

No. 791,201.

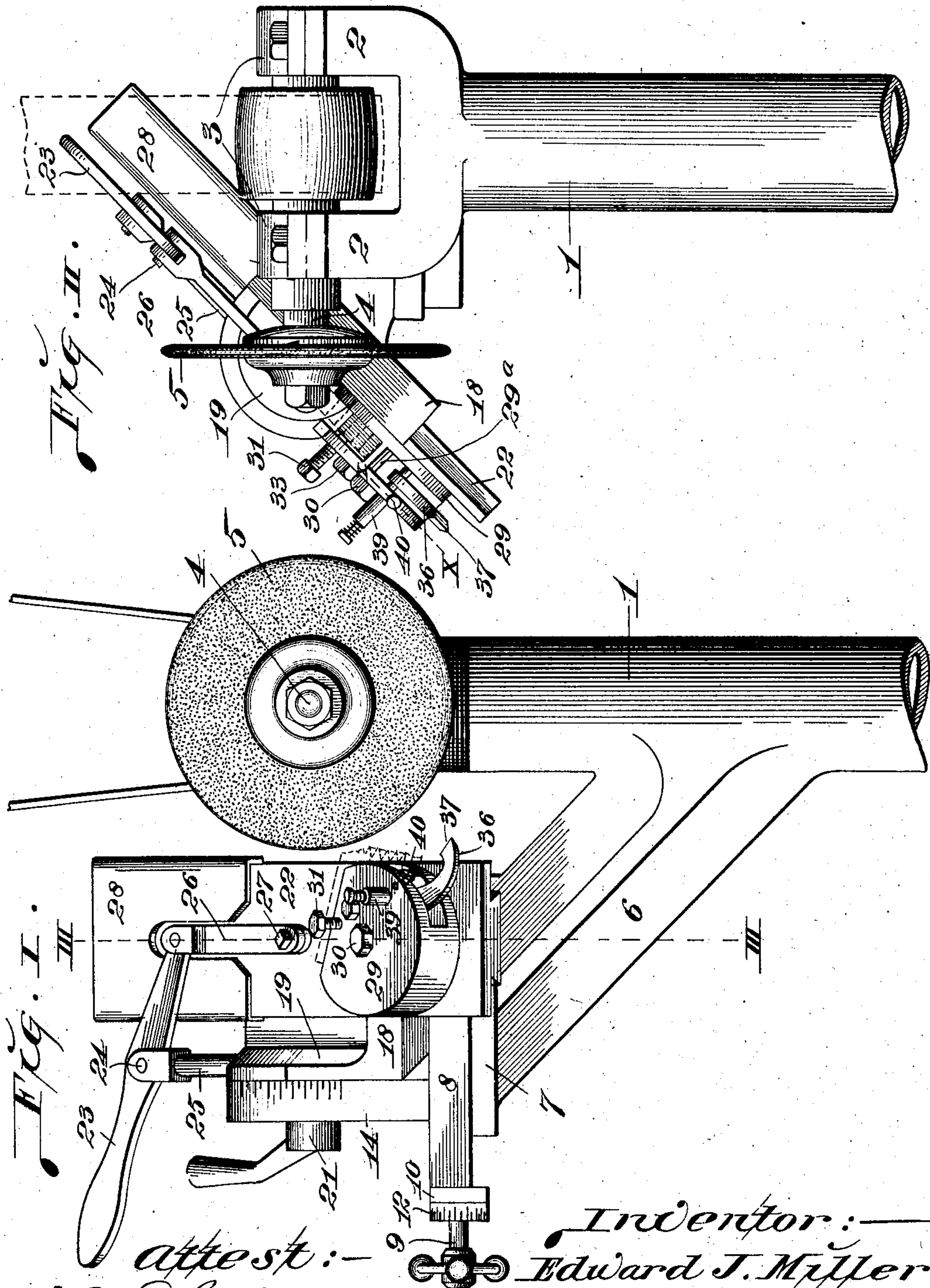
PATENTED MAY 30, 1905.

E. J. MILLER.

MACHINE FOR GRINDING SCREW CUTTING DIES OR CHASERS.

APPLICATION FILED JAN. 26, 1905.

