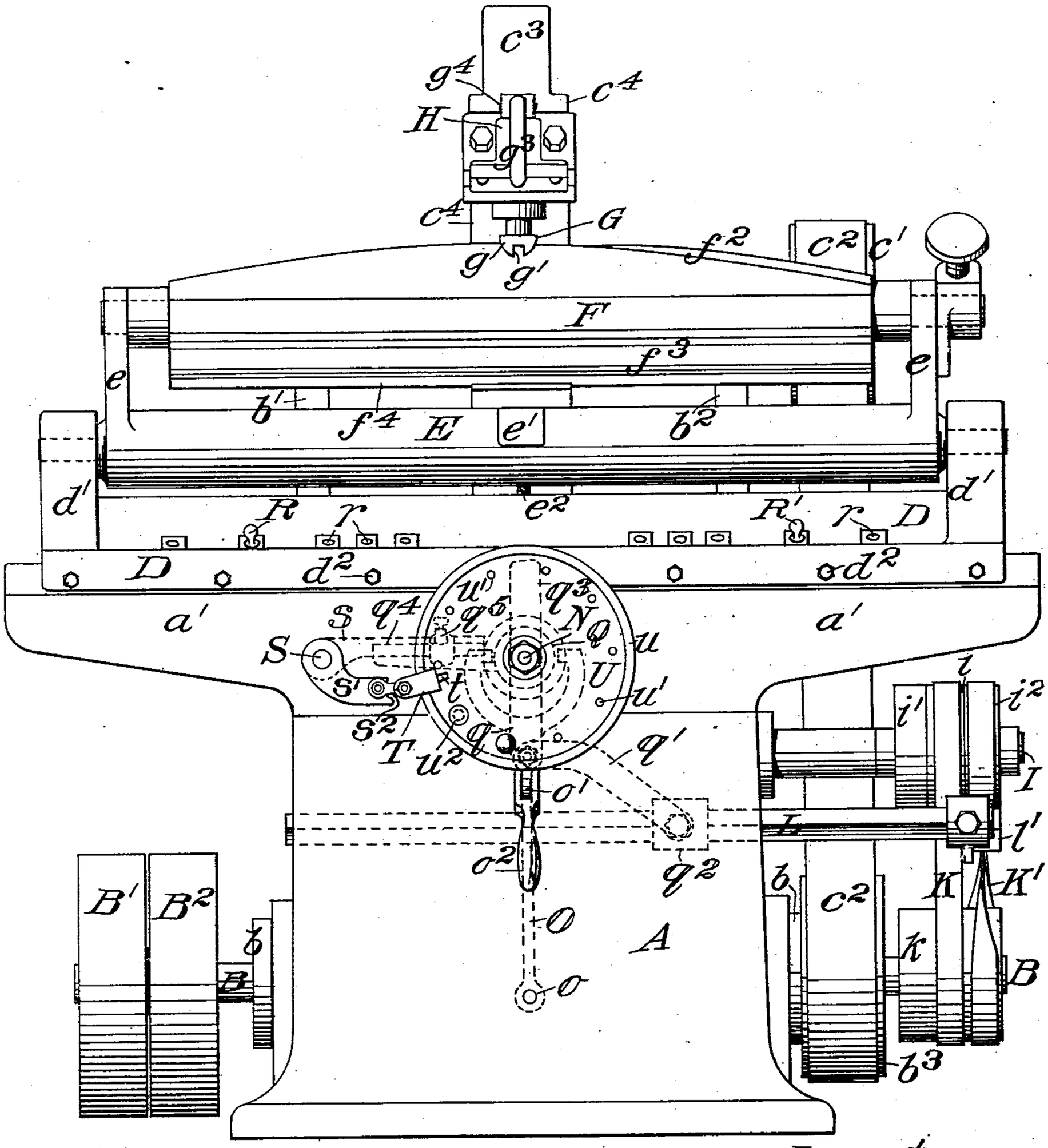
(No Model.) 3 Sheets—Sheet 1.

