L. H. THULLEN.

SAWING MACHINE.

APPLICATION FILED SEPT. 27, 1918.

1,405,697.

Patented Feb. 7, 1922.

3 SHEETS—SHEET 1.

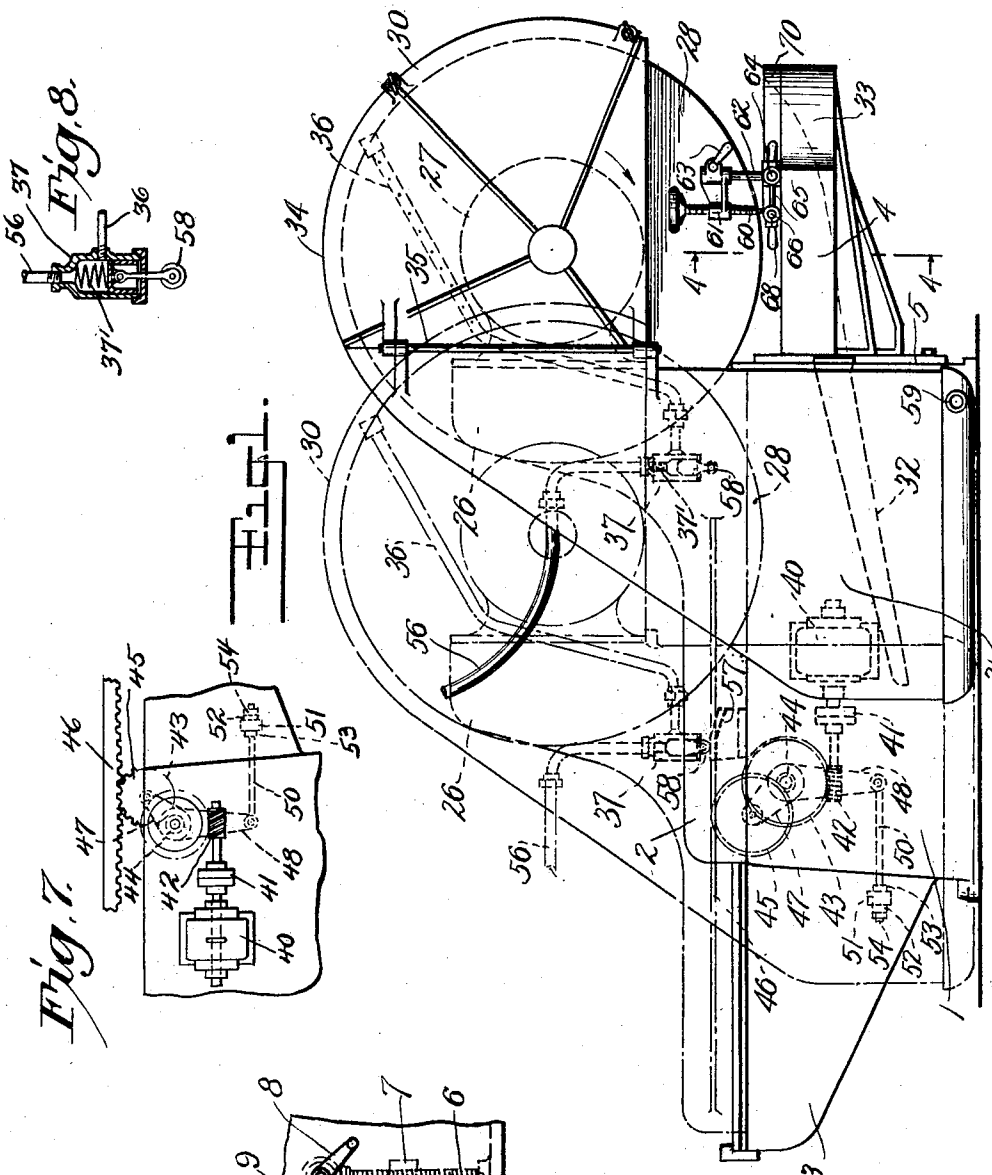

Fig. 1.

