No. 806,551. PATENTED DEC. 5, 1905.

R. MARTIN.

MACHINE FOR CONCAVING RAZORS.

APPLICATION FILED DEC. 10, 1904.

4 SHEETS—SHEET 1.

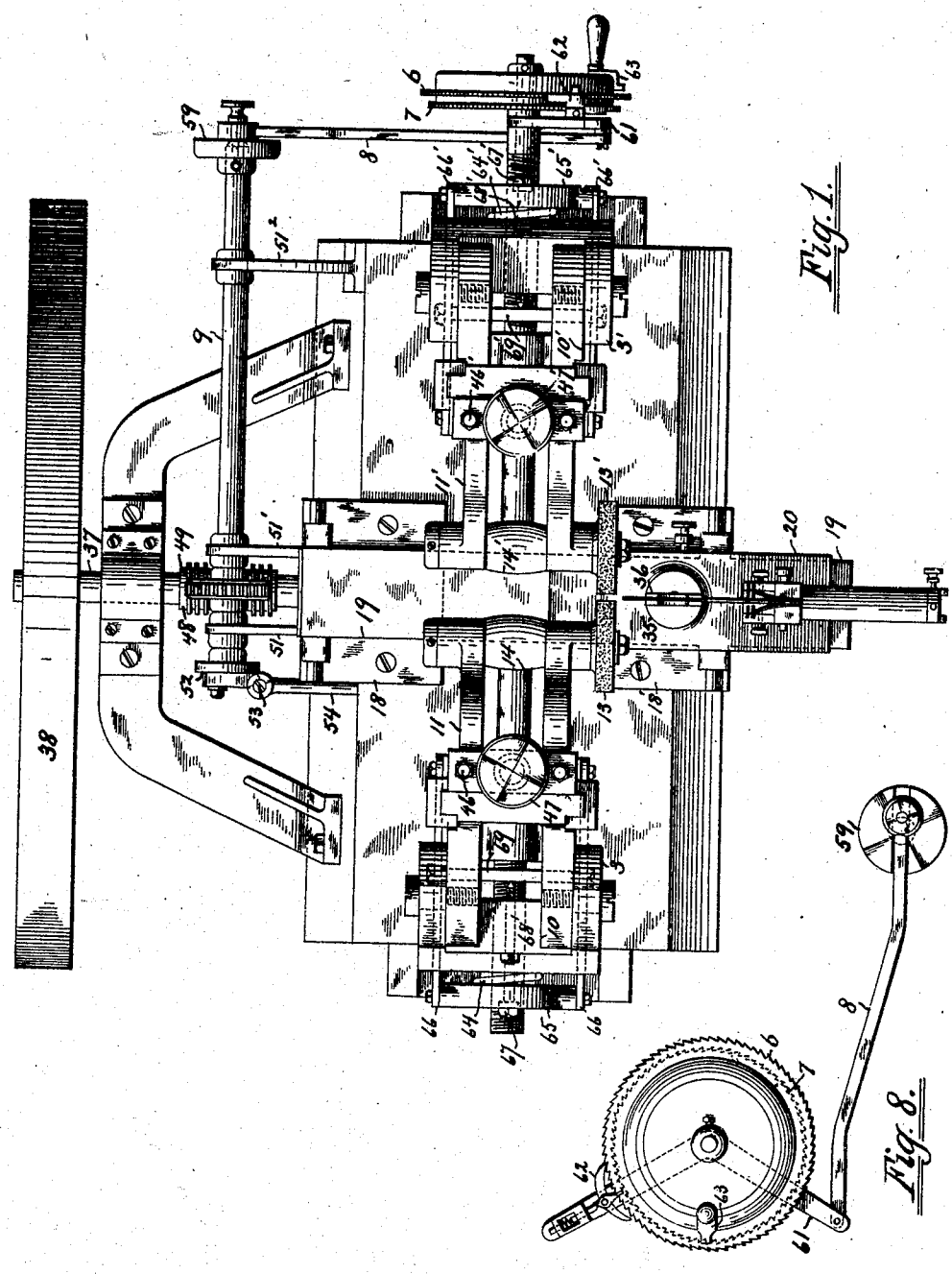


Fig. 1.

