

G. A. HENDERSON.

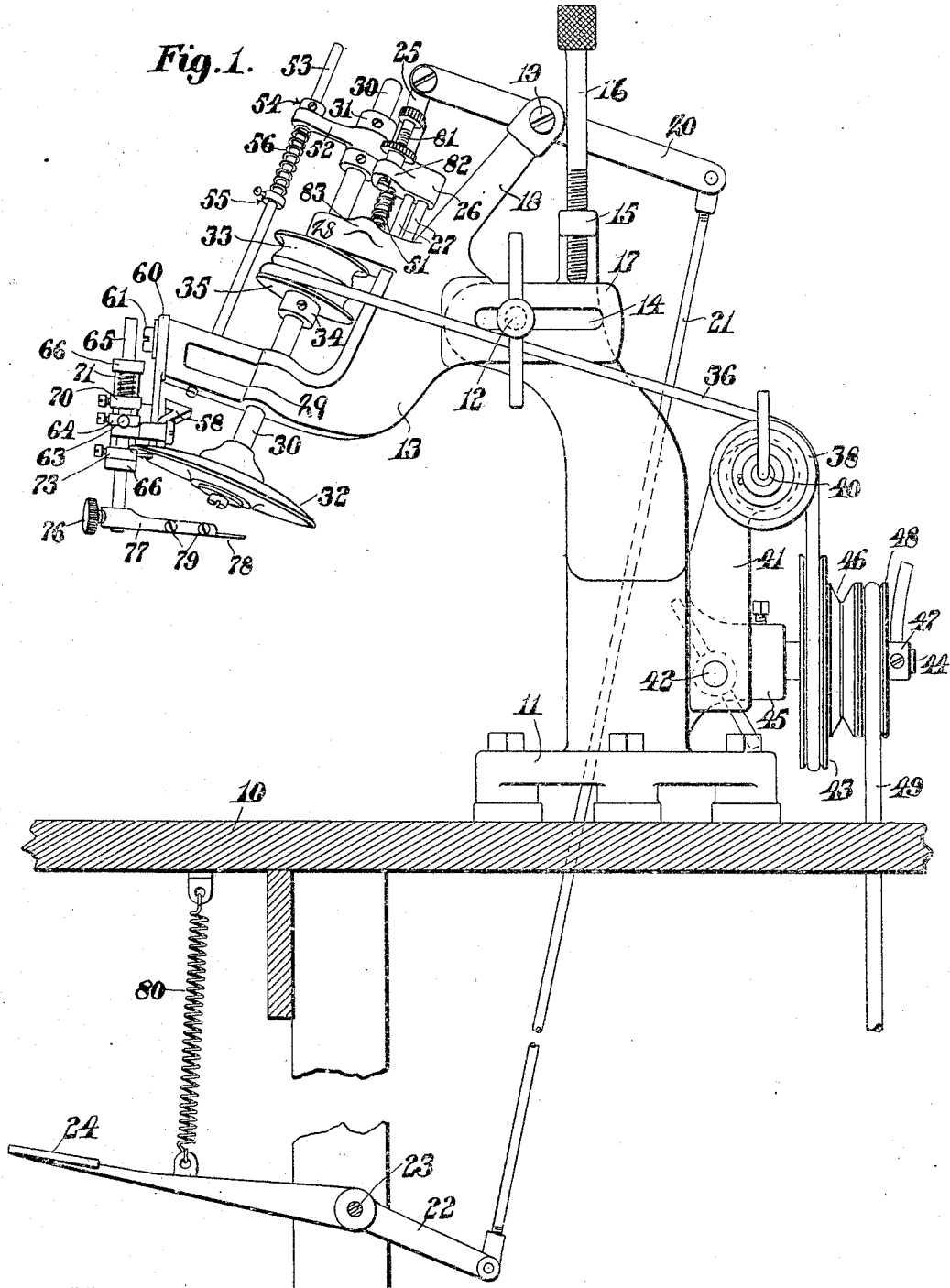
MACHINE FOR SHARPENING THE ROTARY KNIVES OF SKIVING AND SIMILAR MACHINES.