Fig. 8.

Fig. 7.

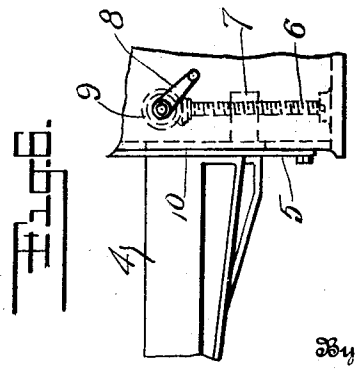

Fig. 6.

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3 SHEETS—SHEET 2.

Fig. 2.

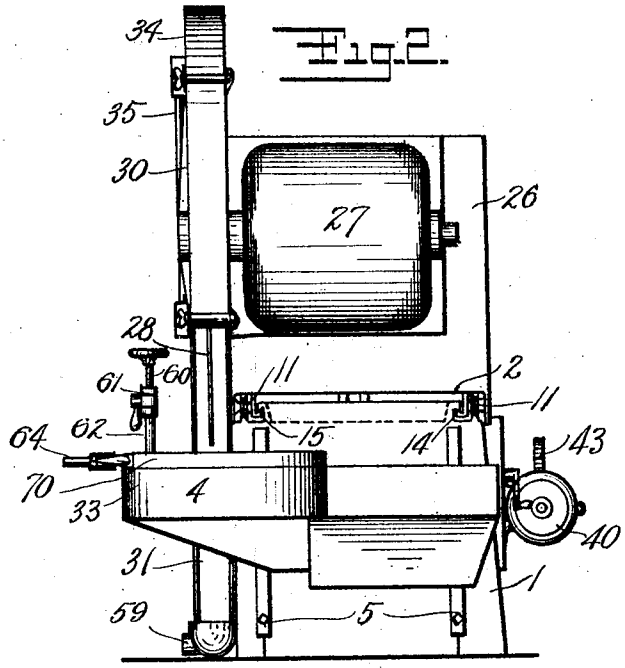
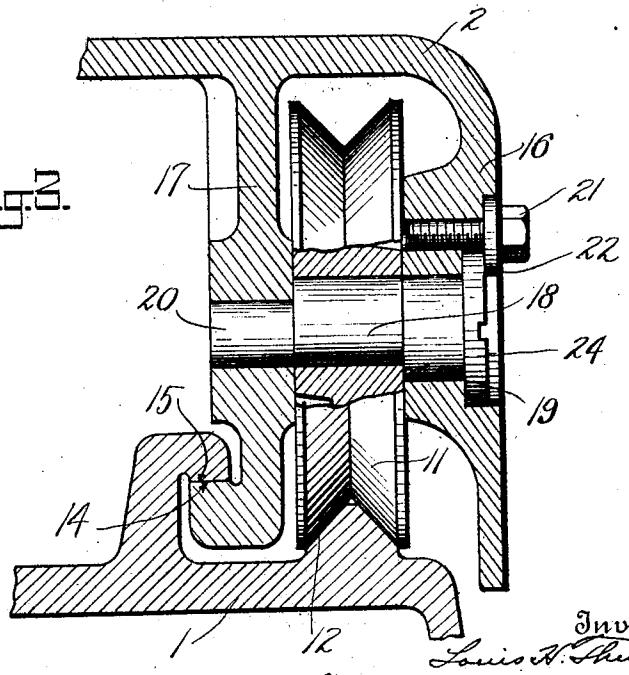


Fig. 3.



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3 SHEETS—SHEET 3.

Fig. 4.