Fig. 8.

Witnesses:

W. Hozer

Inventor.

Rudolph Martin,

per. Frank C. Fischer. Atty.

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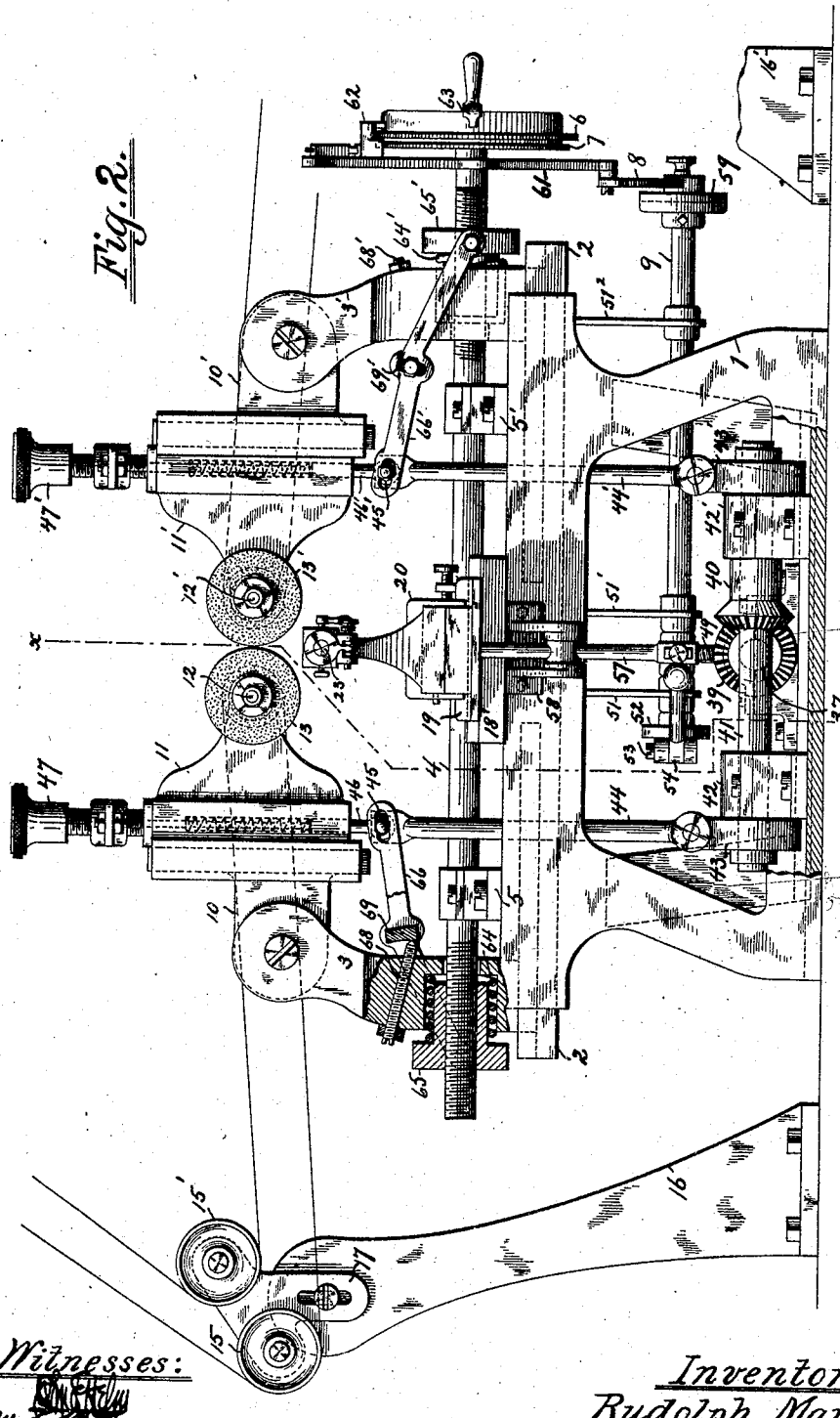
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4 SHEETS—SHEET 2.

Fig. 2.