3 SHEETS—SHEET 1.



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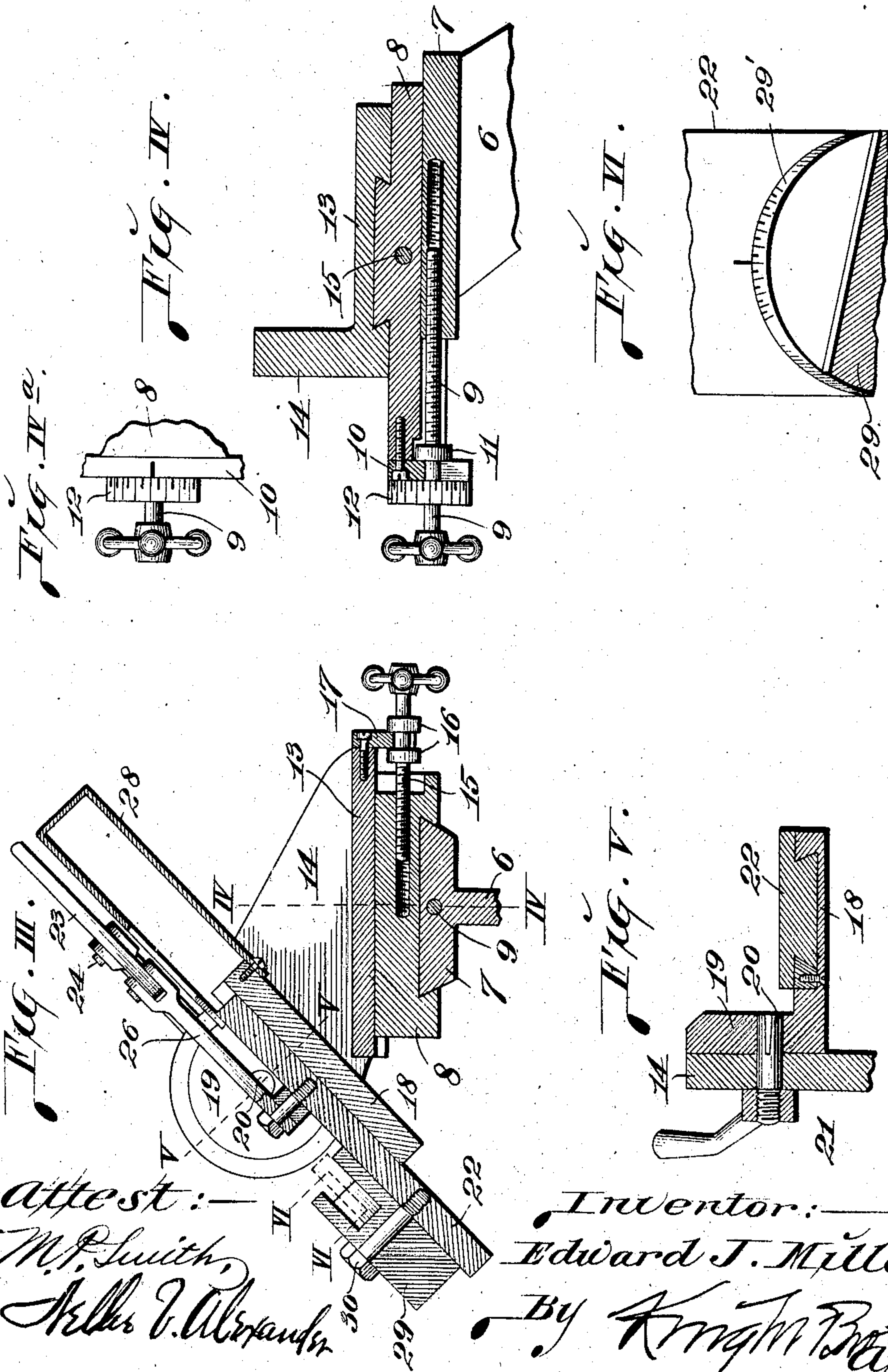
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3 SHEETS—SHEET 3.

Fig. VII.