APPLICATION FILED OCT. 28, 1908.

959,136.

Patented May 24, 1910.

3 SHEETS—SHEET 1.



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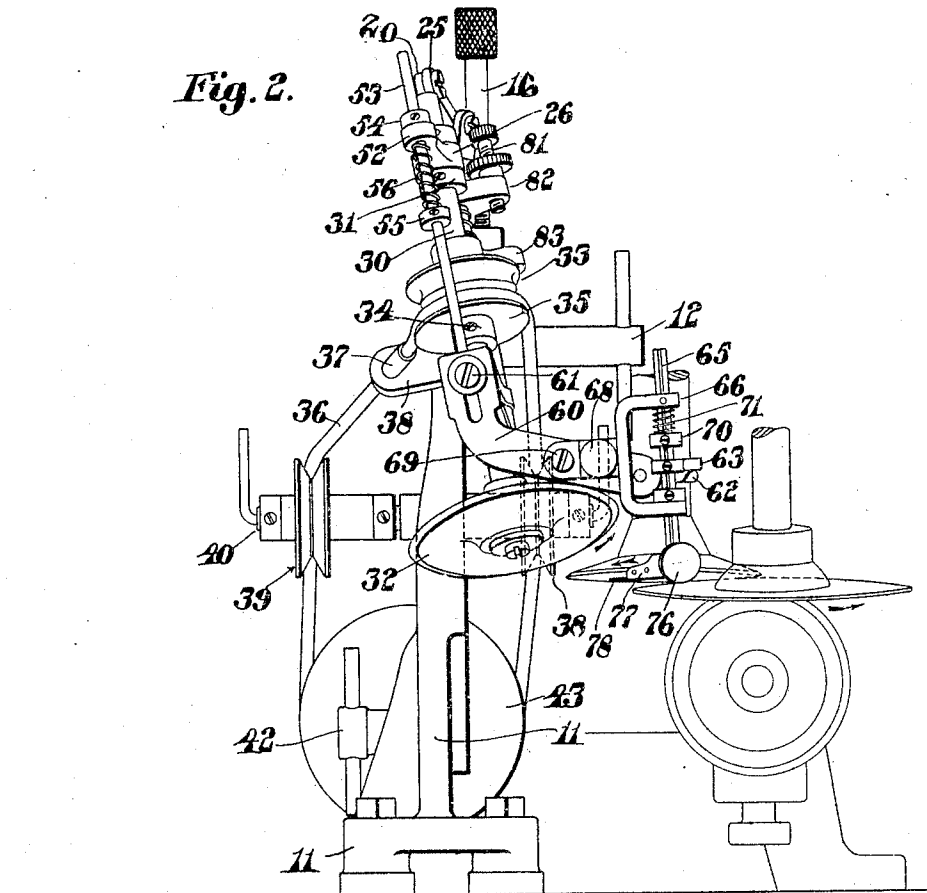
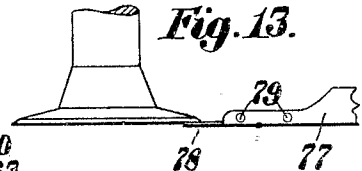
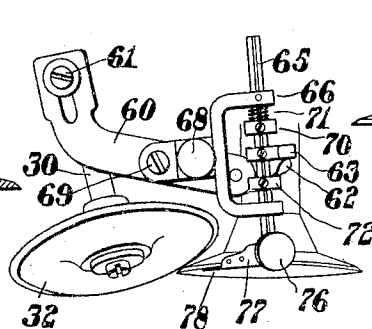
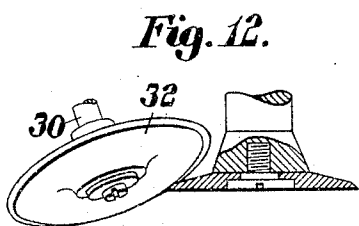


Fig. 11.



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3 SHEETS—SHEET 3.

Fig. 3.