Witnesses:

Inventor.
Rudolph Martin
per Frank C. Fischer. Atty.

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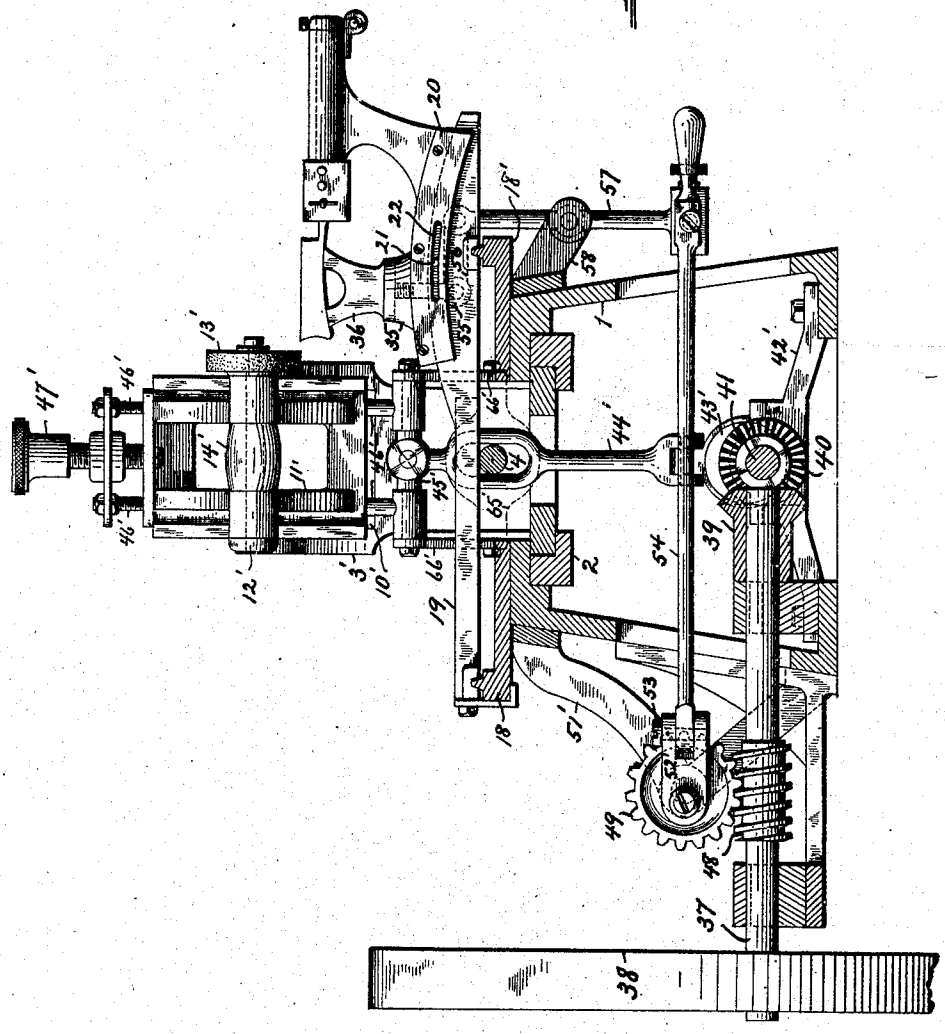
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4 SHEETS—SHEET 3.

Fig. 3.



Witnesses:

Inventor:
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4 SHEETS—SHEET 4.

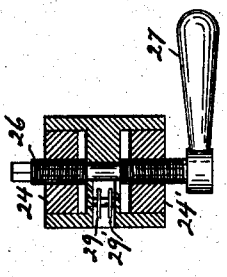


Fig. 7.

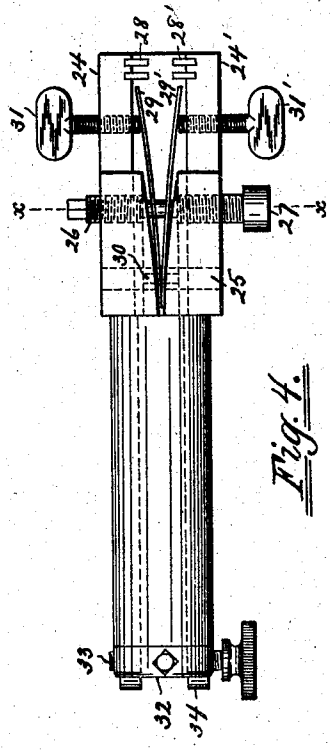


Fig. 4.