W. O. VIVARTTAS.

GRINDING MACHINE.

No. 563,105. Patented June 30, 1896.

Fig. 1.



Witnesses:
C. E. Combs
George Barry Jr.

Inventor:
William O. Vivarttas.
by attorneys:
Brown & Seward

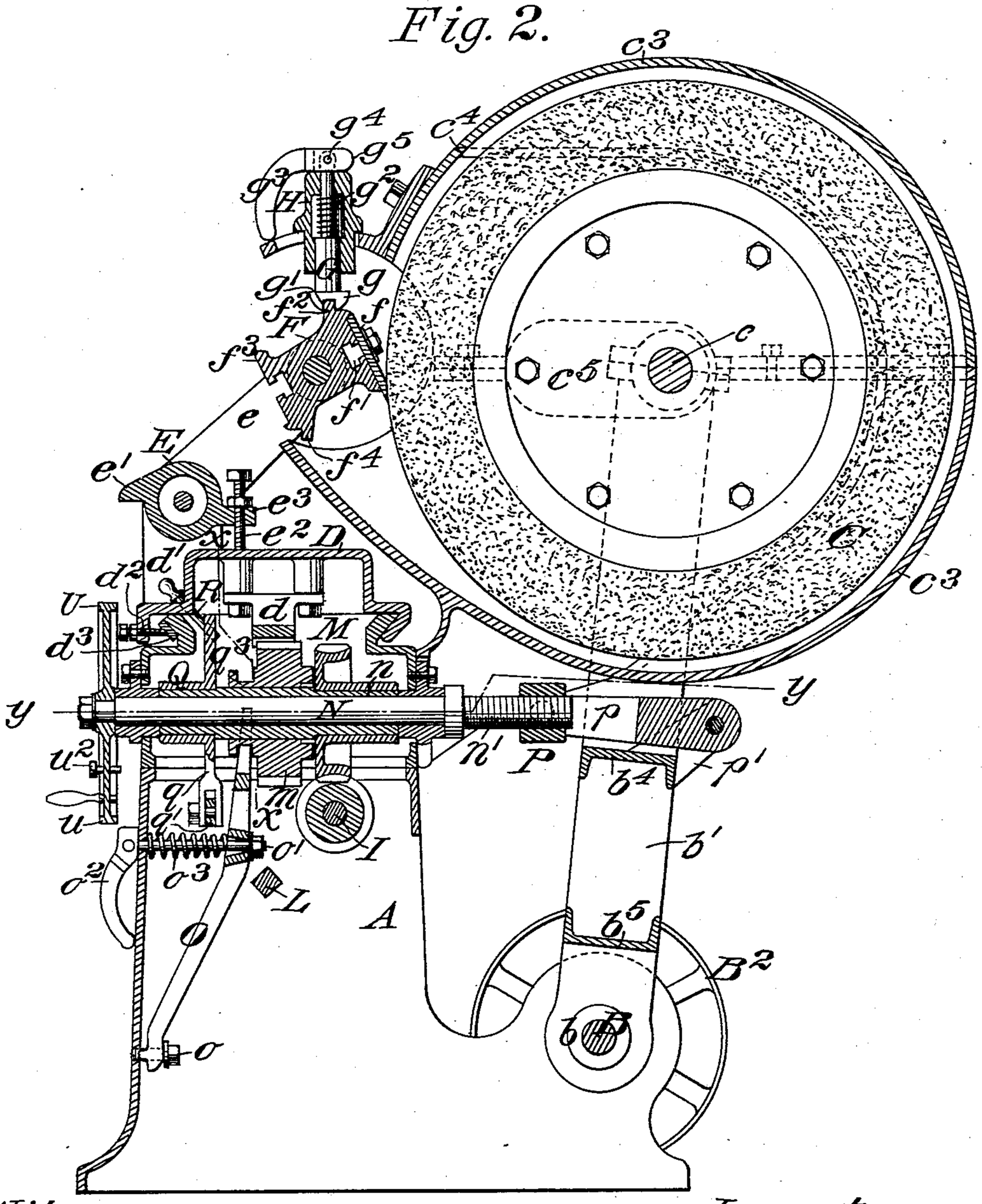
(No Model.) 3 Sheets—Sheet 2.

