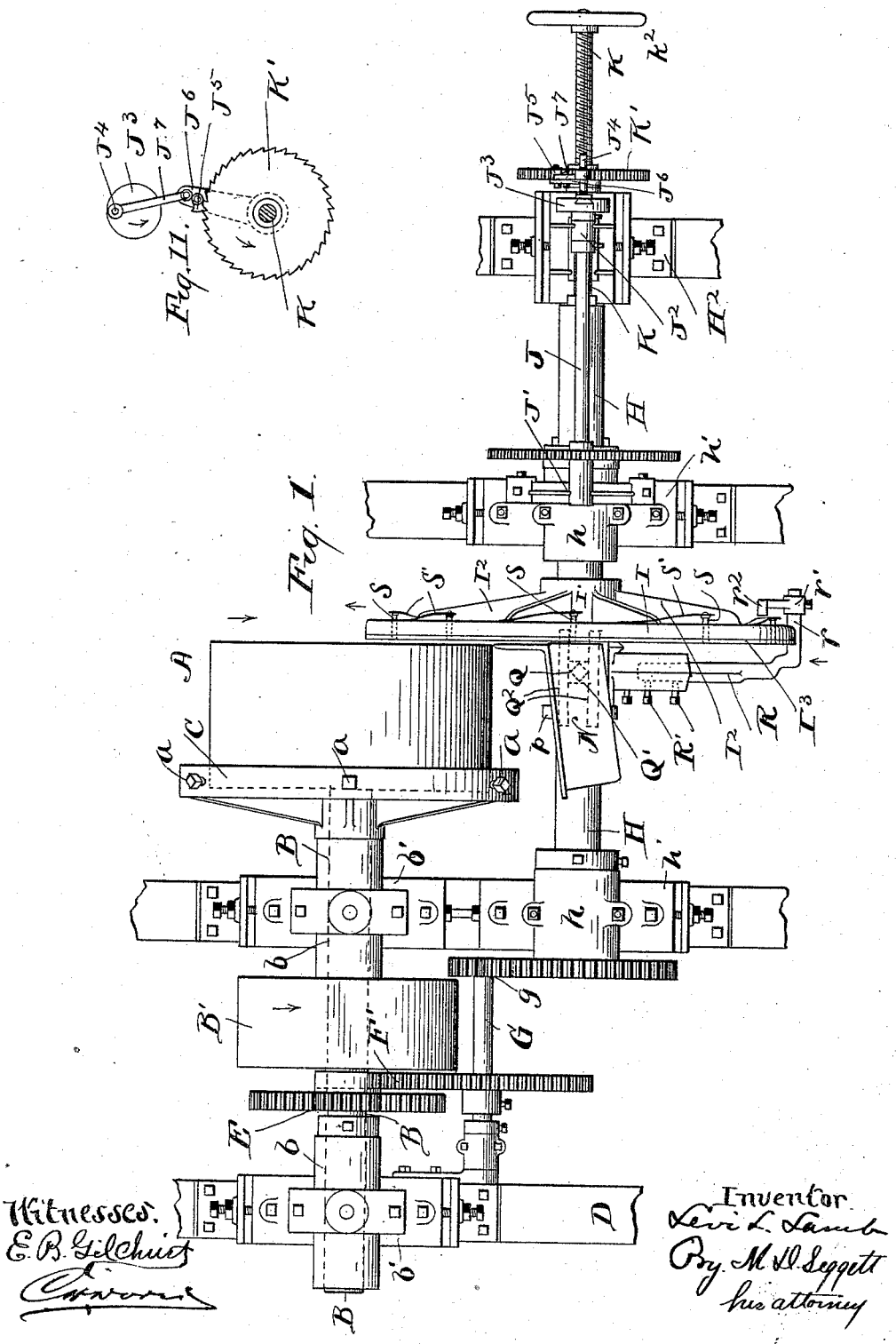
(No Model.) 3 Sheets—Sheet 1.

L. L. LAMB.

GRINDING OR FACING MACHINE.

No. 526,238. Patented Sept. 18, 1894.



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3 Sheets—Sheet 2.