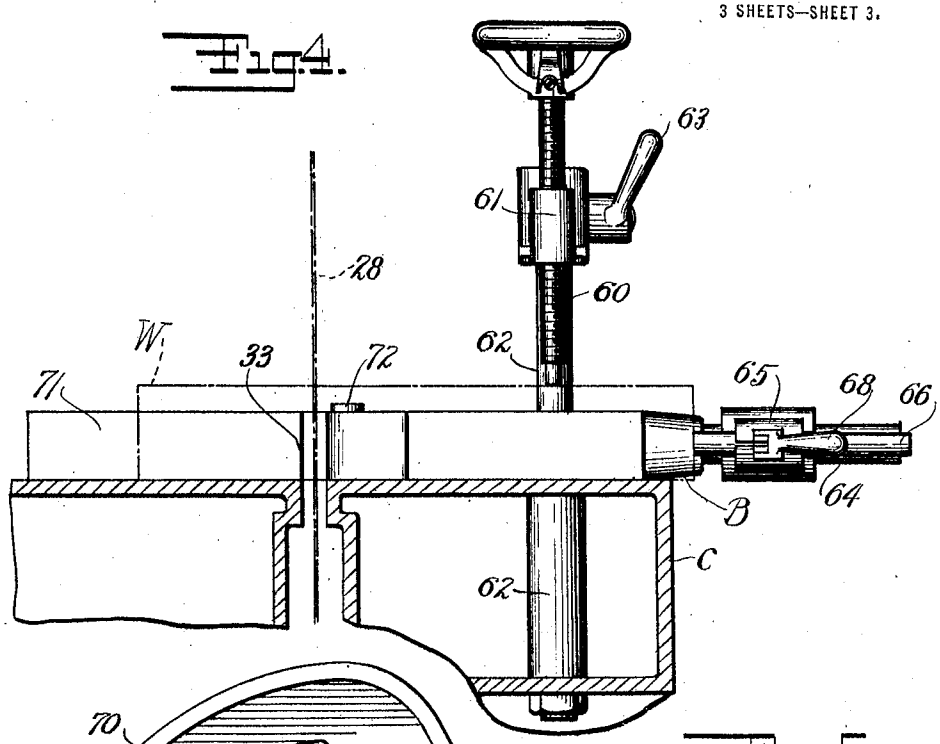
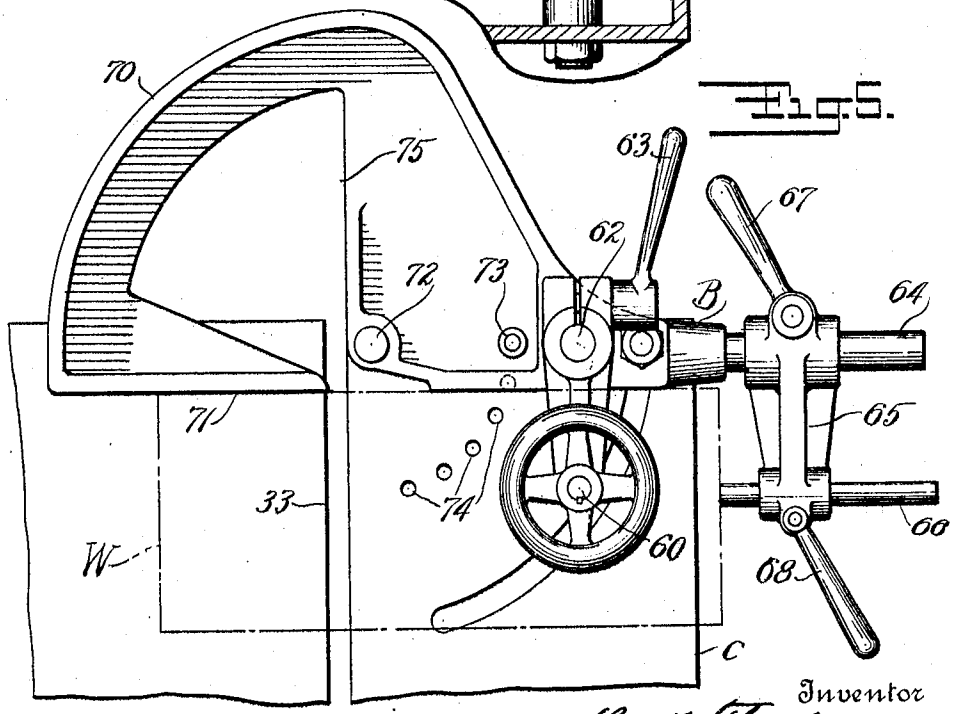


Fig. 5.