W. O. VIVARTTAS.

GRINDING MACHINE.

No. 563,105. Patented June 30, 1896.

Fig. 2.



Witnesses:
C. E. Combs.
George Barry Jr.

Inventor:
William O. Vivarttas.
by attorneys:
Brown & Wood

(No Model.) 3 Sheets—Sheet 3.

W. O. VIVARTTAS.

GRINDING MACHINE.

No. 563,105. Patented June 30, 1896.

Fig. 3.

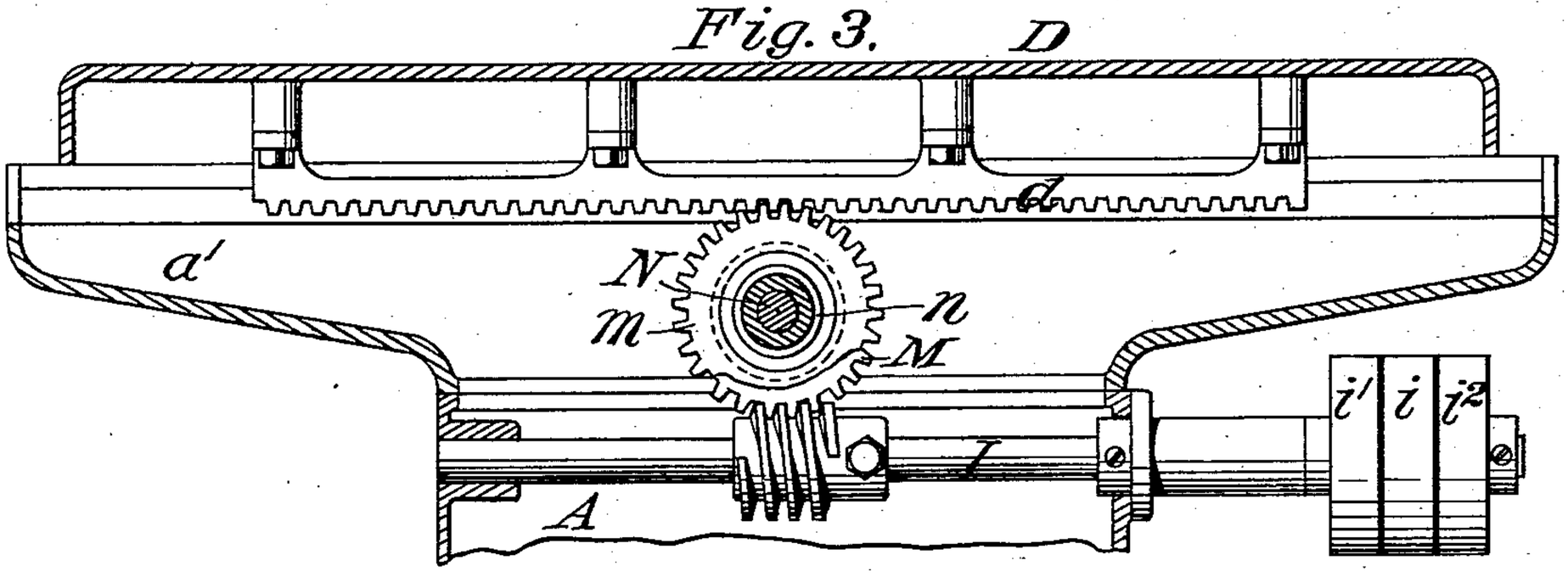


Fig. 4.