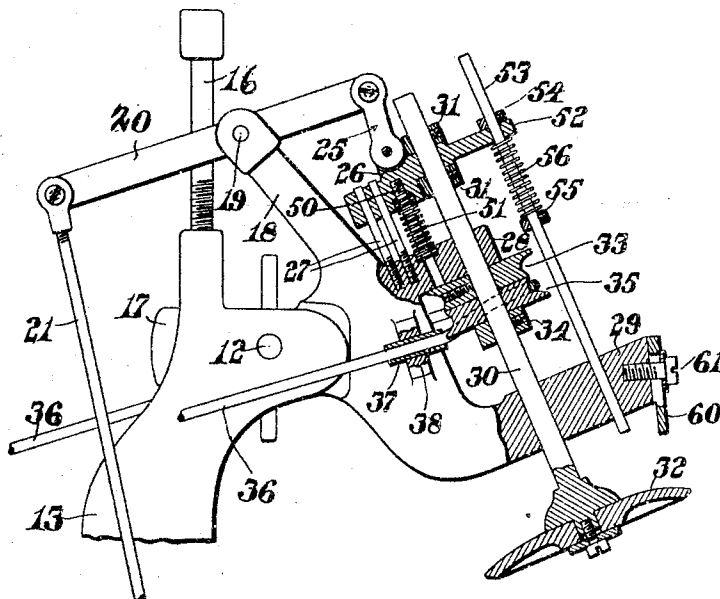


Fig. 4.

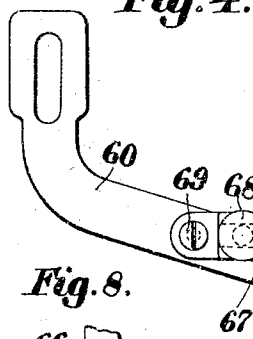


Fig. 3.

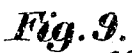


Fig. 5.

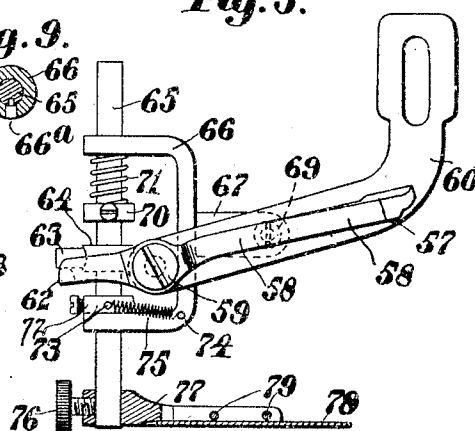


Fig. 8.

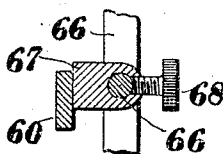


Fig. 7.

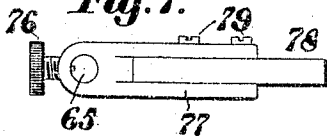
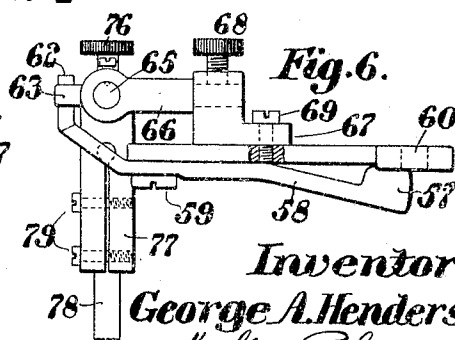


Fig. 10.



Fig. 6.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR SHARPENING THE ROTARY KNIVES OF SKIVING AND SIMILAR MACHINES.

959,136.

Specification of Letters Patent.

Patented May 24, 1910.

Application filed October 28, 1908. Serial No. 459,939.

To all whom it may concern:

Be it known that I, GEORGE A. HENDERSON, a citizen of the United States of America, and a resident of Marblehead, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Machines for Sharpening the Rotary Knives of Skiving and Similar Machines, of which the following is a specification.