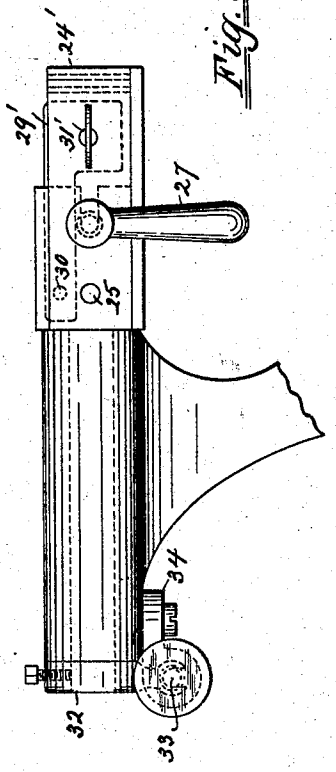


Fig. 5.

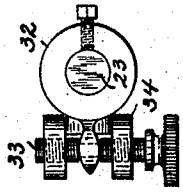


Fig. 6.

Witnesses:

W. Pelzer

Inventor.

Rudolph Martin

per Frank C. Fischer. Atty.

UNITED STATES PATENT OFFICE.

RUDOLPH MARTIN, OF NEWARK, NEW JERSEY, ASSIGNOR TO JAMES E. FULLER, OF NEWARK, NEW JERSEY.

MACHINE FOR CONCAVING RAZORS.

No. 806,551. Specification of Letters Patent. Patented Dec. 5, 1905.

Application filed December 10, 1904. Serial No. 236,290.

To all whom it may concern:

Be it known that I, RUDOLPH MARTIN, a citizen of the United States, and a resident of the city of Newark, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Machines for Concaving Razors; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the numerals of reference marked thereon, which form a part of this specification.

This invention relates to machines for concaving razors; and it consists in mechanisms whereby the act of concaving is performed automatically.

The objects of my invention are to increase the simplicity of the construction and operation of the machine by decreasing the number of parts of which the usual machine is composed, by lessening or avoiding the necessity for adjustment of the various parts, and by increasing the convenience in manipulation of the machine. To this end I have made many changes in this machine from similar machines described in previous patents, all with the object of increased efficiency.

Two vertical sliding heads have heretofore been employed on the bed of the machine, one of said heads arranged stationary on the machine and the other adapted to advance or recede from the fixed one by means of a hand-feed.

Enumerating the different features of my invention, I would say that, first, I construct the aforesaid vertical sliding heads so that both automatically advance toward and recede from each other by mounting both of the vertical sliding heads on the bed of the machine and having them both operated by a main feed-screw automatically, so as to advance the heads to and from each other. Secondly, I operate the vertical sliding heads from the main driving-shaft by connecting the same to eccentrics on the eccentric-shaft by means of connecting-rods and then connecting the eccentric-shaft to the main shaft by miter-gears. Thirdly, my invention consists in the novel construction of my razor-chuck and the cross-feed slide for the same, which imparts to the chuck an arc-shaped peripheral movement, which movement conforms to the shape of the razor-back, and which construction in a large measure facilitates the grinding of the razors. The chuck is automatically reciprocated from the main shaft by a worm on said shaft meshing with a worm-gear on the worm-shaft, and a crank and crank-rod connecting with said worm-shaft imparts the desired reciprocating motion to a rocker-carrying cross-feed rod which is affixed to the chuck. Fourthly, and lastly, my invention consists in a reciprocating feeding means attached to the main feed-screw, which is operated from the main shaft and at the completion of the grinding process automatically stops the further operation of grinding and carries the vertical sliding heads back to their first positions.

The invention further comprises certain special constructions, combinations, and arrangement of parts, as hereinafter set forth.