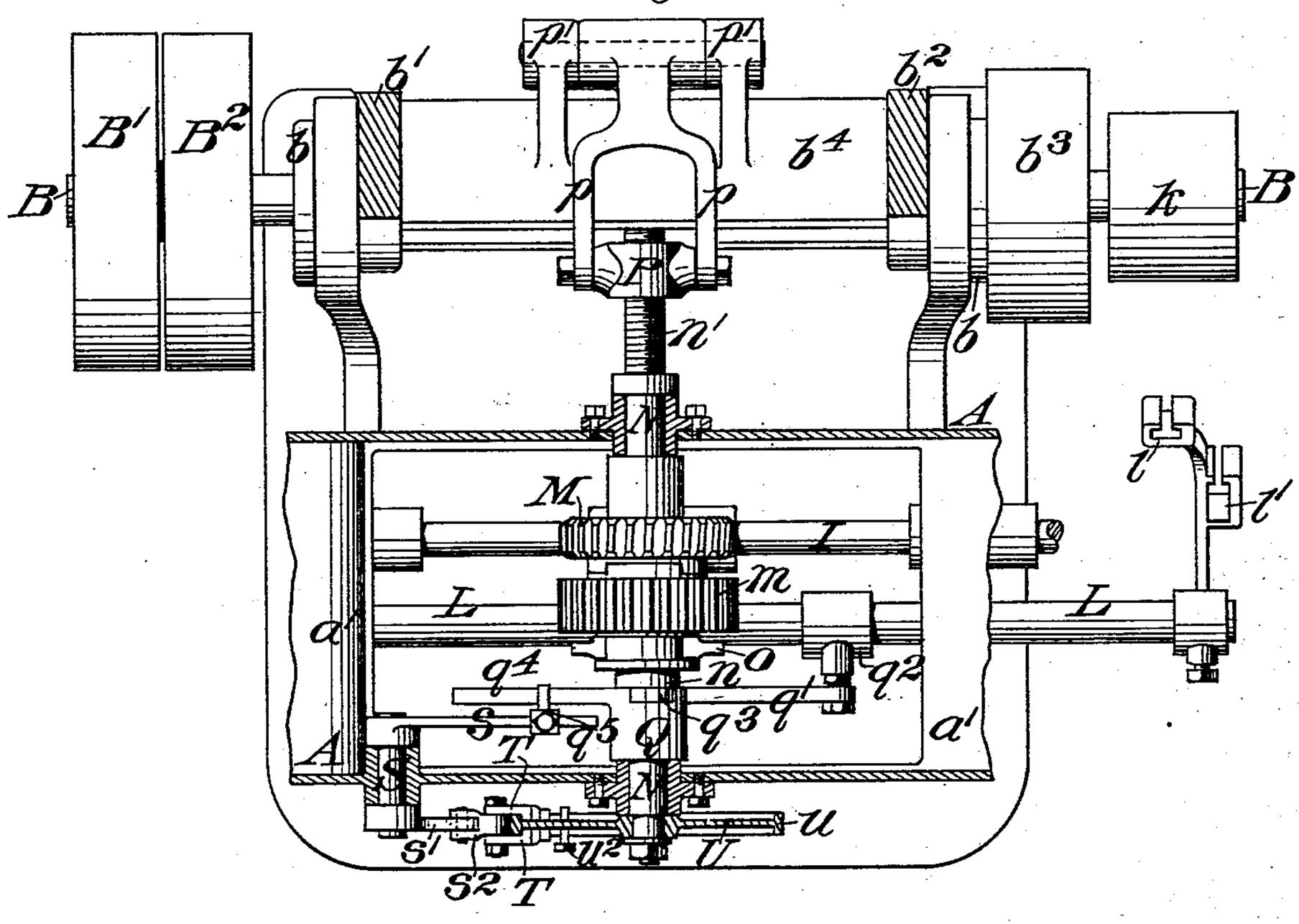
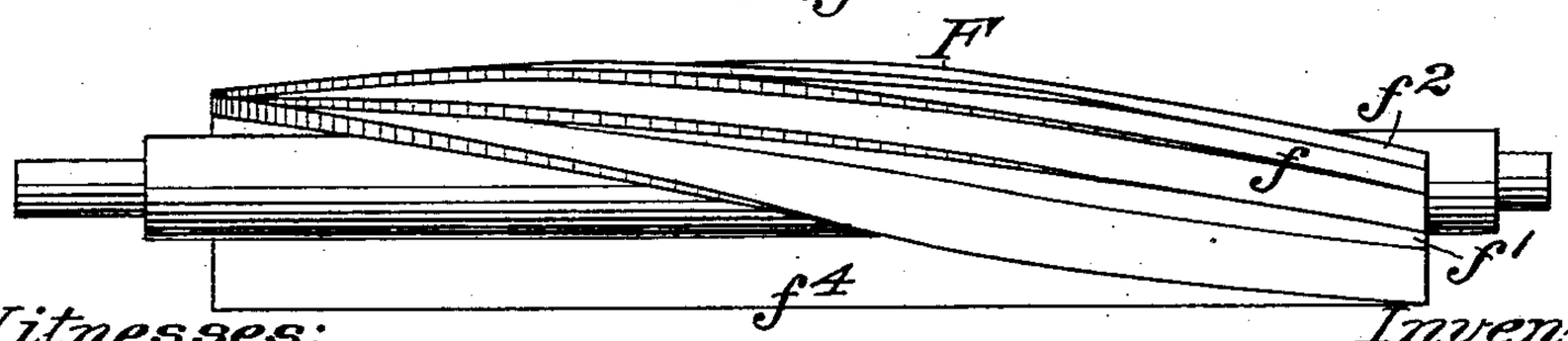