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UNITED STATES PATENT OFFICE.

LOUIS H. THULLEN, OF GRAND RAPIDS, MICHIGAN.

SAWING MACHINE.

1,405,697. Specification of Letters Patent. Patented Feb. 7, 1922.

Application filed September 27, 1918. Serial No. 255,965.

To all whom it may concern:

Be it known that I, LOUIS H. THULLEN, a citizen of the United States, residing in the city of Grand Rapids, State of Michigan, have invented certain new and useful Improvements in Sawing Machines, of which the following is a specification.

My invention relates to sawing machines such as referred to in my U. S. Patent No. 1070638 dated Aug. 19, 1913; and the principal object of my invention is to provide an improved machine of this character. Further objects, features and advantages will more clearly appear from the detailed description given below taken in connection with the accompanying drawings which form a part of this specification. In the drawings:

Fig. 1 is a side elevation of a sawing machine embodying my invention in one form, the saw carriage and the parts carried thereby being shown in full lines in advanced position and in dotted lines in retracted position.

Fig. 2 is a front elevation thereof.

Fig. 3 is a detail sectional view showing the means whereby the traveling carriage of the saw is supported and retained in operative relation to the bed of the saw.

Fig. 4 is a detail sectional view taken on line 4—4 of Fig. 1, but on a larger scale.

Fig. 5 is a plan view of the parts shown in Fig. 4.

Fig. 6 is a fragmentary detail view showing means for elevating or lowering the work table.

Fig. 7 is a detail view in elevation on an enlarged scale looking from the rear of Fig. 1 and showing the connection between the feeding motor and traveling carriage of the machine.

Fig. 8 is a sectional view on an enlarged scale of the valve for controlling the flow of the cooling fluid to the saw.

Referring to the various figures, the numeral 1 designates the bed of the machine and 2 the traveling carriage which is supported as hereinafter described for movement back and forth along the bed 1. The latter is desirably provided with a rear extension 3 by which the rear portion of the traveling carriage is supported when the carriage is in a retracted or partially retracted position. The front of the bed 1 is provided with a work table or support 4 which is guided for up and down movement, as by bars or rails 5 which are secured to the bed of the machine and project within channels or grooves on opposite sides of the work table. Suitable means for effecting the vertical movement of the work table are provided, the means, as shown, comprising a vertical shaft 6 threaded into an extension 7 at the rear of the work table, the shaft 6 being rotated by means of a crank 8 and bevel gears 9 and 10.

Referring to Fig. 3 the means for movably supporting the traveling carriage upon the bed 1 and retaining the carriage in operative position upon the bed comprise, as shown, rollers 11 carried by the carriage 2 and arranged to roll along upwardly facing rails 12 adjacent opposite sides of the bed 1 and bearings 14 arranged to slide upon downwardly facing rails 15 extending along the top of the bed 1 at opposite sides thereof and slightly inwardly of the rails 12. The rails 12 and 15 are desirably formed integrally with the top of the bed 1, and the bearings for the rollers 11 are desirably in the form of spaced parallel flanges 16 and 17 integral with the frame of the traveling carriage and projecting downwardly therefrom. The bearing 14 which engages the lower face of the downwardly facing rail 15 is desirably formed integrally with the lower portion of the flange 17. The rollers 11 are supported upon the shafts 18 which are adjustable so as to raise or lower the rollers relatively to the carriage and to bring the bearing 14 into operative relation to the rail 15 when the rollers are in engagement with the rails 12. As shown, the shafts 18 are formed with the central portion upon which the rollers are mounted eccentric to the end portions 19 and 20, which are supported in bearings 16 and 17 respectively; so that by a rotation of the shafts 18 the rollers may be adjusted upwardly and downwardly with respect to the traveling carriage. For securing each shaft in adjusted position I have shown a bolt 21 threaded into the traveling carriage and adapted to be adjusted so as to press the washer 22 against the headed end 24 of the shaft with the desired degree of pressure. The rollers 11, as shown, are held by the flanges 16 and 17 against lateral movement with respect to the frame of the traveling carriage. To prevent lateral movement of the rollers 11 and the traveling carriage with respect to the bed of the machine, the

periphery of the rollers 11 is desirably grooved and the rails 12 are shaped to fit within the grooves. As shown, the grooves and the rails 12 are of V shape in cross-section. Any suitable number of the rollers 11 may be provided on each side of the machine.