The drawings represent in Figure 1 a plan of a machine embodying my invention; Fig. 2, a front elevation of the same; Fig. 3, a vertical sectional elevation on line $x\,x$ in Fig. 2; Fig. 4, a plan view of the adjustable chuck for holding the razor; Fig. 5, a side elevation, and Fig. 6 an end view, of the same; Fig. 7, a vertical sectional view on line $x\,x$ in Fig. 4; Fig. 8, a side view of the reciprocating feeding means attached to the main feed-screw and operated from the worm-gear shaft.

In said drawings, 1 represents the bed of the machine, which is provided on its under side with suitable gibs 2 for the reception of the horizontal-feed sliding-heads 3 and 3′. Said heads 3 and 3′ are controlled by a main feed-screw 4, which is mounted in bearings 5 and 5′ on the bed of the machine and to which is secured on one end a feed-ratchet 6 and a return-ratchet 7, both of which are controlled automatically by a crank-rod 8, mounted on the worm-gear shaft 9.

Pivoted to the horizontal-feed sliding heads 3 and 3′ are vertical standards 10 and 10′, fitted to receive vertically-sliding spindle-heads 11 and 11′. These latter are provided with shafts 12 and 12′, carrying grinders 13 and 13′. Rotation of the shafts 12 and 12′ is effected by the pulleys 14 and 14′, which are driven by a belt from a counter-shaft and over the idlers 15 and 15′ on brackets 16 and 16′, which are securely fastened to the machine. One advantageous feature of this invention is the means of driving the grinder-shafts, which consists of the two stationary

brackets 16 and 16′, secured to the machine, each supporting an adjustable bracket 17, on which are mounted two idlers, (lettered 15 and 15′.)

The brackets 16 and 16′ are stationary, with belts passing from the counter-shaft over the idlers and thence over the pulley on the grinder-shaft. The spindle-heads 11 and 11′ move to and from the work, and when moving from the work the belts loosen up and when moving toward the work the belts tighten, and the machine when it performs its hardest work does it with the belts tight.

The top surface of the bed 1 supports stationary guide-plates 18 and 18′, upon which is mounted the cross-feed slide 19, which moves transversely of the bed 1 and beneath the spindle-heads 11 and 11′. Mounted upon said cross-feed slide 19 and moving in the arc of a circle is the adjustable chuck 20 for the razor. A stop-pin 21 is secured to the cross-feed slide 19 and operates in a slot 22, formed near the under side of the chuck. The rear upper end of the chuck 20 is provided with a post which serves as a bearing for a horizontal shaft 23, adapted to reciprocate with the chuck, and is furnished at its inner end with a tool-stock which carries the razor. Reference to Figs. 4, 5, 6, and 7 shows this head to comprise two vertical parallel plates 24 and 24′, adapted to open and close by sliding on a guide-pin 25. Positive opening and closing is obtained by means of a right and left handed screw 26, both ends of which are squared and either of which may be operated by a handle 27. Upon the inner face of the vertical parallel plates are affixed guide-plates 28 and 28′, the space therebetween being adapted to receive a small pin which is passed through the razor. Inside of the head are two additional guide-plates 29 and 29′, provided with a pin 30, which serves to steady the same. The sides of the vertical parallel plates are provided with thumb-screws 31 and 31′, which pass through said plates and bear against the guide-plates 29 and 29′, so that the razor may be adjusted and firmly clamped therebetween.

The shaft 23 has secured to its extremity outside of the bearing a collar 32, the under side of which is fork-shaped and which passes over a screw-threaded stud 33, which is mounted in the bracket 34, affixed to the under side of the bearing. The screw-threaded stud 33 is provided with a knurled head, and if the razor is not in proper alinement—that is, normal to the face of the grinders—advancing or retracting the screw-threaded stud will remedy this difficulty. The above-described tool-stock is intended to support the rear of the razor. The front end is upheld by an abutment 35 on the front of the chuck 20. This abutment contains a vertically-adjustable post 36, adapted to receive the back of the razor.