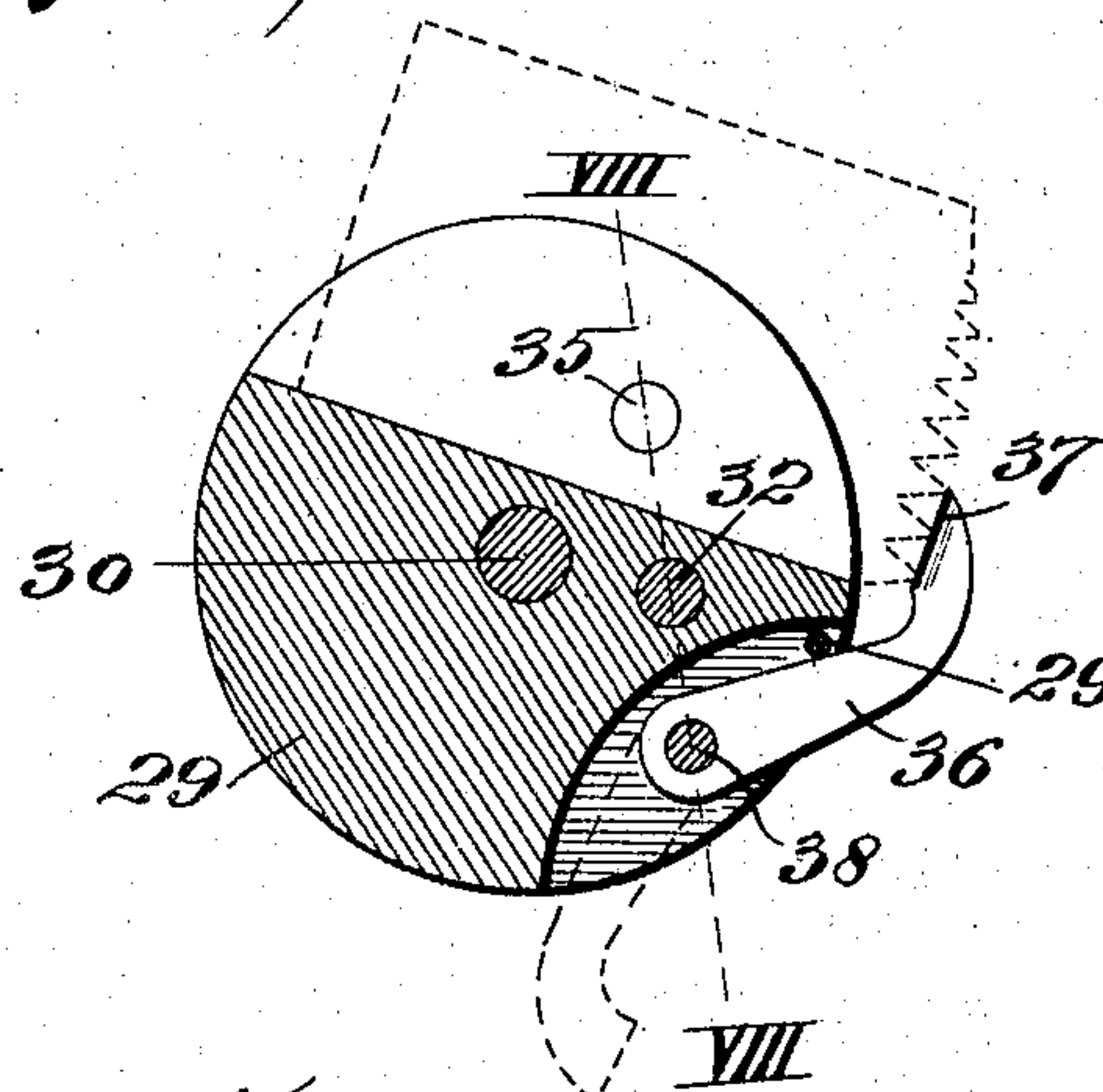


Fig. VIII.

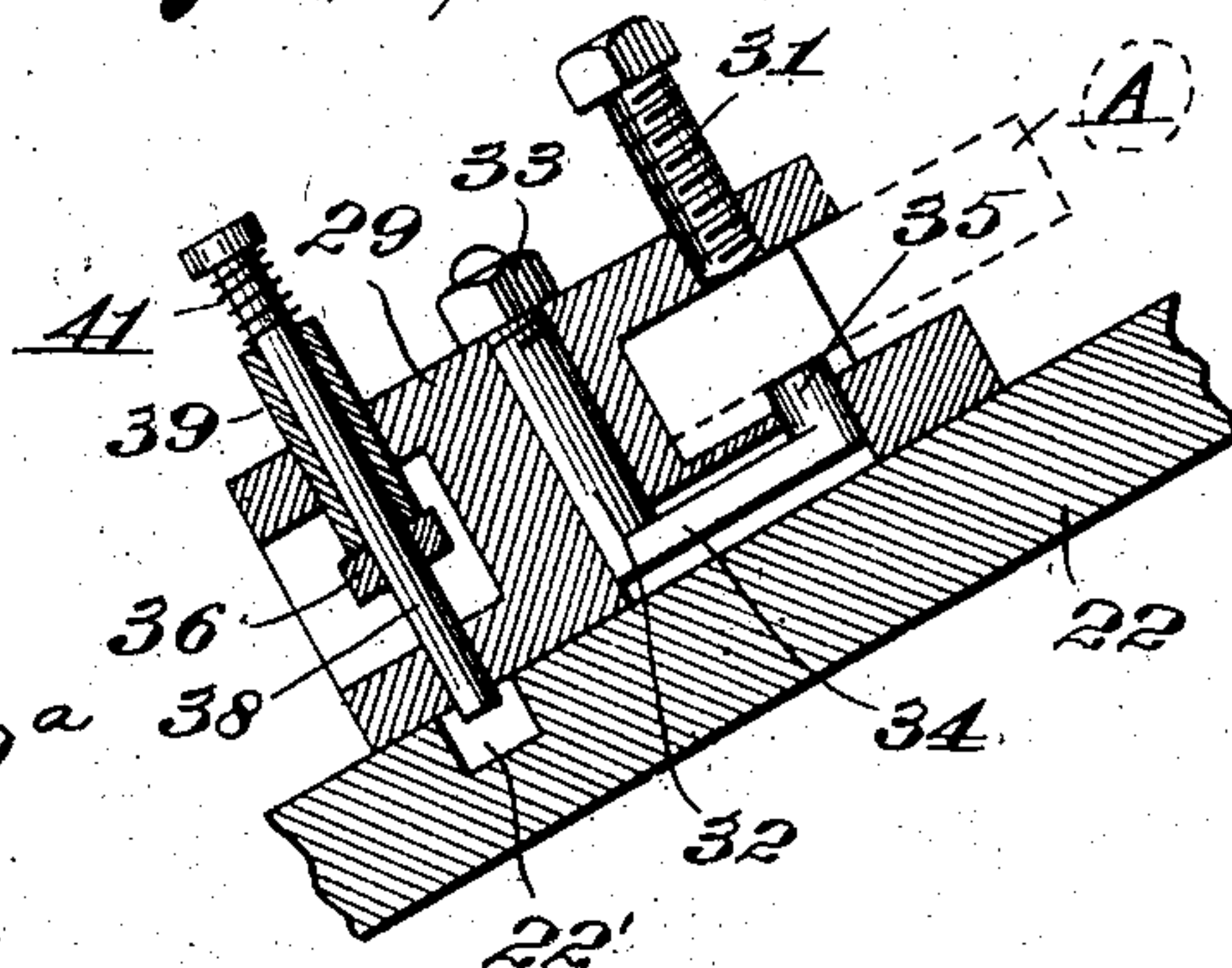


Fig. IX.

