

A. B. LANDIS.
CUTTER HEAD.
APPLICATION FILED JAN. 24, 1907.

1,018,393.

Patented Feb. 20, 1912.

3 SHEETS—SHEET 1.

Fig. 1

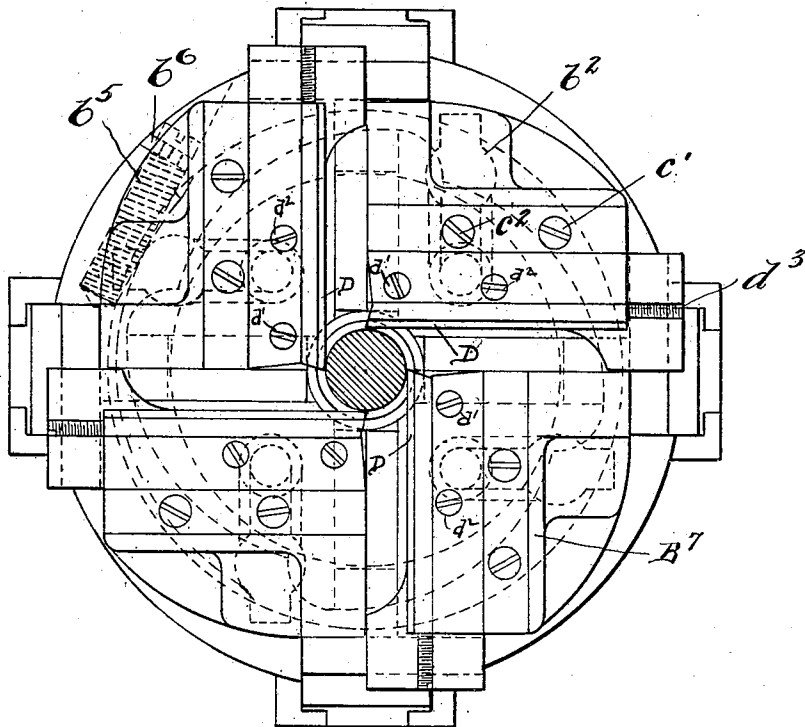
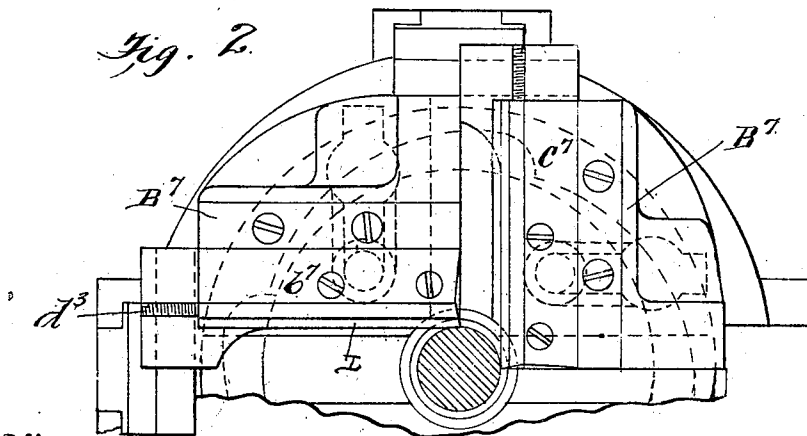


Fig. 2



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334.