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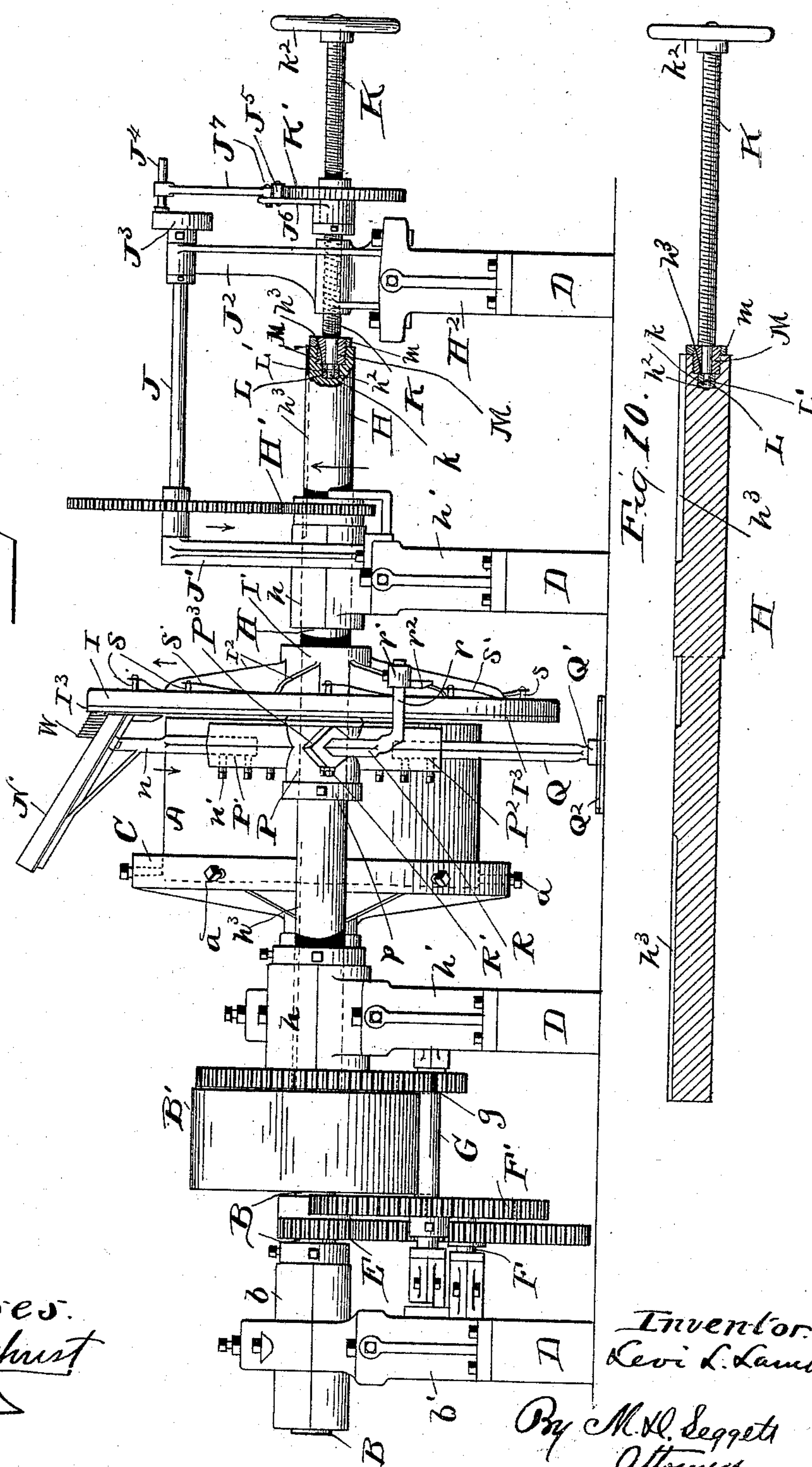

Witnesses.
E. B. Gilchrist
[illegible]

Inventor.
Levi L. Lamb
By M. H. Leggett
Attorney

(No Model.)

3 Sheets—Sheet 3.

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GRINDING OR FACING MACHINE.