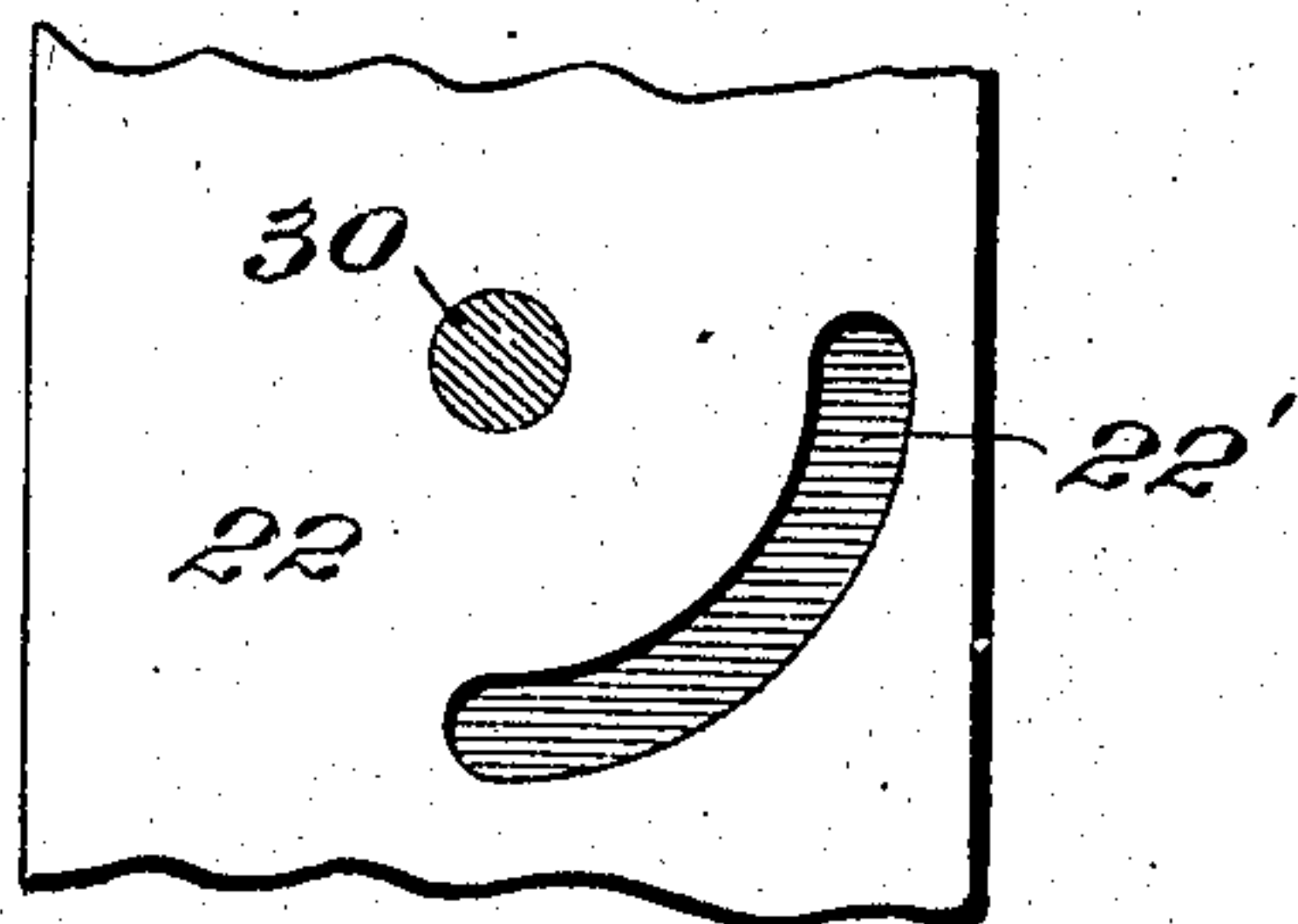


Fig. X.

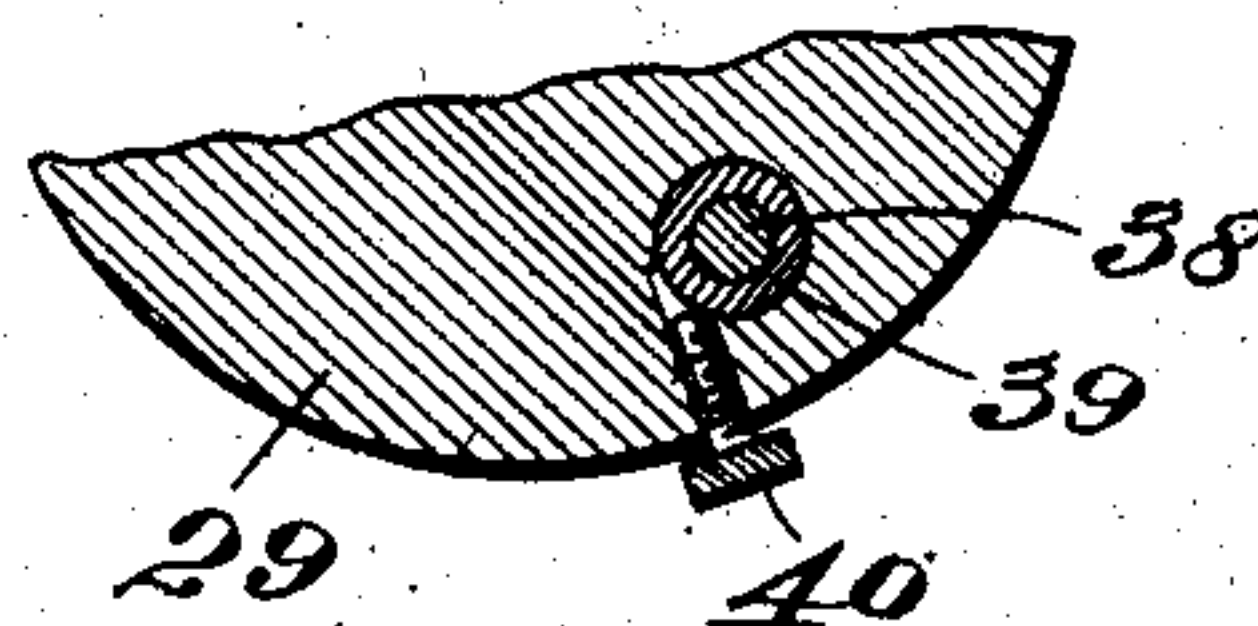


Fig. XI.