In order to have the grinding-stones wipe the entire breadth of the razor-blade, a vertical movement is necessary. To produce this, a main shaft 37, with a pulley 38 continuously rotating, is supplied. At the inner end of this shaft is secured a miter-gear 39, which meshes with a miter-gear 40 on the eccentric-shaft 41. The eccentric-shaft 41 is mounted in bearings 42 and 42′, which are secured to the under side of the bed 1. Outside of the bearings and mounted on the eccentric-shaft 41 are two eccentrics 43 and 43′, which support eccentric-rods 44 and 44′. The eccentric-rods 44 and 44′ straddle the main feed-screw 4 and are connected at their upper extremities to cross-bars 45 and 45′, supported in bearings which are formed in the ends of the adjustable studs 46 and 46′, which are fitted in the vertical sliding spindle-heads 11 and 11′. Adjustment of the spindle-heads and studs is made by means of the knurled screw-heads 47 and 47′, attached to the vertical sliding spindle-heads 11 and 11′, so as to bring grinders to the work. This spindle-head adjustment is independent of the automatic movement of the machines.

It is also necessary that the razor should be operated upon for its entire length, and to render such feed perfectly automatic the following group of mechanism is provided. Upon the main shaft 37 is fitted a worm 48, while a worm-gear 49 upon the worm-gear shaft 9, secured in brackets 51, 51′, and 51² and fastened to the bed of the machine 1, supports the same. One end of the worm-gear shaft 9 is provided with a crank 52, termed a "cross-feed" crank, which has fastened to it by means of a stud 53 a cross-feed rod 54. The cross-feed slide 19 has a central lateral opening for the reception of a screw-threaded stud 55, which is securely tapped into the adjustable razor-chuck 20. Connected to said stud 55 is a link 56, which in turn connects with the rocker-carrying cross-feed rod 57, said rod being supported and pivoting in the bracket 58, which is affixed to the bed 1. The end of the rocker-carrying cross-feed rod 57 is rectangular in shape and is provided with a slot in which is placed a movable block on which is formed a stud for the reception of the forked cross-feed rod 54. A screw engaging with said block carrying the stud causes the same to change positions, and thereby affords a means for increasing or lessening the reciprocation of the razor-chuck 20. The outer end of the cross-feed rod 54 is forked and provided with a handle in order to allow the latter to be thrown on or off of the stud of the rocker-carrying cross-feed rod 57.

In order to automatically feed and draw the vertical spindle-heads to and from their work, the worm-shaft is provided with an adjustable crank 59 and connects with a crank-rod 8 to a lever 61, which is loosely mounted on the main feed-shaft 4.

The main feed-shaft 4 has securely mounted on its extremity a feed-ratchet 6 and a return-ratchet 7. Both ratchets are secured to a circular disk, and said disk is provided with a circular groove. The lever 61 has mounted near its upper end a double pawl 62 with a projection above and below it. Above the pawl 62 in the lever 61 is a slot provided with a finger and spring, said finger engaging with the upper projection on the pawl. The circular groove in the disk to which the ratchets are secured has fitted to it an adjustable block 63, which is also provided with a similar projection and which serves to disengage the pawl from the feed-ratchet when the projection of the adjustable block strikes the lower projection on the pawl. When this takes place, the upper projection on the pawl throws the finger-piece in the lever up and permits the pawl to disengage from the feed-ratchet 7 and engage with the return-ratchet 6, the return-ratchet performing its function of separating the heads until the adjustable block 63 in the disk strikes the lower projection of the pawl again.

Mounted on the bed 1 in bearings 5 and 5′ is the main feed-screw 4, which has a right-hand screw-thread cut on one end and a left-hand screw-thread cut on the other. The main feed-screw 4 passes through the horizontal-feed sliding heads 3 and 3′, which are provided with clearance-holes and recesses for the reception of compressed spiral springs 64 and 64′. Said spiral springs are mounted on adjusting-nuts 65 and 65′, which travel on said shaft and serve to keep the heads together. The adjusting-nuts are provided with two studs corresponding to the studs on the cross-feed head of the spindle-head and which are connected together by the rockers 66 and 66′. The adjusting-nuts are secured to the horizontal-feed sliding heads by screw-bolts 67 and 67′ and have clearance-holes for the bolts, so that the distance between the outside of the horizontal-feed sliding head and the inside of the nut can vary, which is due to the points of the screw 68 and 68′ wiping across the templets 69 and 69′ during the rise and fall of the vertical spindle-heads 11 and 11′. Furthermore, between the roll-gear rockers 66 and 66′ and in slots provided in them I have affixed adjustable templets 69 and 69′, which engage with screws 68 and 68′, which are tapped through the horizontal-feed sliding heads 3 and 3′, the points of which are adapted to wipe across the templets during the rise and fall of the vertical sliding spindle-heads and rockers. By this arrangement any form of contour in the concaving of a razor can be produced, since the spring maintains the point of the screw against the templet.