This invention relates to machines for sharpening the knives of skiving machines and other machines, the knives of which have a rotary movement, the object being to provide a device which may be secured to the bench upon which such skiving or other machine is mounted and adjusted relative to the knives thereof in such a manner that during the operation of the machine the sharpening mechanism will not interfere with the operation of skiving but may be brought into coöperation with said knife without stopping the machine.

It has for a further object the provision of a suitable device operable in conjunction with said sharpening mechanism to simultaneously remove the bur on the edge of the knife caused by the sharpening thereof.

The invention consists in certain novel features of construction and arrangement of parts which will be readily understood by reference to the description of the drawings and to the claims hereinafter given.

Of the drawings: Figure 1 represents a section through a portion of a bench showing in elevation a machine embodying the features of this invention. Fig. 2 represents a front elevation of said machine showing in connection therewith the knife and work feeding mechanism of a skiving machine. Fig. 3 represents an elevation partly in section of the apparatus for operating the grinding member. Fig. 4 represents an elevation partly in section of the apparatus for operating the bur remover. Fig. 5 represents an elevation of the opposite side thereof. Fig. 6 represents a plan of the same. Fig. 7 represents an inverted plan of the bur remover. Figs. 8, 9, and 10 are details to be hereinafter referred to. Fig. 11 represents an elevation of the revoluble knife of a skiving machine showing the grinding member and bur remover coöperating therewith. Fig. 12 represents a partial section of the revoluble knife of a skiving machine

showing the grinding member coöperating therewith, and Fig. 13 represents an elevation of the revoluble knife showing the bur remover coöperating therewith.

Similar characters designate like parts throughout the several figures of the drawings.

In the drawings, 10 represents a suitable bench to which is secured the standard 11 to the upper end of which is secured by means of the clamping bolt 12 a frame 13 provided with a slot 14 through which said bolt 12 extends. Through an ear 15 formed upon the upper end of the standard 11 is threaded an adjusting member 16, the end of which bears against the upper face of the extension 17 of the frame 13. It is obvious that by adjusting the member 16 the frame 13 will be moved about the axis of the bolt 12 to cause it to assume various inclinations relative to the standard 11. It is also obvious that the frame may be moved laterally of the standard 11 by unclamping the bolt 12 and moving the frame 13 sidewise and then reclamping the bolt 12 in its new position in the slot 14. The frame 13 is provided with an upwardly extending arm 18 to which is pivoted at 19 the lever 20, one end of which is connected to a rod 21, the opposite end of which is pivotally connected to the treadle member 22 pivoted at 23 beneath the bench 10 and provided with the usual foot pad 24. The opposite end of the lever 20 has pivotally connected thereto a link 25, the opposite end of which has pivotally connected thereto a block 26. Through two openings in the block 26 extend two guide pins 27 mounted in an extension 28 of the frame 13. The extension 28 of the frame 13 and a similar extension 29 are each provided with a suitable bearing for the revoluble shaft 30, the upper end of which extends through a bearing in the block 26 and has secured thereto on either side of said block 26 the collars 31 which cause the shaft 30 to be moved endwise whenever the block 26 is moved downwardly on the guide pins 27 by the operation of the treadle 22. The lower end of the revoluble shaft 30 has secured thereto in any well-known manner a grinding disk 32. Secured to the shaft 30 are a fixed pulley 33 and a collar 34 between which is mounted a loose pulley 35 freely movable about the shaft 30. A driving belt 36 normally rests within the groove of said

loose pulley 35 and at the rear of the machine extends through a thimble 37 mounted in an ear 38 on said frame 13. The driving belt 36 is continuous and passes over pulleys 38 and 39 freely revoluble on a shaft 40 mounted in a bracket 41 pivotally secured by a clamping bolt 42 to the standard 11, said belt also passing around the pulley 43 mounted upon a cylindrical stud 44 secured in an extension 45 forming a part of the standard 11.