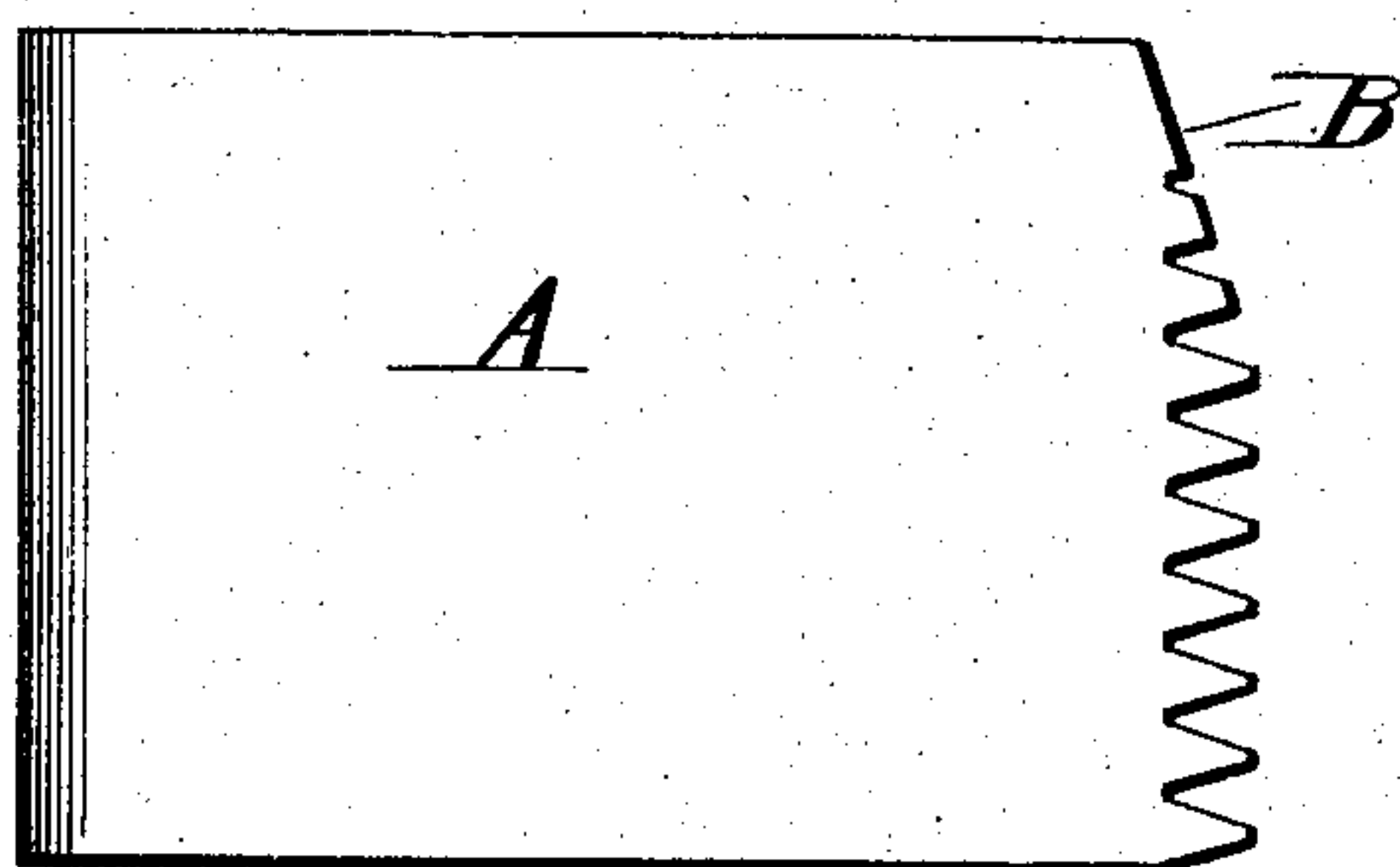
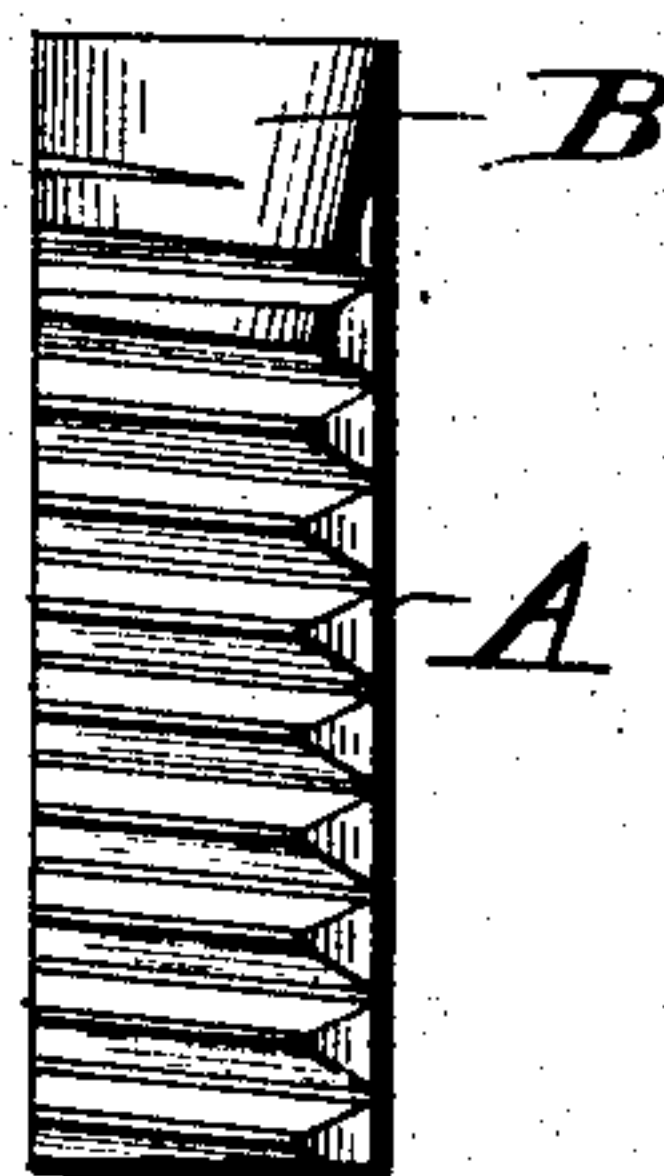
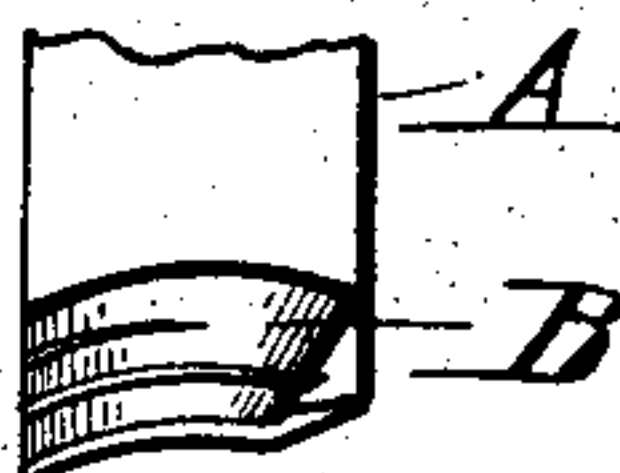