The operation of the machine is as follows: A small pin is passed through the hole in the rear end of the razor and said pin passed down between the guide-plates. The binding-screw is then turned home by means of the handle, after which the front clamping-screws are brought to firmly bear against the inner additional guide-plates, which serve to properly and securely hold and adjust the razor. If it is then found necessary to further aline the razor vertically, the knurled head operating the screw at the end of the shaft is turned in either direction, which then will turn the tool-stock bodily, thereby remedying the difficulty at once. The belt is then shifted, and the machine performs its work automatically. The driving-pulley turns main shaft, and that by means of the miter-gears transmits motion to the eccentric-shaft and also to the worm-gear shaft by means of the worm on main shaft. The eccentrics on the eccentric-shaft by means of eccentric-rods impart vertical motion to the vertical spindle-heads. The cross-feed crank mounted on the worm-gear shaft and connected, by means of the cross-feed rod, to the rocker carrying cross-feed rod imparts the transverse motion to the razor-chuck, and the adjustable horizontal feed sliding head connected, by means of the crank-rod, to the lever carrying a pawl, said pawl being in engagement with the ratchets operates the main feed-screw, which serves to automatically draw the vertical spindle-heads to and from the work. The above-described operations taking place, the grinders now rise and fall, while at the same time the razor travels longitudinally between the grinders on the arc of a circle until the latter have traversed the entire side surfaces. The feed movement is then automatically reversed by means of the ratchets and pawl, and the act is repeated until the desired amount has been removed.

I do not desire to be limited to the exact construction shown, as I am aware that changes and various modifications may be made in the details of construction without departing from the spirit and scope of my invention, that my improved machine, of course, can be utilized to grind aside from razors any kind of keen-edged articles—such as, for instance, knife-blades, scissors, surgical lances, &c.

So, what I in accordance with the above description claim, and desire to secure protection for by Letters Patent, is—

1. The combination in a grinding-machine of two simultaneously-movable and automatically-operated vertical sliding heads, and means for simultaneously operating the said vertical sliding heads.

2. The combination in a grinding-machine of two simultaneously-movable and automatically-operated vertical sliding heads, designed to automatically advance toward and

recede from each other, and a main feed-screw for simultaneously operating the said vertical sliding heads.

3. The combination in a grinding-machine of two simultaneously-movable and automatically-operated vertical sliding heads, designed to automatically advance toward and recede from each other, gibs secured to the bed, horizontal sliding heads moving in said gibs, having the vertical sliding heads secured to them and a main feed-screw for simultaneously operating the said horizontal sliding heads.

4. The combination in a grinding-machine of two simultaneously-movable and automatically-operated vertical sliding heads, designed to automatically advance toward and recede from each other, gibs secured to the bed, horizontal sliding heads moving in said gibs, standards attached to said horizontal sliding heads, supporting vertical sliding heads, means for reciprocating said vertical sliding heads, and a main feed-screw for simultaneously operating the said horizontal sliding heads.

5. The combination in a grinding-machine of two movable and automatically-operated vertical sliding heads, gibs secured to the bed, horizontal sliding heads moving in said gibs, standards attached to the said horizontal sliding heads supporting vertical sliding heads, a main feed-screw supporting adjustable nuts and springs, rockers connecting the adjustable nuts with the vertical sliding heads and operating the said horizontal sliding heads, substantially as described.