Fig. 5.



Witnesses:
C. E. Combs.
George Barry Jr.

Inventor:
William O. Vivarttas.
by attorneys:
Brown & Seward

UNITED STATES PATENT OFFICE.

WILLIAM O. VIVARTTAS, OF HOBOKEN, NEW JERSEY, ASSIGNOR TO THE GLEN COVE MACHINE COMPANY, LIMITED, OF NEW YORK, N. Y.

GRINDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 563,105, dated June 30, 1896.

Application filed November 4, 1895. Serial No. 567,796. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM O. VIVARTTAS, of Hoboken, in the county of Hudson and State of New Jersey, have invented a new and useful Improvement in Grinding-Machines, of which the following is a specification.

My invention relates to an improvement in grinding-machines, and more particularly to machines for automatically grinding edges of cutting-knives, either straight or curved.

In the accompanying drawings, Figure 1 is a view of the machine in front elevation. Fig. 2 is a view in vertical section from front to rear. Fig. 3 is a view in detail in vertical section taken transversely through the machine in the plane of line $x\,x$ of Fig. 2. Fig. 4 is a horizontal section taken along the plane of the line $y\,y$ of Fig. 2, and Fig. 5 is a view in detail of the head on which the knife is supported while being ground.

The supporting-frame of the machine consists of a base or pedestal A, spreading out laterally at its upper portion, as shown at a', to form an extended way for the travel of the carriage which, in the present form of my invention, carries the knife to be ground back and forth past the periphery of the grinding-stone while the latter is caused to rotate in a vertical plane and positively and automatically fed toward the surface to be ground.

The main drive-shaft (denoted by B) is mounted within sleeves or hollow trunnions b, which latter are supported in suitable openings in a rearward projection of the pedestal A. On the sleeves or hollow trunnions b arms b' b^2 are mounted and extend upwardly into position to support the grinding-stone C at the proper height. The stone C is fixed to a shaft c, mounted in suitable bearings at the upper ends of the arms b' b^2, and said shaft is provided with a drive-pulley c', which is connected by a belt c^2 with a drive-pulley b^3 on the main shaft B.