Fig. XII.



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Fig. XIII.



UNITED STATES PATENT OFFICE.

EDWARD J. MILLER, OF ST. LOUIS, MISSOURI, ASSIGNOR TO ST. LOUIS
SCREW COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION.

MACHINE FOR GRINDING SCREW-CUTTING DIES OR CHASERS.

SPECIFICATION forming part of Letters Patent No. 791,201, dated May 30, 1905.

Application filed January 26, 1905. Serial No. 242,745.

To all whom it may concern:

Be it known that I, EDWARD J. MILLER, a citizen of the United States, residing in the city of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Machines for Grinding Screw-Cutting Dies or Chasers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to a machine for grinding screw-cutting dies or chasers, such as are used in bolt or pipe cutting machines, and die-heads in which the cutters are removable from their holders. In grinding dies or chasers of this type the essential features are, first, that they be ground in such manner that the cutting edges of the throats will not be weakened and that the die or chaser will not ride upon the throat, thereby causing chattering of the die or chaser; second, that the dies or chasers be so ground at the proper angle to suit the class of work they are to perform; third, that they be ground alike, so that all the dies or chasers mounted in a holder will do their proper proportion of work. In most instances this grinding has been accomplished by hand, and it is practically impossible to carry out the essential characteristic of grinding when work is so done. In previous machines for accomplishing this work, so far as I am aware, use has been made of very small emery-wheels for grinding action conforming to the size of the work the dies or chasers are to operate upon in order to obtain proper curvature and clearance in the throats of the dies or chasers. In this practice the grinding-wheel being necessarily small to conform to the die or chaser it has been found next to impossible to run it at a speed high enough to secure free cutting or grinding of the die or chaser throat, owing to the peripheral surface being so small that it will not retain its size, and consequently it fails to grind the set of dies or chasers correspondingly due to wear. In addition the grinding-wheel spindle is necessarily small to correspond to the size of the wheel, and in consequence of its being necessary to locate the grinding-wheel upon said spindle beyond the

spindle-bearing as it stands in the grinding-line the spindle is so frail that it is subject to springing action, and therefore the grinding action is inaccurate.

In my machine all of the objectionable features pointed out are obviated, as by the peculiar arrangement of the parts of the machine I am enabled to use a grinding-wheel of practically any diameter, due to the parts being so arranged that the proper curvature of the die or chaser throat is secured in grinding action by swinging the die-holder and its carrying member to the proper angle so that the die or chaser will be caused to travel across the periphery of the grinding-wheel in an oblique direction, the degree of obliquity corresponding to the particular curvature of the die or chaser throat. In this connection it may be stated that the peripheral face of the grinding-wheel should be kept narrow, so that if the die or chaser to be ground thereby were moved vertically it would be ground of a shape corresponding to the peripheral face of the grinding-wheel; but by throwing the die-holder into an inclined position the ground throat of the die or chaser will assume a curve, becoming larger with increased angle until when the die-holder is horizontal the curvature with which the throat is ground would be the same as the peripheral curvature of the grinding-wheel. In my machine provision is made for advancing the die-holder to the grinding-wheel for grinding action in line of the grinding-wheel spindle for clearance of the cutting edge and also for holding the dies or chasers by either front or rear sides in order to provide for the proper grinding of the dies or chasers, which in some die-heads are alined by their front faces and in some by their rear faces. For the purpose of insuring that all dies or chasers be ground alike, even if of unequal length, I provide a gage which is adapted to be adjusted to the teeth of the die or chaser when clamping it in the holder to be ground. This gage is preferably of such configuration at its die-engaging portion that it will extend across several of the teeth of the die or chaser, and its teeth-engaging portion is made of a shape

to conform to the general trend of the teeth whether such trend be tapering or in straight transverse line.