6. The combination in a grinding-machine of two movable and automatically-operated vertical sliding heads, horizontal sliding heads, standards attached to same and supporting vertical sliding heads, a main feed-screw supporting adjustable nuts and springs, rockers connecting the nuts with the vertical sliding heads, removable templets affixed to the roll-gear rockers, and screws affixed to the horizontal heads in order to cause the templet and screw to coöperate, substantially as described.

7. The combination in a grinding-machine of two simultaneously-movable and automatically-operated vertical sliding heads, designed to automatically advance toward and recede from each other, a connecting-rod attached to each vertical sliding head, a connecting-rod shaft, and main driving-shaft operating said connecting-rod shaft, and means attached to said connecting-rod shaft, operating the vertical sliding heads.

8. The combination in a grinding-machine of two simultaneously-movable and automatically-operated vertical sliding heads, designed to automatically advance toward and recede from each other, an eccentric-rod attached to each vertical sliding head, an eccentric-shaft mounted in bearings on the machine, eccentrics on the eccentric-shaft and connected to the eccentric-rods, and a pair of miter-gears connecting the main driving-shaft with the eccentric-shaft, operating the vertical sliding heads.

9. The combination in a grinding-machine of two simultaneously-movable and automatically-operated vertical sliding heads, designed to automatically advance toward and recede from each other, means for simultaneously operating the said heads and an adjustable razor-chuck having an arc-shaped peripheral movement coöperating with the said vertical sliding head.

10. The combination in a grinding-machine of two simultaneously-movable and automatically-operated vertical sliding heads, designed to automatically advance toward and recede from each other, means for simultaneously operating the said heads a main shaft supporting a worm in engagement with a worm-shaft supporting a worm-gear, a worm-shaft mounted in bearings affixed to the machine, a crank secured to the worm-shaft, a crank-rod connecting the crank with the rocker-carrying cross-feed rod, a link connecting a stud on the adjustable razor-chuck and an adjustable razor-chuck mounted on a cross-feed slide, all coöperating with the said vertical sliding head.

11. The combination in a grinding-machine of two simultaneously-movable and automatically-operated vertical sliding heads, designed to automatically advance toward and recede from each other, means for simultaneously operating the said heads a cross-feed slide mounted on guide-plates of the machine, an adjustable razor-chuck having an arc-shaped peripheral movement, a tool-stock mounted in said chuck, a reciprocating link mounted and pivoting in a bracket attached to bed of machine, and a crank and crank-rod connected to worm-gear shaft operating said adjustable chuck.

12. The combination in a grinding-machine of two simultaneously-movable and automatically-operated vertical sliding heads, designed to automatically advance toward and recede from each other, a main feed-screw operating vertical sliding heads and reciprocating feeding means attached to said main feed-screw and operated from the main driving-shaft.

13. In a machine for grinding razors, a tool-stock comprising a shaft, a transverse guide-pin at one end, two parallel plates, adapted to slide upon said pin, a clamping-screw which controls said plates, two intermediate guide-plates and a pin for guiding said plates, small guide-plates in parallel plates for the reception of the razor-pin, a collar on the end of the shaft and a bracket containing an adjusting-screw, all operating substantially as described.

14. The combination in a grinding-ma-

chine of two movable and automatically-operated vertical sliding heads, a main feed-screw operating vertical sliding heads, a feed-ratchet and a return-ratchet, a double pawl mounted on a lever and in engagement with said ratchets, a worm-gear shaft supporting a crank, a crank-rod connecting the lever carrying the pawl with the crank on the worm-gear shaft, as and for the purposes set forth.

15. The combination in a grinding-machine of two movable and automatically-operated vertical sliding heads a main feed-screw operating vertical sliding heads and carrying a feed-ratchet and a return-ratchet, a lever carrying a double pawl and means for actuating same in engagement with said ratchets, a disk to which are secured the feed and return ratchets and which is provided with a groove and adjustable block, a worm-gear shaft supporting a crank, a crank-rod connecting the lever carrying the pawl with the crank on the worm-gear shaft, as and for the purposes set forth.

This specification signed and witnessed this 28th day of November, 1904.

RUDOLPH MARTIN.

Witnesses:

FREDK. C. FISCHER,

CHAS. F. GERKEN.