The forward end of the traveling carriage, as shown, is provided with an upward extending portion 26 to which is secured an electric motor 27 to the shaft of which is secured the saw-disc 28. This may be a large rapidly rotating metallic disc without teeth which cuts through the material by friction; but it will be understood that my invention is not limited to use with this particular kind of saw or operation performing member. As shown in Fig. 1, the saw 28 projects downwardly below the motor 27 and forwardly of the frame of the traveling carriage so as to be in a position to readily operate upon the work supported upon the table 4. All except the lower portion of the saw 28 is enclosed within a hood 30 which is secured to and carried by the traveling carriage, the hood, as shown, being formed continuously with a tank 31 which is arranged below and to the rear of the saw 28. As shown, the side walls of the tank are continuous with and extend downwardly from the rear portions of the side walls of the hood, the rear wall of the hood being inclined downwardly and rearwardly and merging with the rear wall of the tank. This tank serves to catch the sparks and cooling water thrown rearwardly by the saw. By forming the hood and tank as one unitary structure a strong, simple and efficient structure is obtained and both the hood and the tank remain in proper fixed relation to the saw regardless of its position relatively to the bed 1. The tank 31 extends nearly to the bottom of the bed 1, being arranged on one side thereof, as shown in Figs. 1 and 2; and the table 4 has secured thereto an inclined chute or spout 32 which telescopes within the tank 31 and serves to convey into said tank cooling water which collects in the recess or gutter 33 in the work table. The front of the tank 31 is open sufficiently to permit vertical adjustment of the table 4 and spout 32 and also to permit forward and backward reciprocation of the tank with the traveling carriage. The hood is provided on the outer side thereof with a door 34 hinged as shown in 35 to permit access to the interior of the hood. The cooling fluid which is desirably water, although it may be air or any other suitable cooling medium, is sprayed on the face of the saw through a perforated pipe 36 carried by the hood. The flow of the cooling fluid through the pipe 36 is controlled through a valve 37 in a manner which will be more fully explained hereinafter.

The traveling carriage is desirably fed by power in accordance with the invention described in my patent No. 1070638 hereinbefore referred to so as to maintain the resistance of the work to the saw substantially constant. The feeding means, as shown, comprise an electric motor 40 supported upon the side of the bed 1 and connected through a suitable coupling 41 and worm 42 to drive speed reducing gearing 43, 44 and 45 co-acting with rack 46, which is secured upon the bottom of the traveling carriage. In order to permit proper adjustment of the speed reducing gearing with respect to the rack 46 I desirably mount the gear 45 for adjustment about the axis of the gear 44. To this end the gear 45, as shown, is carried by a forked arm 47 which is pivoted on the shaft carrying the gear 44, the arm 47 being rigid with downward extending arm 48 to the lower end of which is pivoted a rod 50 which passes through a bracket 51 at the rear of the bed 1. By adjustment of the nuts 52 and 53 which are threaded upon the rod 50 on opposite sides of the bracket 51, the rod 50 may be moved back and forth so as to adjust the gear 45 towards or away from the rack 46 without disturbing the connection between the gear 45 and the gear 44. Means such as the nut 54 may be mounted to prevent loosening of the nut 52, it being understood that when the gear 45 has been properly adjusted with respect to the rack 46 the nuts 52 and 53 are moved into engagement with opposite faces of the bracket 51.