The grindstone C is surrounded by a casing c^3, spaced a short distance from its periphery and widened opposite the hub portion of the grindstone, as shown at c^4. This casing c^3 is provided with elongated slots c^5 where the shaft c passes through the casing to permit the wheel to be rocked with its supporting-arms toward and away from the work. The casing c^3 is fixed to the upper portion of the pedestal A. The arms b' b^2 are connected at points below the casing c^3 by cross-girders b^4 b^5.

On the top of the pedestal A, along the upper edge of the extended portion a, there is formed a dovetailed way, on which a carriage D is fitted to slide. The carriage D has fixed to its under side a rack-bar d in position to be engaged by a spur-wheel, as will be hereinafter particularly described. The carriage D has a U-shaped frame E pivoted between uprising arms d' of the carriage, and between the branches e of the U-shaped frame E the head or work-holder F is mounted for the attachment thereto of the knife to be ground. One side f of the head F is made winding and provided with a central longitudinal groove f' and with a winding rib f^2, having the same wind as the face f, for the purpose of guiding the head in such a manner as to present the edge throughout its entire length in the same position relative to the grinding-stone. Another side of the head F is made straight, and is denoted by f^3, for the grinding of the straight knife, and it also has a projecting rib f^4 for holding it truly to the stone.

A yielding plunger G is mounted in a socket-piece H, supported by the casing just above the opening through which the supporting-head F enters the casing to bring the knife into contact with the stone. The lower end of said plunger G is provided with a winding groove g to fit the guide-rib f^2, and also with a straight groove g', extending transversely to the groove g for receiving the rib f^4 when grinding a straight knife. The plunger G is held in engagement with the rib by a spring g^2, engaged with the upper end of the wall of the socket-piece H and with a shoulder on the plunger, and the plunger is lifted and held out of engagement with the guide-rib by means of a lever g^3, pivoted to the upper end of the plunger at g^4, so that when rocked upwardly it will lift the plunger and at the same time swing its rounded end g^5 into position between the pivotal point g^4 and the head of the socket-piece H, thereby holding the plunger in elevated adjustment.

The U-shaped swinging support E has a nose e' formed at its front, so that when it is

swung forwardly for the purpose of adjusting a new knife-blade to the supporting-head, the nose e' will engage the top of the carriage and prevent it from swinging beyond a predetermined point. The adjustment of the U-shaped frame E, when swung into its position for use, is effected by means of a set-screw e^2, extending through a screw-threaded perforation in a lug e^3, projecting rearwardly from the frame E and engaging the top of the carriage D.

The carriage is adjusted to its way by means of set-screws which extend through a depending flange of the carriage at its front and engages a wearing-shoe d^3 in contact with the beveled face of the way.

A worm-shaft I, extending transversely of the machine, is provided with a pulley i, fixed to rotate with the shaft and with loose pulleys i' and i^2 upon opposite sides of the pulley i. A belt K and a cross-belt K′ connect two of the pulleys i i' i^2 with the driving-pulley k, fixed to rotate with the drive-shaft B. The arrangement of the belts K K′ is such that one of them, for example K, may be engaged with the pulley i and the drive-pulley k to rotate the worm-shaft I in one direction, while the cross-belt K′ runs idly upon the loose pulley i^2, and when it is desired to rotate the worm-shaft I in the opposite direction the belt K may be shifted onto the loose pulley i' and the cross-belt K′ may be shifted onto the pulley i. A belt-shifter, consisting of a sliding bar L, provided with sets of jaws l l', is employed for simultaneously shifting the two belts K K′ to rotate the worm-shaft in the one direction or the other.