Figure I is a front elevation of my machine, in which only the upper portion of the stand is illustrated. Fig. II is a side elevation of the parts shown in Fig. I. Fig. III is a vertical section taken on line III III, Fig. I. Fig. IV is a vertical section taken on line IV IV, Fig. III. Fig. IV^a is a view showing in detail the outer end of the bed-plate and parts associated therewith. Fig. V is a cross-section taken on line V V, Fig. III. Fig. VI is an enlarged view taken partly in section on line VI VI, Fig. III, and showing portions beneath said line in plan. Fig. VII is an enlarged cross-section taken through the die-holder. Fig. VIII is a vertical section taken on line VIII VIII, Fig. VII, through the die-holder. Fig. IX is a top view of a portion of the die-holder-carrying slide, showing the curved runway therein in which the gage-carrying rod operates. Fig. X is an enlarged section taken on line X X, Fig. II, through a portion of the die-holder. Fig. XI is a front view of one of the dies or chasers such as are ground in my machine. Fig. XII is an end view of the die or chaser shown in Fig. XI. Fig. XIII is an edge view of the toothed end of a die or chaser, showing the cutting-throat.

1 designates the post of the stand of my machine, the upper end of which is bifurcated to provide arms 2, supporting journal-boxes 3, in which is fitted a spindle 4, that carries a grinding-wheel 5.

6 is an arm extending laterally from the stand-post 1 and terminating in a table 7. (See Figs. I, III, and IV.)

8 is a bed-plate that is reciprocally mounted upon the table 7 for movement toward and away from the periphery of the grinding-wheel 5. Reciprocation is imparted to the bed-plate 8 through the medium of a shift-screw 9, that operates in a screw-threaded bore in the table 7 and extends longitudinally beneath said bed-plate and through a bearing member 10, that is fitted to the outer end of said plate, as shown most clearly in Fig. IV. Fixed to the shift-screw 9, at the inner side of the bearing member 10, is a collar 11, that bears against said member, and fixed to the shift-screw at the other side of the bearing member is a gage or scale disk 12, that is adapted to rotate with the shift-screw to serve as an indicator of the adjustment of said screw through the medium of the scale thereon registering with a mark upon the bearing member 10, as seen in Fig. IV^a. By this means the degree of adjustment of the bed-plate 8 to and from the periphery of the grinding-wheel 5 may be accurately determined.

13 designates a carriage-bed reciprocally mounted upon the bed-plate 8 and adapted for movement transversely of said bed-plate

and also transversely of the grinding-wheel 5. This bed is provided at its outer side with an upright wing 14, and it is shifted through the medium of a shift-screw 15, that is seated in a screw-threaded bore in the bed-plate 8 (see Fig. III) and has fixed thereto a pair of collars 16, that operate in engagement with a bearing member 17, fixed to the outer end of the carriage-bed.

18 designates an oscillating plate that is provided with an ear 19, which is swingingly connected to the wing 14 of the carriage-bed 13 by means of a stub-shaft 20, fixed to the ear 19 (see Fig. V) and extending through the wing 14, this stub-shaft being equipped with a clamp-nut 21, by which the oscillating-plate ear may be drawn tightly to the wing 14 to hold the oscillating plate from movement. The oscillating plate is thereby so supported that it may be oscillated transversely of the grinding-wheel 5 to place the plate at any desired inclination to a horizontal or perpendicular line. For the purpose of determining the degree of inclination of the oscillating plate I provide the carriage-bed wing 14 with a scale and also provide an indicating-mark upon the oscillating-plate ear.

22 designates a slide reciprocally mounted upon the oscillating plate 18 and arranged for movement on said plate in a direction transversely of the grinding-wheel 5 or in a direction obliquely to the axis of said grinding-wheel. The slide 22 is reciprocated through the medium of a hand-lever 23, that is fulcrumed at 24 in a pivot-stem 25, projecting from the oscillating-plate ear 19, and has connected to it a link 26, that is pivotally united at 27 to the slide 22.

28 is a protective casing secured to the oscillating plate 18 at its rear end and into which the slide 22 operates.

29 designates a die-holder that is rotatably mounted upon the slide 22, to which it is held by a swivel-bolt 30. (See Figs. I, II, III, and VII.) The die-holder is provided with a pocket for the reception of the die or chaser to be ground and which protrudes from said pocket in a direction toward the grinding-wheel 5, as seen in Fig. I. It is essential in grinding dies or chasers that such tools be held in a die-holder by pressure of the retaining device either against the side or back of the tool, according to whether the tool is alined by its front face or by its rear face. For this reason I provide a clamping member for engagement with the front face of the die or chaser and also a clamping member for engagement with the rear face of the die or chaser, either of which is to be used independently of the other.

31 designates a clamping-screw that extends downwardly through the die-holder at the location of the pocket therein and which is adapted to engage the front of the die or chaser seated in the die-receiving pocket.

32 is a clamping-bolt that is movably positioned in the die-holder 29 and equipped at its upper or outer end with a nut 33, by which it may be moved upwardly and downwardly.

5 The clamping-bolt is provided at its lower end with a laterally-extending arm 34, that extends beneath the die-holder pocket and terminates in a stud 35, which enters into the die-holder pocket. This stud is adapted to
10 bear against the rear of the die or chaser in said pocket and clamp the tool therein by pressing it upwardly against the top wall of the pocket when the nut 33 of the clamp-bolt is drawn tight.

15 36 designates a gage-arm, the free end of which is provided with a knife-edge 37, that is adapted to be brought against the teeth of the die or chaser seated in the pocket in the die-holder 29, as seen in Fig. VII, its movement being limited by a stop 29^a. This gage-arm is rockingly supported by a rod 38, that
20 is seated in the die-holder and the lower end of which is adapted to move in a runway 22' in the slide 22. (See Figs. VIII and IX.)
25 The rod 38 is loosely positioned in a sleeve 39, mounted in the die-holder and adjustably held by a set-screw 40 passing through the die-holder and bearing against said sleeve. (See Figs. I, II, and X.)