It is desirable that the cooling fluid be sprayed upon the saw 28 while the latter is in operation, but that, to avoid waste, the supply of said fluid be shut off when the traveling carriage and saw are in retracted or inoperative position. To this end I desirably form the valve 37 with an operating spring 37′ so that normally it will tend to move downwardly to open the passage between the supply pipe 56 and the pipe 36 and I also provide means whereby said valve is closed when the carriage reaches a predetermined point in its rearward movement. As shown, I have secured to the bed 1 a cam or incline 57 which is adapted to be engaged by the anti-friction roller 58 upon the lower end of the valve to force the latter upwardly into a closed position as the carriage approaches its rearmost position, the arrangement being such that the said valve is closed only when the carriage is substantially in its rearmost position and the saw and work are separated or in inoperative relation to each other. In this way a supply of cooling fluid to the saw is insured throughout the operation of the latter while waste of the fluid is prevented. The cooling fluid sprayed upon the saw is, as hereinbefore stated, thrown rearwardly from the

saw into the tank 31 together with a certain amount of the sparks which may be formed, the cooling water or other fluid serving to quench the sparks. The water which collects in the lower part of the tank 31 may be led off through an opening 59 whence it may be caused to flow by suitable means to the sewer or to any other place desired.

For securing the work in proper position upon the work table I have shown a screw-rod 60 which is adapted to bear downwardly upon the work, this rod being threaded within a bearing 61 which is supported for up and down and lateral adjustment upon a vertical rod 62 fixedly secured to the work table. The bearing bracket 61 may be secured in suitable position upon the rod 62 by means such as the clamp 63. It is desirable to provide a suitable means to facilitate positioning of the work W with respect to the saw, which, as shown in dot and dash lines in Fig. 4, is arranged to extend downwardly in the slotted opening 33 in the work table. To this end, as clearly shown in Figs. 4 and 5, the pivoted sector shaped abutment 70 upon the work table carries a fixed laterally projecting horizontal rod 64 upon which is slidably mounted a bracket 65 which carries a bearing in which an abutment such as a rod 66 is mounted for longitudinal movement parallel to rod 64 and transverse to the plane of the saw. The inner end of rod 66 is adapted to be engaged by the end of the work, thereby insuring the cutting off of a section of desired length and also facilitating the holding of the work in position. Means such as the clamps 67 and 68 serve respectively to secure the bracket 65 in adjusted position upon the rod 64 and the rod 66 in adjusted position within the bracket 65. It is frequently desirable to make a cut at an angle to the length of an article; and to facilitate positioning the work so as to maintain the same at the proper angle to the saw I have shown a pivoted sector shaped abutment 70 having a straight vertical face 71 against which the front edge of the work is adapted to bear, said face being parallel to the rod 66. The member 70 is pivoted for movement, as shown at 72, and may be held in adjusted position at any one of several angles to the saw by passing a dowel pin 73 through an opening provided therefor in the member 70 and into one of the spaced openings 74 in the work table. The sector 70 is, as shown in Fig. 5, provided with a cut-away portion 75 into which the saw may project when the sector 70 is in its various positions of adjustment.

The operation of the machine will be clear to any one skilled in the art from the foregoing detailed description thereof. Although I have described my improvement in considerable detail and in respect to one particular embodiment of my invention, nevertheless, I do not desire to be limited to the details shown and described except where clearly set out in the appended claims, since many changes and modifications may be made without departing from the spirit of my invention and scope of the appended claims.

Having fully and clearly described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a machine of the class described, the combination with a rotatable operation performing member, work supporting means and means for feeding said operation performing member relatively to said work supporting means, of a tank arranged below and to the rear of the operation performing member and in fixed relation to the axis thereof, to catch particles thrown from the operation performing member.

2. In a machine of the class described, the combination with a rotatable operation performing member, work supporting means and means for feeding said operation performing member relatively to said work supporting means, of means for supplying a cooling medium to said operation performing member, and a tank arranged below and to the rear of the operation performing member and in fixed relation to the axis thereof, to catch particles thrown from the operation performing member.

3. The combination with a rotatable operation performing member, work supporting means and means for producing a relative feeding movement between said member and means, of means for supplying a cooling medium to said operation performing member, a tank arranged in fixed relation to the axis of said operation performing member to catch particles thrown from said member, and a drain leading from said work supporting means and arranged to communicate with said tank throughout said relative feeding movement.