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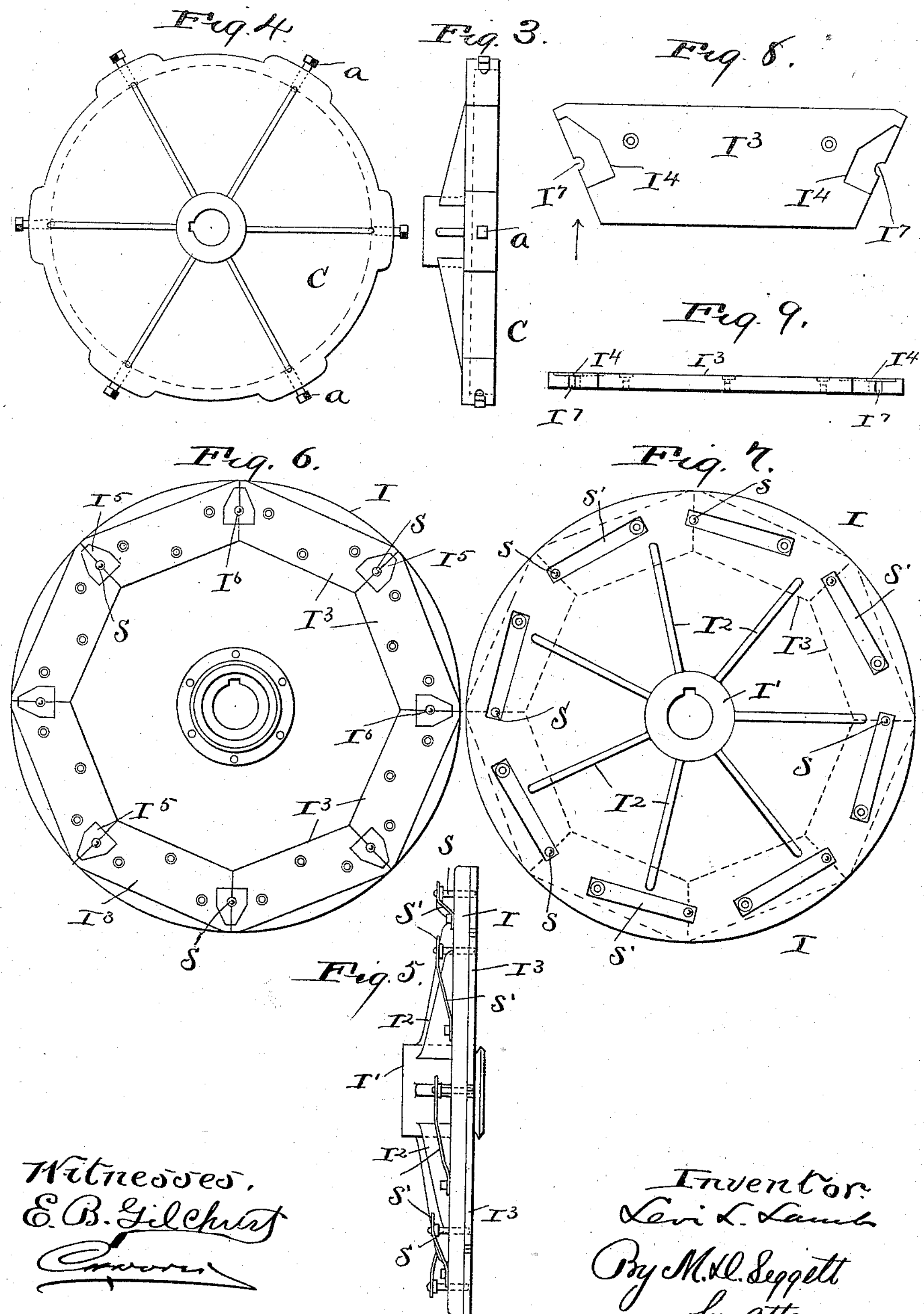

Witnesses.
E. B. Gilchrist

Inventor.
Levi L. Lamb
By M. D. Leggett
his attorney

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UNITED STATES PATENT OFFICE.

LEVI L. LAMB, OF AKRON, OHIO, ASSIGNOR TO THE WHITMAN & BARNES MANUFACTURING COMPANY, OF SAME PLACE.

GRINDING OR FACING MACHINE.

SPECIFICATION forming part of Letters Patent No. 526,238, dated September 18, 1894.

Application filed June 25, 1894. Serial No. 515,658. (No model.)

