located, which registers with the screw F, and when the screw F is turned

the nut k^4 will thereby be caused to travel on the screw, and by its engagement with the supporting-lugs k^3 will cause the frame K K′ to travel along the screw. The frame K K′, which I have represented herein, is particularly well adapted for the support of radiator-sections or other articles, upon both sides of which it is desirable to operate simultaneously. To this end the foot of the frame-section K′ is provided with a pair of draw-bolts L, carrying upon their free ends a clamping-plate l, preferably of angular form in cross-section, as shown, and corresponding to the angular foot-piece l' on the section K′. By this means the foot of the radiator-section or other article supported upon the frame may be tightly clamped to the movable supporting-frame. The upper section K of the movable supporting-frame is provided with a pair of bosses M, projecting outwardly from its upper portion, from or through which screws m project and form supports for a clamping-plate m'.

Tail-nuts m^2 on the screws m serve to force the clamping-plate m' into contact with the upper portion of the article to be operated upon and to hold it snugly in position while being engaged by the cutters. The article to be operated upon when clamped in the movable supporting-frame K K′ is fed by the mechanism hereinbefore described, rearwardly, its opposite faces to be operated being thereby brought into engagement with the cutters upon the adjacent faces of the cutter-heads D D′. The movable frame K K′ may be returned from between the cutters by throwing the worm g on the worm-shaft G out of gear with the worm-wheel f' and turning the screw in the opposite direction by means of the hand-crank f^2.

The cutter-heads D D′, hereinbefore referred to, are preferably formed of cast-iron and are provided at intervals on their peripheries with transverse recesses N to receive the shanks n of the cutters. The cutters are preferably formed of what is commonly known as "Mushet steel." The ends of the cutter-heads opposite those from which the cutting ends of the cutters project are reduced in size, as shown at O, and are provided with screw-threads o, on which works a circular nut P, provided with recesses p for turning it. The rear ends of the shanks n of the cutters abut against the inner face on the ring-nut P, and hence the several cutters located in the transverse recesses in the periphery of the cutter-head may be simultaneously forced forward with the greatest precision by turning the nut P.

To hold the several cutters firmly in their position, a ring Q is provided, which surrounds the front portion of the cutter-head and the several cutter-shanks seated therein, and is held in position on the cutter-head by means of screw q, for instance, extending through the ring and tapped into the cutter-head. Through the ring Q set-screws q' extend and bear against the backs of the cutter-shanks, holding them firmly in their seats. By the above adjustment the time and labor required in drifting the cutters outwardly one at a time, and the subsequent regulating of their cutting-faces by grinding or other means, is avoided, and the adjustment may be accurately made with great nicety.

The cutter-shaft B is provided with a spur-wheel R, fixed thereon, which is driven by a pinion r, fixed on the drive-shaft C, the drive-shaft C being provided between the supports a' with a cone-pulley r' for varying the speed, as is usual. A belt S from a source of power not shown engages the pulley r' to actuate the machine.

What I claim is—

1. In a milling-machine, the combination, with the cutters and means for actuating them, of a feed-screw, means for actuating the screw, a work-support depending from the feed-screw frame and provided with lugs or ears, which embrace the feed-screw and have a free sliding movement thereon, and a nut having an engagement with the feed-screw between the said lugs or ears for moving the work-support along the feed-screw toward and away from the cutting mechanism, substantially as set forth.

2. In a milling-machine, the combination, with the cutting mechanism and means for actuating it, of the feed-screw, means for operating it, a sectional work-support depending from the feed-screw frame, one of the sections being vertically adjustable upon the other section, the said work-support being provided with lugs or ears which embrace the feed-screw and have a free sliding movement thereon, a traveling nut on the feed-screw between the lugs or ears for operating the work-support, and clamping devices for securing the work to the work-support, substantially as set forth.

3. The cutter-head comprising the cylindrical body portion provided at intervals on its periphery with recesses extending transversely across it, the rear portion of the head being reduced and provided with a screw-thread, cutters seated in the transverse recesses, a ring-nut engaged with the reduced screw-threaded portion of the head with its side in position to engage the ends of the seated cutter-shanks, a ring surrounding the larger portion of the cutter-head at the face from which the cutters project, and set-screws extending through the ring into position to lock the cutters against longitudinal displacement, substantially as set forth.

PATRICK J. KELLY.

Witnesses:
J. C. CONNOLLY,
D. SCHLEIMER.