The worm on the shaft I is arranged to engage a worm-wheel M, loosely mounted on a sleeve n, which is supported upon a shaft N, extending from front to rear of the machine and mounted in suitable bearings in the supporting-frame. On the same sleeve n on which the worm-wheel M is mounted there is also mounted a spur-wheel m in gear with the rack-bar d on the under side of the carriage D. Provision is made for sliding the spur-wheel m along the sleeve n toward and away from the worm-wheel M to clutch it to and release it from the worm-wheel in order to operate the carriage on its way or to throw it out of operative position. The shifting mechanism for throwing the spur-wheel m into and out of engagement with the worm-wheel consists of a lever O, supported at its lower end at the front of the pedestal A, as shown at o, with its free end in loose engagement with the hub of the spur-wheel m. The lever-operating rod o' is engaged at one end with the lever O and extends at its opposite end through the front of the pedestal, where it is provided with an operating-handle o^2, pivoted to its end in such a manner that when the operating-handle o^2 is thrown upwardly it will draw the rod o' forwardly against the tension of the interposed spring o^3, and by the engagement of the end of the operating-handle o^2 with the front of the pedestal will lock the shifting-lever O in its forward adjustment against the tension of the spring o^3, and hence the spur-wheel m out of engagement with the worm-wheel M, and so cause the carriage D to stop its travel.

The shaft N is provided at its rear end with a screw-threaded portion n', which works in a nut P, secured between a pair of rocking arms p, pivoted to a pair of lugs p' on the cross-girder b^4. As the shaft N is held against longitudinal movement its rotary movement will tend, by the engagement of its screw-threaded portion with the nut P, to draw the grind-stone-supporting arms toward or push them away from the front of the machine or toward and away from the work on the supporting-head F, according as it is rotated in the one direction or the other.

On the sleeve n there is also loosely mounted a three-armed wheel Q, the depending arm q being connected by a rod q' with a connecting-piece q^2 on the sliding belt-shifter L, and the upwardly-extending arm q^3, extending into the path of pins R and R′, which may be inserted in any of the several holes r through the side of the carriage D. The third arm q^4 of the three-armed wheel has an adjustable connection q^5 with an arm s on a short rock-shaft S, journaled in a suitable bearing at the front of the upper portion of the supporting-frame, which shaft S has also fixed thereto, at the front of the frame, an arm s', engaged with a set of gripping-jaws T by a link s^2. The gripping-jaws T are adapted to embrace the rim u of a wheel U, fixed to rotate with the shaft N at the front of the supporting-frame. The wheel U is provided with a series of perforations u' for receiving a pin u^2, which pin is arranged to engage a projection t on the gripping-jaws T when the wheel U has been rotated in a position to bring the pin u^2 into proximity to the jaws. Power may be applied to and released from the drive-shaft B by means of a drive-pulley B′ and a loose pulley B^2 from any suitable source.

The operation is as follows: Suppose the blade, either the curved blade or straight blade, to have been placed upon the supporting-head F and the guide G adjusted to the supporting-head, the carriage for traversing the blade back and forth against the periphery of the grinding-stone is set in motion by throwing the spur-wheel m into engagement with the worm-wheel M. The pins R and R′ having been inserted in the holes r in the carriage at such distances apart as to correspond to the length of the blade to be ground, as the carriage in traveling in the direction in which it was started brings one of the pins R R′ into engagement with the upwardly-extending arm q^3 of the three-armed wheel Q, it will rock said wheel Q and will, by means of the connection of its depending arm q with the belt-shifter L, shift the belts K K′ to rotate the worm-shaft in the opposite direction and hence start the carriage on its return move-