To all whom it may concern:

Be it known that I, LEVI L. LAMB, of Akron, in the county of Summit and State of Ohio, have invented certain new and useful Improvements in Grinding or Facing Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

My invention relates to improvements in grinding or facing machines, more especially designed for facing the knife-sections of harvesting-machines; and it consists in certain features of construction and in combinations of parts hereinafter described and pointed out in the claims.

A preferable construction of machine embodying my invention is illustrated in the accompanying drawings, wherein—

Figure 1 is a top plan, and Fig. 2 is a front side elevation of the same, portions being in section to more clearly show the construction, and portions being broken away to reduce the size of the figures. Fig. 3 is a side elevation of the chuck employed to carry the grinding or facing-stone or substance, and Fig. 4 is an elevation of the back side of said chuck. Fig. 5 is a side elevation of the work-holding-plate employed to carry the sections of work during the grinding or facing operation. Fig. 6 is an elevation of the face of said plate, and Fig. 7 is an elevation of the back of the plate. Fig. 8 is an enlarged elevation in detail showing the face side of one of the plates employed in the formation of the section-receiving-pockets of the work-holding-plate, and Fig. 9 is an edged view of the same, looking in the direction of the arrow in Fig. 8. Fig. 10 is a side elevation of a portion of the machine, partly in section, and enlarged relative to the corresponding parts exhibited in Figs. 1 and 2, to more clearly show the construction. Fig. 11 is an elevation, in detail, of the connection between crank J^3 and ratchet-wheel K′.

Referring to the drawings A designates the facing or grinding-stone that is operatively connected in any suitable manner with the driving-shaft B, a preferable manner of supporting said stone being shown in Figs. 1 and 2, wherein the same is secured by means of set screws, *a*, within a chuck, C, operatively mounted in any suitable manner upon the driving-shaft, said chuck having a rim provided with screw-threaded perforations for receiving the securing-screws, several of said screws being preferably provided at equal intervals apart. Chuck C is shown detached in Figs. 3 and 4.

The driving-shaft is journaled in suitable boxes *b* that are supported from standards *b*′ suitably secured to a supporting-frame, D, or to the floor of the shop wherein the machine is operated, the driving-shaft being provided with a driving-pulley B′. The driving-shaft is intergeared, as at E, (see Figs. 1 and 2) with a short shaft, F, that is suitably supported and arranged below and parallel with the driving-shaft. (See Fig. 2.) Shaft F, in turn, is intergeared, as at F′, with a shaft G, that is suitably supported a suitable distance below and forward of and arranged parallel with the driving-shaft, and shaft G is intergeared, as at *g*, with a shaft, H, that has bearing in suitable boxes *h* rigid with standards *h*′ suitably secured to the supporting-frame.

Upon shaft H is operatively mounted the work-holding-plate that is adapted to receive or carry the sections or work to be ground or faced. The work-holding-plate is shown detached in Figs. 5, 6, and 7, that exhibit a preferable construction of the same, the construction shown comprising a large circular plate I that is provided with a hub I′ and reinforcing ribs I^2, on its back side, which reinforcing ribs extend from the hub in a radial direction to near the outer edge of plate I as shown in Figs. 5 and 7.

Secured to the face and near the edge of the plate I and arranged in the form of a polygonal figure and concentric with the axis of the plate, is a series of plates I^3, adjacent plates I^3 abutting each other at their adjacent edges. A plate I^3 is shown detached in Figs. 8 and 9. Plates I^3 are recessed, respectively, on their faces at the ends, as at I^4, said recesses being open at the respective ends of the plates and the recesses in the contiguous ends of adjacent plates registering with each other so as to form pockets I^5 that are adapted to receive the sections or work to be ground or faced, the form of said pockets be-

ing such as to nicely receive the work, and the depth of the pockets being such that the work shall project outside of or protrude somewhat at the face of the chuck-plate. Briefly described, one-half of pockets I^5 is formed in each of adjacent plates I^3.

By means of the gearing hereinbefore described the driving-shaft and shaft H, the grinding or facing substance and sections to be faced or ground are revolved in opposite directions, respectively, and the arrangement of parts is such that the work-holding-plate shall overlap the one side of the face of the grinding or facing-stone, as shown in Fig. 1, and so that when the stone and work-holding-plate are revolved, the sections to be ground or faced shall traverse said side of the stone. I would here remark that the stone or grinding-surface is preferably speeded at about two hundred and twenty-five rotations to five rotations of the work.