30 41 is a spring surrounding the rod 38 at its upper end and seated between the head of said rod and the upper end of the sleeve 39. This spring serves to support the rod and maintain the gage-arm 36 fixed thereto in any
35 adjusted position corresponding to the seating of the rod surrounding sleeve 39. It will be seen that by shifting the sleeve 39 to any desired position and securing it through the medium of the set-screw 40 the gage-arm will
40 be caused to rest against the lower end of said sleeve, and therefore be maintained at the proper elevation to bear centrally against the teeth of the die, according to the positioning of said die in the die-holder.

45 For the purpose of gaging the setting of the die-holder 29 in order that the die or chaser confined therein will be properly presented to the grinding-wheel by which it is to be ground I provide upon the periphery of said die-holder
50 at 29' a scale that is adapted to register with a mark upon the slide 22. (See Fig. VI.) In Figs. XI to XIII, I have shown a die or chaser A of the type ground in my machine and which is provided with a cutting-throat B.

55 In the practical use of my machine the die or chaser to be ground is first set into the die-holder 29. The gage-arm 36 is then swung into a position against the stop 29^a, and the die or chaser is adjusted to said gage-arm,
60 after which it is secured by clamping it either at its front or rear side through the medium of the clamp-screw 31 or clamp-bolt 34, according to whatever the alinement of the tool may be. The gage-arm is then swung rear-
65 wardly into the position seen in dotted lines,

Fig. VII, so that it is out of the way of the grinding-wheel, transversely to which the die or chaser is shifted in grinding action. The bed-plate 8 is next shifted toward or away
70 from the grinding-wheel 5 to properly position the die or chaser with respect to the periphery of the grinding-wheel. The oscillating plate 18 is also rocked to the proper inclination with respect to the axis of the grinding-wheel after the clamp-nut 21 is loosened,
75 and when the desired positioning of said oscillating plate is secured the clamp-nut is again tightened to hold said plate rigidly. The positioning of the oscillating plate is determined according to the degree of curvature
80 in which the throat of the die or chaser is to be ground. After the parts enumerated have been positioned in the manner stated the operator by manipulating the hand-lever 23
85 causes reciprocation to be imparted to the slide 22, which lies obliquely to the peripheral surface of the grinding-wheel, and as a consequence the die or chaser held in the die-holder is carried obliquely across the periphery of the grinding-wheel, and the throat of
90 the die or chaser is ground exactly to the proper curvature by traversing the grinding-wheel periphery in the oblique movement.

I claim as my invention—

1. In a grinding-machine of the character 95 described, the combination of a grinding-wheel, a reciprocally-mounted die-holder arranged for movement obliquely to the periphery of said grinding-wheel, an oscillatory member by which said die-holder is supported,
100 and means supporting said oscillating member and adjustable toward and away from said grinding-wheel, substantially as set forth.

2. In a grinding-machine of the character 105 described, the combination of a grinding-wheel, a reciprocatory slide rockingly supported adjacent to said grinding-wheel, and arranged for movement obliquely to the periphery of said grinding-wheel and a die-holder carried by said slide, substantially as set forth. 110

3. In a grinding-machine of the character described, the combination of a grinding-wheel, a reciprocatory carriage-bed provided with an upright arm, an oscillating member pivoted to said arm, a slide movably fitted to
115 said oscillating member, and a die-holder carried by said slide, substantially as set forth.

4. In a grinding-machine of the character described, the combination of a die-holder provided with a die-receiving pocket, and means 120 mounted in said die-holder for clamping the die by either its front or rear side, substantially as set forth.

5. In a grinding-machine of the character described, the combination of a die-holder provided with a die-receiving pocket, a clamp-bolt loosely mounted in said die-holder and having an arm provided with a stud entering
125 said pocket, and means for adjusting said clamp-bolt, substantially as set forth. 130

6. In a grinding-machine of the character described, the combination of a die-holder provided with a die-receiving pocket, a clamp-bolt loosely mounted in said die-holder and
5 having an arm provided with a stud entering said pocket, means for adjusting said clamp-bolt, and a clamping-screw passing through said die-holder in a direction opposite to the stud of said clamp-bolt, substantially as set
10 forth.

7. In a grinding-machine of the character described, the combination of a die-holder provided with a die-receiving pocket, and an adjustable die-gage supported in said die-holder;
15 said gage being provided with a knife-edge at its free end, substantially as set forth.

8. In a grinding-machine of the character described the combination of a die-holder provided with a die-receiving pocket, a rod passing through said die-holder, a die-gage fixed
20 to said rod, and means for holding said rod in an adjusted position, substantially as set forth.

9. In a grinding-machine of the character

described the combination of a die-holder provided with a die-receiving pocket, a rod passing through said die-holder, a die-gage fixed to said rod, and means for holding said rod in an adjusted position; said means consisting of a sleeve seated in said die-holder, and a set-screw for holding said sleeve, substantially as
3 set forth.

10. In a grinding-machine of the character described, the combination of a die-holder provided with a die-receiving pocket, a rod passing through said die-holder, a die-gage fixed
3 to said rod, and means for holding said rod in an adjusted position; said means consisting of a sleeve seated in said die-holder, a set-screw for holding said sleeve, and a spring surrounding said rod and bearing against said sleeve,
4 substantially as set forth.

EDWARD J. MILLER.

In presence of—

NELLIE V. ALEXANDER,
E. S. KNIGHT.