ment. As the carriage approaches the limit of its stroke on its return movement, the other pin R or R′ will, in like manner, rock the three-armed wheel Q in the opposite direction and will again shift the belts K K′, so as to cause the carriage to again advance in the opposite direction, and in this manner the carriage will continue to be automatically reciprocated back and forth across the periphery of the grindstone until the spur-wheel *m* has been thrown out of engagement with the worm-wheel M. As the three-armed wheel Q is rocked in the direction to lower the arm q^4 it will, by its connection with the arm *s* on the rock S, lower the arm *s′* and thereby slide the gripping-jaws T loosely along the rim *u* of the wheel U. When the three-armed wheel is rocked in the opposite direction, the arm q^4, by lifting, will carry with it the arm *s* and hence the arm *s′* and the gripping-jaws T, connected therewith, which, by the link connection s^2, will be caused to grip tightly the rim *u* and thereby rotate the wheel U in the direction in which the hands of a clock travel. This movement of the wheel U will rotate the shaft N and by its engagement with the nut P will feed the grindstone forward toward its work. This forwardly feeding of the grindstone may be arrested at any predetermined interval by inserting a pin u^2 in one of the holes *u′* at a greater or less distance from the gripping-jaws T, so that the said pin will arrest the downwardly-sliding movement of said jaws along the rim of the wheel U when the shaft S is rocked by the movement of the three-armed wheel and hence will prevent it from catching a new hold of the rim to rotate the wheel U. By this provision the grinding action may be made to automatically stop after a predetermined amount has been ground from the blade or other work presented to the grindstone, even though the attendant be absent and fail to stop the travel of the carriage.

It is obvious that slight changes might be resorted to in the form and arrangement of the several parts without departing from the spirit and scope of my invention. Hence I do not wish to limit myself strictly to the structure herein set forth; but

What I claim is—

1. A grinding-machine, comprising a grindstone, means for rotating it, a rotary work-holder, a reciprocating carriage forming a support for the work-holder, means for reciprocating the carriage, a guide for determining the rotary movement of the work-holder while it is being reciprocated, a feed mechanism under the control of the reciprocating carriage to cause the grindstone to approach the work and means for automatically stopping the feed at a predetermined point in its travel, substantially as set forth.

2. A grinding-machine, comprising a grindstone, means for rotating it, a rotary work-holder, a swinging frame forming a support for the work-holder, a reciprocating carriage forming a support for the swinging frame, a guide for determining the amount of rotation of the work-holder during its reciprocating movement and means for automatically reversing the movement of the carriage, substantially as set forth.

3. A grinding-machine, comprising a grindstone, means for rotating it, a rotary work-holder, a carriage forming a support for the work-holder, a guide for determining the amount of rotation of the work-holder during its reciprocating movement, a rack-bar on the carriage, a spur-wheel mounted in position to engage the rack-bar, a worm-wheel, means for locking the spur-wheel to and releasing it from the worm-wheel, a worm for operating the worm-wheel, a direct and a cross belt connecting pulleys on the drive-shaft and worm-shaft, and means under the control of the carriage for shifting the said belts to reverse the worm-shaft and hence the carriage, substantially as set forth.

4. A grinding-machine, comprising a grindstone, a swinging support for the grindstone, a rotary shaft provided with a screw-thread, a nut connected with the swinging grindstone-support and adapted to engage the screw-threaded portion of the said shaft, a reciprocating carriage, a work-holder supported by the carriage, means for reciprocating the carriage, a wheel fixed to rotate with said shaft, a clamp engaged with the rim of said wheel, and means under the control of the reciprocating carriage for operating the clamp and thereby rotating the wheel and its shaft to swing the grindstone toward its work, substantially as set forth.

5. In combination, a drive-shaft, sleeves or trunnions in which the drive-shaft is mounted, a grindstone, a swinging grindstone-support mounted on said sleeve or trunnions, a work-holder, means for reciprocating the work-holder transversely to the plane of the grindstone, means for automatically swinging the grindstone toward its work, and means for rotating the grindstone, substantially as set forth.

6. The combination with a grindstone, its support and means for rotating it, of a casing for protecting the grindstone, a work-holder, means for swinging the work-holder through an opening in the casing into proximity to the grindstone, and a plunger supported by the casing and fitted to engage the work-holder and guide it, substantially as set forth.

WILLIAM O. VIVARTTAS.

Witnesses:
FREDK. HAYNES,
IRENE B. DECKER.