The work-holding-plate, and consequently the sections or work to be ground or faced, are gradually fed toward the face of the grinding or facing-stone to keep said sections in proper contact with the stone during the grinding or facing operation. Suitable means are provided for automatically accomplishing this endwise motion of the work-holding-plate, a preferable construction of feeding-mechanism for the purpose being shown in Figs. 1 and 2, wherein shaft H, a suitable distance at the rear of the work-holding-plate is intergeared, as at H′, with a horizontal shaft J that is shown arranged a suitable distance above and in the same vertical plane with shaft H and supported by upright brackets or arms J' J^2, the one whereof J' is rigid with a standard h' at the rear of the work-holding-plate and the other J^2 being rigid with a standard H^2 located still farther rearward of the work-holding-plate.

Shaft J, at its outer end, is provided with a crank-wheel or disk J^3 provided with a wrist-pin J^4 to which, as will hereinafter appear, is operatively connected, a pawl or ratchet, J^5, (see also Fig. 11) that engages a ratchet-wheel K′ operatively mounted upon a feed-screw, K, that extends, through a correspondingly-threaded hole in arm or bracket J^2, into the outer end of shaft H, the arrangement of parts being such that said screw, by the mechanism operatively connecting it with shaft H, shall be turned so as to feed shaft H, and the work-holder borne by said shaft, toward the grinding or facing-stone or substance.

Pawl or ratchet J^5 is pivoted to an arm, J^6, loosely mounted upon the hub of ratchet-wheel K′, and arm J^6, by means of a link J^7, is operatively connected with the wrist-pin J^4 of crank J^3, said link being slidably mounted upon the wrist-pin to accommodate the movement of the pawl or ratchet with the ratchet-wheel and feed-screw during the feeding operation.

Feed-screw K is operatively connected with a shaft H preferably in the following manner: Said shaft (see also Fig. 10) is bored centrally at its outer end, as at h^2, (see Fig. 10) the inner portion of which bore is engaged by a collar L rigidly mounted, preferably by means of a pin L′, upon the reduced unthreaded inner end k of the feed-screw. The outer portion of bore h^2 in the shaft is enlarged diametrically, as shown, said enlarged portion of the bore being screw-threaded and engaged by a retaining-screw M that is shown engaging shoulder h^3 formed by the enlargement of the bore in the shaft at the outer end of collar L and engages and holds collar L in engagement with the unthreaded portion of hole h^2. The retaining-screw extends somewhat outside of the bore in the shaft, and has mounted thereon a lock-nut m that is tightened against the end of the shaft and locks the retaining-screw in position within the enlarged portion of bore h^2 in the shaft. The retaining-screw is loosely mounted upon the feed-screw, the portion of the feed-screw upon which screw M is mounted being plain or unthreaded, as shown in Figs. 2 and 10.

By the construction just described, it will be observed that the feed-screw is operatively connected with the shaft in such a manner that the shaft and the work-holding-plate borne thereby are moved endwise in the one direction or the other according as the feed-screw is turned in the one direction or the other. The feed-screw, in the case illustrated, is provided with a left-handed thread. Hence shaft H and the members carried thereby are fed in the direction of the grinding or facing-stone by turning said screw to the left and are farther separated from said stone by turning the screw to the right.

The feed-screw, at its outer end, is provided with a hand-wheel k^2 whereby the screw can be turned in the direction to separate the work-holding-plate from the grinding or facing-stone.

Having described the mechanism whereby the knife-sections or work to be ground or faced are automatically fed toward the grinding or facing surface during the grinding or facing operation, I will next refer to the manner of feeding the knife-sections to the work-holding-plate and the mechanism whereby the knife-sections, upon the completion of the grinding or facing operation, are automatically discharged from the pockets in said plate, and referring, first, to the manner of feeding, the knife-sections to the work-holding-plate, I would remark that the knife-sections are placed in a hopper, N, suitably supported at the top and forward of the work-holding plate. The hopper, as shown in Fig. 1, is arranged somewhat obliquely to a line extending parallel with the axis of shaft H, and declines toward the work-holding-plate as shown in Fig. 2. The knife-sections to be ground or faced (several of which are shown in the hopper at W in Fig. 2) are placed in the hopper in an upright position, and descends down

the hopper by gravity into the pockets of plate I, the location of the discharging-end of the hopper being such relative to the location of the pockets in the plate, that the empty pockets receive a section as they pass the discharging-end of the hopper during the rotation of the work-holding-plate.