The pulley 43 has secured thereto another pulley 46 and between this pulley 46 and the collar 47 secured to the stud 44 is a loose pulley 48 over which the driving belt 49 from any suitable driving shaft normally passes. When the belt 49 is transferred to the pulley 46 motion is imparted to the belt 36, thus causing the loose pulley 34 to move about the shaft 30. The bracket 41 may be moved about its pivot 42 to keep the belt 36 taut under all conditions of adjustment of the frame 13 about its pivot 12. Interposed between the extension 28 and the block 26 and surrounding a stud 50 screwed into said block 26 is a spring 51 normally separating said members. An extension 52 formed on said block 26 is provided with an opening through which extends a rod 53, said rod having secured thereto above said extension 52 a collar 54 and at some distance below said extension a collar 55 between which and the extension 52 is a spring 56 which normally retains the collar 54 against the upper face of the extension 52, the lower end of the rod 53 having a bearing in the extension 29 and extending a short distance beyond the lower face thereof. This rod 53 is in the same plane with a pad 57 formed upon a lever 58 pivoted at 59 to a member 60 adjustably secured by means of the bolt 61 to the end of the extension 29. The other end of the lever 58 is provided with a finger 62 engaging with a stud 63 on a collar 64 secured to the slidable rod 65 mounted in bearings in the bifurcated frame 66 pivotally secured to a boss 67 by means of the clamping screw 68. The rod 65 is provided with a groove 65^a into which extends the pin 66^a mounted in the frame 66 to prevent the rod 65 from turning in its bearings. The boss 67 is pivotally secured to the member 60 by means of a clamping screw 69 which retains said stud in any position to which it may be adjusted.

Above the collar 64 is secured a collar 70 between which and one of the arms of the bifurcated member 66 is interposed a spring 71 which forces the rod 65 downwardly, the downward movement of said rod being limited by means of the collar 72 secured thereto. The collar 72 is provided with a radial pin 73 between which and a similar pin 74 set into the bifurcated member 66 is interposed a spring 75, the object of which will

be hereinafter described. To the lower end of the rod 65 is secured by means of the clamping bolt 76 an arm 77 in which is mounted a steel scraper or bur remover 78, the arm 77 being bifurcated and provided with a groove into which the blade 78 is inserted and then clamped therein by means of the screws 79 connecting the two arms of said bifurcated member 77. When the blade 78 is acting upon a revoluble disk knife to remove the bur therefrom, the rotation of said disk knife would tend to move said blade about its axis and thus cause the pin 66^a to impinge upon the wall of the groove 65^a and thus interfere with the free end movement of the rod 65. By means of the spring 75, however, the action of the knife on the blade 78 is overcome, the tension of the spring being made to substantially balance the force in the opposite direction due to the action of said knife upon said blade. As a consequence the shaft may be freely moved endwise even when the blade is in contact with the revoluble disk knife.

In the operation of the device, the standard 11 is secured to the bench 10 in a position adjacent to the skiving machine or other machine provided with a revoluble knife which it is desired to sharpen. The apparatus is so located relative to the knife of the skiving machine that the grinding member 32 and the bur remover 78 may be adjusted relative to said knife by means of the various adjustments provided in the machine described to bring them at the required angle with said revoluble knife to secure the proper operation thereon.

It is obvious that the various adjustments in the machine are sufficient to permit the various parts to be moved into such positions relative to each other that the members, which are adapted to operate upon the knife, may be brought into most any desired angle with the knife of any skiving or other machine no matter what its position may be. This does away with the necessity of providing a different device for each type of skiving machine or for other machines provided with a revoluble knife blade or cutter.

The principal object of the device is to provide a means whereby the knife may be sharpened without stopping the skiving machine and thereby losing much valuable time. Skiving machines when in operation require frequent sharpening in order to keep the knife in condition to do good work and where it has been necessary to stop the machine and make certain adjustments by hand in the process of sharpening the knives much valuable time is lost.