4. The combination with a rotatable operation performing member, work supporting means and means for producing a relative feeding movement between said member and means, of means for supplying a cooling medium to said operation performing member, a tank arranged in fixed relation to the axis of said operation performing member to catch particles thrown from said member, and a drain spout leading from said work supporting means and telescoping with said tank so as to communicate with the latter throughout said relative movement.

5. The combination with a rotatable operation performing member, work supporting means and means for producing a relative feeding movement between said member and means, of a hood arranged in fixed relation to said operation performing member and a tank communicating with and in fixed rela-

tion to said hood for catching particles thrown from said operation performing member.

6. In a machine of the class described, the combination with a rotatable operation performing member, normally stationary work supporting means and means for feeding said operation performing member relatively to said work supporting means, of a movable tank in fixed relation to the axis of said operation performing member to catch particles thrown from the said member, and a drain leading to said work supporting means and having a fixed relation thereto but communicating with said tank throughout the aforesaid relative movement.

7. The combination with a rotatable operation performing member, work supporting means adjustable vertically relatively to said operation performing member, and means for feeding said operation performing member horizontally relatively to said work supporting means, of a tank arranged in fixed relation to the axis of said operation performing member to catch particles thrown from said member, means for supplying a cooling medium to said member, and a drain leading from said work supporting means and arranged to communicate with said tank throughout said feeding movement and vertical adjustment of said work supporting means.

8. In a machine of the class described, the combination with a rotatable operation performing member, work supporting means, and means for feeding said operation performing member relatively to said work supporting means, of a tank in fixed relation to the axis of said operation performing member to catch particles thrown from the said member, means for supplying cooling medium to the said member, a valve controlling the supply of cooling medium and means for automatically closing said valve when the operation performing member and work supporting means are in separated or inoperative position to each other.

9. In a machine of the class described, the combination with a rotatable operation performing member, work supporting means, and means for feeding said operation performing member relatively to said work supporting means, of a tank in fixed relation to the axis of said operation performing member to catch particles thrown from the said member, means for supplying cooling medium to the said member, a valve controlling the supply of cooling medium and a cam for automatically closing said valve when the operation performing member and work supporting means are in separated or inoperative position to each other.

10. The combination with a rotatable operation performing member, work supporting means, and means for producing a relative feeding movement between said member and means, of means for spraying a cooling medium upon said operation performing member, a valve for controlling the passage of the cooling medium through said means, and automatic means for closing said valve when said operation performing member and said work-supporting means are in separated or inoperative relation to each other.

11. In a machine of the class described, the combination with a stationary bed and a traveling carriage one of which is provided with work supporting means and the other with an operation performing member, of means for producing a relative feeding movement between said bed and carriage, said means comprising a motor, a rack carried by said carriage, speed reducing gearing between said motor and rack, and means for adjusting said gearing into operative relation with respect to said rack without disconnecting the same from said motor.

12. In a machine of the class described, the combination with a stationary bed and a traveling carriage, one of which is provided with work supporting means and the other with an operation performing member, of means for producing a relative feeding movement between said bed and carriage, said means comprising a motor, a rack carried by said carriage, speed reducing gearing between said motor and rack including a pair of intermeshing gears, and means for adjusting one of said gears about the axis of the other gear towards operative position with respect to said rack.

13. In a machine of the class described, the combination with a work table, of means for holding the work in position upon said table, said means including a pivoted abutment against which one side of the work is adapted to bear and a second abutment carried by said first abutment for engaging an end of the work.

14. In a machine of the class described, the combination with a work table, of means for holding the work in position upon said table, said means including a pivoted abutment against which one side of the work is adapted to bear and a second abutment carried by said first abutment for engaging an end of the work, and said second abutment being mounted for adjustment longitudinally of the work engaging surface of said first named abutment.

In testimony whereof, I have signed my name to this specification.

LOUIS H. THULLEN.