The hopper is preferably supported by an upright arm or post, n, that is removably secured, by means of set-screws n', within an arm P′ of a three-armed casting or collar P that is loosely mounted upon shaft H at the face of the work-holding-plate, member P being held from endwise displacement by means of a collar p fixed upon the shaft at the end of member P opposite to the location of the work-holding-plate. An arm P^2 of said member P projects downwardly and embraces, and is secured preferably by means of set-screws, to a post or support Q suitably supported. The remaining arm P^3 of member P projects laterally in a horizontal or approximately horizontal plane, and embraces an arm R that is adjustable endwise of arm P^3 of member P and is secured to member P^3 by means of set-screws R′.

Arm R extends somewhat beyond the edge of the work-holding-plate, and at the edge of said plate extends laterally and somewhat rearwardly of the plate, as at r (see Figs. 1 and 2) and said laterally and rearwardly-projecting member r of arm R, at its free end, and at the rear side of plate I, has adjustably and rigidly mounted thereon an inwardly projecting arm r', to the inner extremity whereof is secured a depending incline r^2 hereinafter referred to.

A hole I^6 (see Fig. 6) extends through the plates I at each work-holding-pocket and preferably centrally of the respective pocket, the meeting edges of plates I^3 being shown cut away, as at I^7 (see Fig. 8) to form said holes. Adapted to enter holes I^6 are pins S, that are supported in any suitable manner, a preferable construction being shown in Fig. 5, wherein said pins are operatively connected with springs, S′, that are suitably secured to the back side of the work-holding-plate. The arrangement of parts and the trend of incline r^2 are such that said pins or the portion of the springs connected with the pins shall, during the rotation of the work-holding plate, engage the aforesaid incline, and, by the latter, be actuated inwardly, causing the respective pin to enter the respective hole in the work-holding-plate, and push the ground or faced knife-section out of the pocket containing the section, and the pocket that is thus emptied will again be occupied by an unground knife-section when said pocket again comes opposite the discharging-end of the feed-hopper during the rotation of the work-holding-plate.

The capacity of the feed-hopper is preferably such as to enable the hopper to receive from fifty to a hundred knife-sections. All the attendant has to do is to keep the feed-hopper supplied with knife-sections, and it will be observed that owing to the small amount of labor the machine requires of the attendant, the latter can, without difficulty, look after several machines or other work. The feed-hopper must, of course, move with the work-holding plate and shaft H during the endwise movement of the latter, and, to accommodate such movement of the hopper, post Q, at its lower extremity, terminates in a sliding-plate or block, Q′, that is adapted to slide endwise of ways or guides Q^2 rigidly secured to the floor of the shop and arranged parallel with shaft H. Of course, the gears that are mounted upon and employed in establishing operative connection between shaft H and shafts G and J, are connected with shaft H by the well known means of groove and feather, and the grooves h^3 (see Figs. 2 and 10) in the shaft are of such length as to accommodate the endwise movement of the shaft during the feeding operation hereinbefore described. In other words, said gears are both operatively and slidably mounted upon the shaft.

What I claim is—

1. In a grinding or facing-machine, the combination with a rotating shaft and a chuck operatively mounted upon said shaft and bearing or adapted to bear the grinding or facing surface, of another suitably driven shaft arranged parallel with and a suitable distance forward of the chuck-carrying-shaft, and having a work-holding-plate operatively mounted thereon, said work-holding-plate being provided with pockets for receiving the work to be ground or faced, suitable means for feeding the work-holding-plate toward the grinding or facing surface during the facing or grinding operation, and mechanism operatively connected with one of said rotating shafts for actuating the feeding-device, substantially as set forth.