With a machine of the nature described herein the amount of time lost is reduced to a minimum as without stopping the machine the operator simply places his foot

upon the foot pad 24 of the treadle 22 and causes an operation of the lever 20, thus forcing the grinding member into contact with the revoluble knife, a spring 80 secured to the treadle 22 returning the parts to their normal position as soon as the operator removes his foot from the treadle. The adjacent faces of the pulleys 33 and 35 are flanged, as indicated in the drawings, so that as the shaft 30 is moved downwardly to bring the grinding member into contact with the revoluble knife the belt 36 passes from the loose pulley 35 to the fixed pulley 33 and causes a revolution of the shaft and its grinding member. As the grinding member 32 operates upon the knife it leaves a slight bur due to the sharpening which it is desirable should be immediately removed and in order to effect a removal of this bur the steel blade 78 is provided.

It is obvious from the foregoing description and an inspection of the drawings that as the shaft 30 is moved downwardly it will carry therewith the rod 53 which, after traveling a short distance, will contact with the pad 57 of the lever 58 and cause a movement of the blade 78 in an upward direction so that it will contact with the under side of the revoluble knife and scrape therefrom any burs which may have been made upon its edge by means of the sharpening of said knife.

The blade 78 is retained in contact with the under face of the knife as indicated in Fig. 13 by means of the spring 56, the tension of which is slightly in excess of the spring 71, thus permitting the downward movement of the rod 35 to bring the blade 78 into contact with the knife being sharpened, and then retain it in this position with only a slight pressure against the knife.

The downward movement of the grinding member 32 is limited by means of the adjustable stop 81 threaded to an ear 82 on the block 26, which in its downward movement comes into contact with an ear 83 on the extension 28.

It is believed that from the foregoing the operation and many advantages of a machine of this class will be fully apparent without any further description.

Having thus described my invention, I claim:

1. In a machine of the class described, the combination of a revoluble member adapted to sharpen a knife; a non-revoluble bur remover; and means for moving said revoluble member into contact with one face of said knife and near the end of its movement moving said bur remover toward said revoluble member into contact with the opposite face thereof.

2. In a machine of the class described, the combination of a standard; driving mechanism thereon; a frame pivoted to said stand-

ard; means for locking said frame in adjusted position about said pivot; a knife sharpener mounted on said frame; means connected with said driving mechanism for revolving said knife sharpener; a bur remover mounted on said frame; and a pivoted lever for moving it into engagement with the knife.

3. In a machine of the class described, the combination of a frame; a shaft reciprocable and revoluble therein; a knife sharpener thereon; a rod parallel with said shaft and movable endwise therewith; a bur remover; and mechanism interposed between said rod and bur remover whereby the operation of the latter is controlled by the end movement of the former.

4. In a machine of the class described, the combination of a frame; a shaft reciprocable and revoluble therein; a knife sharpener thereon; a rod parallel with said shaft and movable endwise therewith; a bur remover; a pivoted lever operable by said rod; and means interposed between said bur remover and pivoted lever for moving the bur remover into engagement with the knife by the movement of said pivoted lever.

5. In a machine of the class described, the combination of a frame; a shaft reciprocable and revoluble therein; a knife sharpener thereon; a rod parallel with said shaft and movable endwise therewith; a bur remover; a pivoted lever operable by said rod; means interposed between said bur remover and pivoted lever for moving the bur remover into engagement with the knife by the operation of said pivoted lever; and a spring on said rod adapted to permit said rod to yield under abnormal conditions.

6. In a machine of the class described, the combination of a reciprocating block; a shaft revolubly mounted therein but adapted to reciprocate therewith; a yielding member on said shaft; a rod movable endwise in said block; a stop to limit its movement in one direction; a collar and a spring to limit its movement in the opposite direction; and a bur remover the operation of which is controlled by said reciprocating rod.

7. In a machine of the class described, the combination of a reciprocating block; a shaft revolubly mounted therein but adapted to reciprocate therewith; a grinding member on said shaft; a rod movable endwise in said block; a stop to limit its movement in one direction; a collar and a spring to limit its movement in the opposite direction; a pivoted lever operable by said reciprocating rod; and a bur remover the operation of which is controlled by said lever.

8. In a machine of the class described, the combination of a reciprocating block; a shaft revolubly mounted therein but adapted to reciprocate therewith; a grinding member on said shaft; a rod movable endwise in

said block; a stop to limit its movement in one direction; a collar and a spring to limit its movement in the opposite direction; a pivoted lever operable by said reciprocating rod; a spring-pressed rod adapted to be moved against the tension of said spring by said lever; and a bur remover secured to the end of said spring-pressed rod.