2. In a facing or grinding-machine, the combination with a rotating shaft provided with a chuck bearing or adapted to bear the grinding or facing, surface another rotating shaft arranged parallel with and a suitable distance forward of the chuck-bearing-shaft, said forward shaft being provided with a work-holding-plate having pockets for receiving the work to be ground or faced, a feed-screw for actuating the shaft bearing the work-carrying-plate for feeding said plate toward the grinding or facing surface during the facing or grinding operation, suitable means for turning said screw to effect said feed, and mechanism operatively connected with the aforesaid plate-bearing-shaft for actuating said screw-turning means, substantially as set forth.

3. In a facing or grinding-machine, the combination with a chuck-bearing-shaft the chuck whereof carried or is adapted to bear the grinding or facing surface, and another suitably driven shaft bearing the work-holding-plate and arranged parallel with and located

a suitable distance forward of the chuck-bearing-shaft, the work-holding-plate being provided with pockets for receiving the work to be ground or faced and said plate-bearing-shaft being adapted to move endwise, of a screw for actuating said plate-bearing-shaft toward the facing or grinding surface during the grinding or facing operation, a correspondingly threaded bearing for the screw, a ratchet-wheel operatively mounted upon the screw, a crank-shaft operatively connected with the shaft that bears the work-holding-plate, and a pawl or ratchet operatively connected with the crank of the crank-shaft, said pawl or ratchet engaging and being adapted to actuate the ratchet-wheel in the direction to cause the work to be fed and properly held against the grinding or facing surface during the facing or grinding operation, substantially as set forth.

4. In a facing or grinding-machine, the combination with a suitably driven shaft bearing a chuck for carrying the grinding or facing surface, and another suitably driven shaft bearing the work-holding-plate and movable endwise, of suitable means for automatically actuating said longitudinally movable shaft toward the grinding or facing surface during the facing or grinding operation, a feed-hopper supported from said longitudinally movable shaft in front of the face of the work-holding-plate, said hopper being adapted to receive and deliver the work to be faced or ground to said plate and being movable with the supporting shaft and work-holding-plate, substantially as set forth.

5. In a facing or grinding-machine, the combination with a suitably driven shaft bearing a chuck for carrying the grinding or facing surface and another suitably driven shaft bearing the work-holding-plate and movable endwise, of suitable means for automatically actuating said longitudinally movable shaft toward the grinding or facing surface during the facing or grinding operation, and other means for actuating said shaft in the opposite direction, substantially as set forth.

6. The combination of two shafts B and H intergeared and arranged parallel with each other, the one shaft bearing a chuck for receiving the grinding or facing-surface and the other shaft bearing a work-holding plate provided with pockets for receiving the work to be ground or faced and movable endwise to feed the work-holding-plate to and from the facing or grinding surface, a screw K operatively connected with one end of the aforesaid longitudinally movable shaft substantially as indicated, suitable mechanism for automatically turning said screw in the direction required to feed the work, and suitable means for turning the screw in the opposite direction.

7. In a facing or grinding machine, the combination with a suitably driven shaft bearing a chuck for carrying the grinding or facing surface and another suitably driven shaft bearing the work-holding-plate and movable endwise, of suitable means for automatically actuating said longitudinally movable shaft toward the grinding or facing surface during the facing or grinding operation, other means for actuating said shaft in the opposite direction, and suitable means for automatically effecting the discharge of the work from the work-holding-plate upon the completion of the grinding or facing operation, substantially as set forth.

8. In a facing or grinding-machine, the combination with a suitably driven shaft bearing a chuck for carrying the grinding or facing surface and another suitably driven shaft bearing the work-holding-plate and movable endwise, of suitable means for automatically actuating said longitudinally movable shaft toward the grinding or facing surface during the facing or grinding operation, other means for actuating said shaft in the opposite direction, and suitable means for automatically effecting the discharge of the work from the work-holding-plate upon the completion of the grinding or facing operation, said discharging means consisting of pins extending into and movable in the work-holding-plate, suitable means acting to retain said pins in their normal or inoperative position and an incline r^2 the location and trend whereof is such that the work-discharging pins shall, during the rotation of the work-holding-plate, come opposite said incline and be thereby actuated, against the action of the aforesaid springs, in the direction to effect the discharge of the work, substantially as shown and described.

In testimony whereof I sign this specification, in the presence of two witnesses, this 4th day of November, 1893.

LEVI L. LAMB.

Witnesses:
C. H. DORER,
GEO. BILLOW, Jr.