9. In a machine of the class described, the combination of a reciprocating block; a shaft revolubly mounted therein but adapted to reciprocate therewith; a grinding member on said shaft; a rod movable endwise in said block; a stop to limit its movement in one direction; a collar and a spring to limit its movement in the opposite direction; a pivoted lever operable by said reciprocating rod; a spring-pressed rod adapted to be moved against the tension of said spring by said lever; an adjustable collar on said rod to limit the movement of said rod in one direction; and a bur remover secured to the end of said spring-pressed rod.

10. In a machine of the class described, the combination of a reciprocating block; a shaft revolubly mounted therein but adapted to reciprocate therewith; a grinding member on said shaft; a rod movable endwise in said block; a stop to limit its movement in one direction; a collar and a spring to limit its movement in the opposite direction; a pivoted lever operable by said reciprocating rod; a spring-pressed rod adapted to be moved against the tension of said spring by said lever; a bifurcated member in which said spring-pressed rod is mounted provided with a pivotal extension; a bearing for said extension; means for clamping said pivotal extension in its bearing; and a bur remover secured to the end of said spring-pressed rod.

11. In a machine of the class described, the combination of a reciprocating block; a shaft revolubly mounted therein but adapted to reciprocate therewith; a grinding member on said shaft; a rod movable endwise in said block; a stop to limit its movement in one direction; a collar and a spring to limit its movement in the opposite direction; a pivoted lever operable by said reciprocating rod; a spring-pressed rod adapted to be moved against the tension of said spring by said lever; a bifurcated member in which said spring-pressed rod is mounted provided with a pivotal extension; a bearing for said extension pivoted to a supporting arm; means for clamping said pivotal extension in its bearing; and a bur remover secured to the end of said spring-pressed rod.

12. In a machine of the class described, the combination of a reciprocating block; a shaft revolubly mounted therein but adapted

to reciprocate therewith; a grinding member on said shaft; a rod movable endwise in said block; a stop to limit its movement in one direction; a collar and a spring to limit its movement in the opposite direction; a pivoted lever operable by said reciprocating rod; a spring-pressed rod adapted to be moved against the tension of said spring by said lever; a bifurcated member in which said spring-pressed rod is mounted provided with a pivotal extension; a bearing for said extension pivoted to a supporting arm; a frame on which said reciprocating block is mounted; adjustable means for securing said supporting arm to said frame; means for clamping said pivotal extension in its bearing; and a bur remover secured to the end of said spring-pressed rod.

13. In a machine of the class described, the combination of a frame; a shaft revoluble in said frames; guides parallel to said shaft secured to said frame; a block reciprocable on said guides and having a bearing for said shaft; means permitting said shaft to revolve in said block while causing it to reciprocate therewith; a grinding member secured to said shaft; and means for causing the revolution of said shaft when an endwise movement is imparted thereto.

14. In a machine of the class described, the combination of a frame; a shaft revoluble in said frame; guides parallel to said shaft secured to said frame; a block reciprocable on said guides and having a bearing for said shaft; means permitting said shaft to revolve in said block while causing it to reciprocate therewith; a grinding member secured to said shaft; means for causing the revolution of said shaft when an endwise movement is imparted thereto; and a spring for returning said block to its normal position.

15. In a machine of the class described, the combination of a frame; a shaft revoluble in said frame; a block reciprocable on said frame and having a bearing for said shaft; means permitting said shaft to revolve in said block while causing it to reciprocate therewith; a grinding member secured to said shaft; means for causing the revolution of said shaft when an endwise movement is imparted thereto; a spring for returning said block to its normal position; and an adjustable member for limiting the movement of said block from its normal position.

Signed by me at 4 Post Office Sq., Boston, Mass., this 24th day of October, 1908.

GEORGE A. HENDERSON.

Witnesses:

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NATHAN C. LOMBARD.