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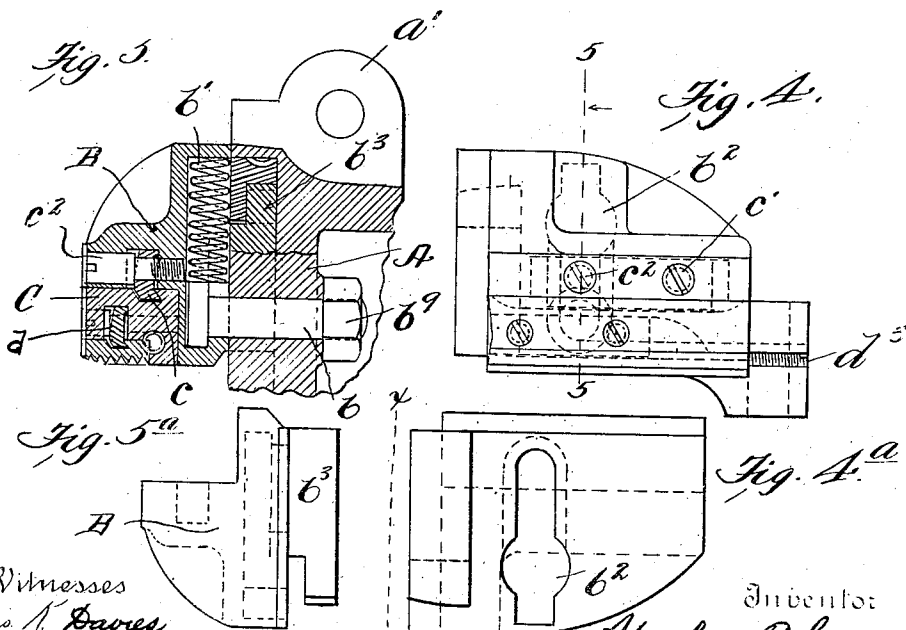
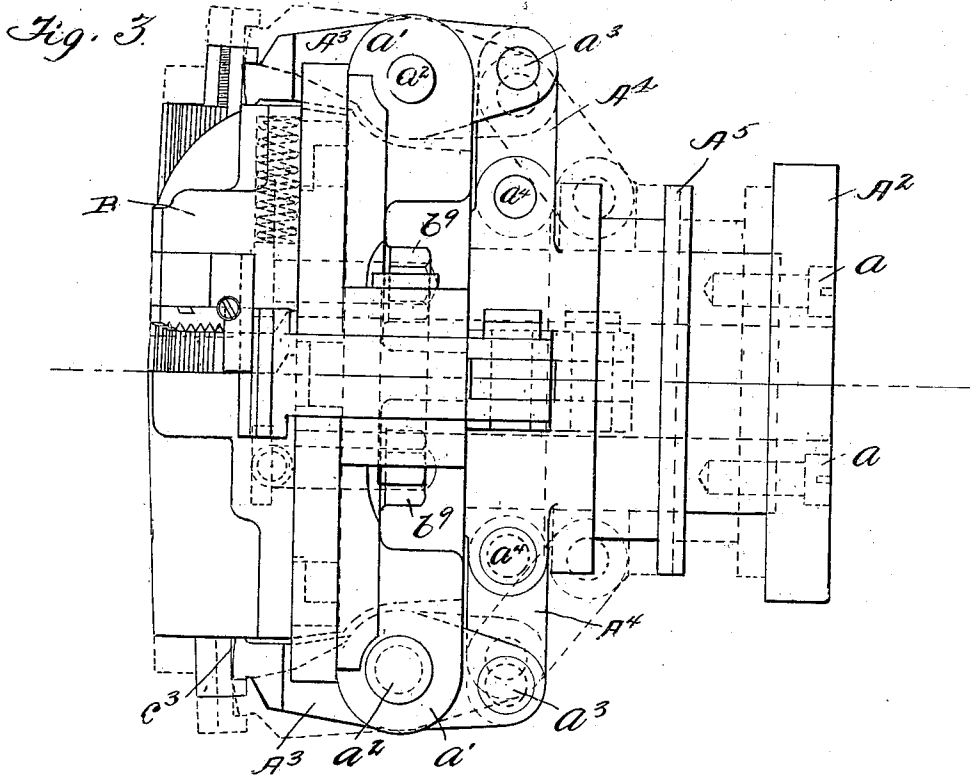
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3 SHEETS-SHEET 2.



Witnesses
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A. W. Smallwood

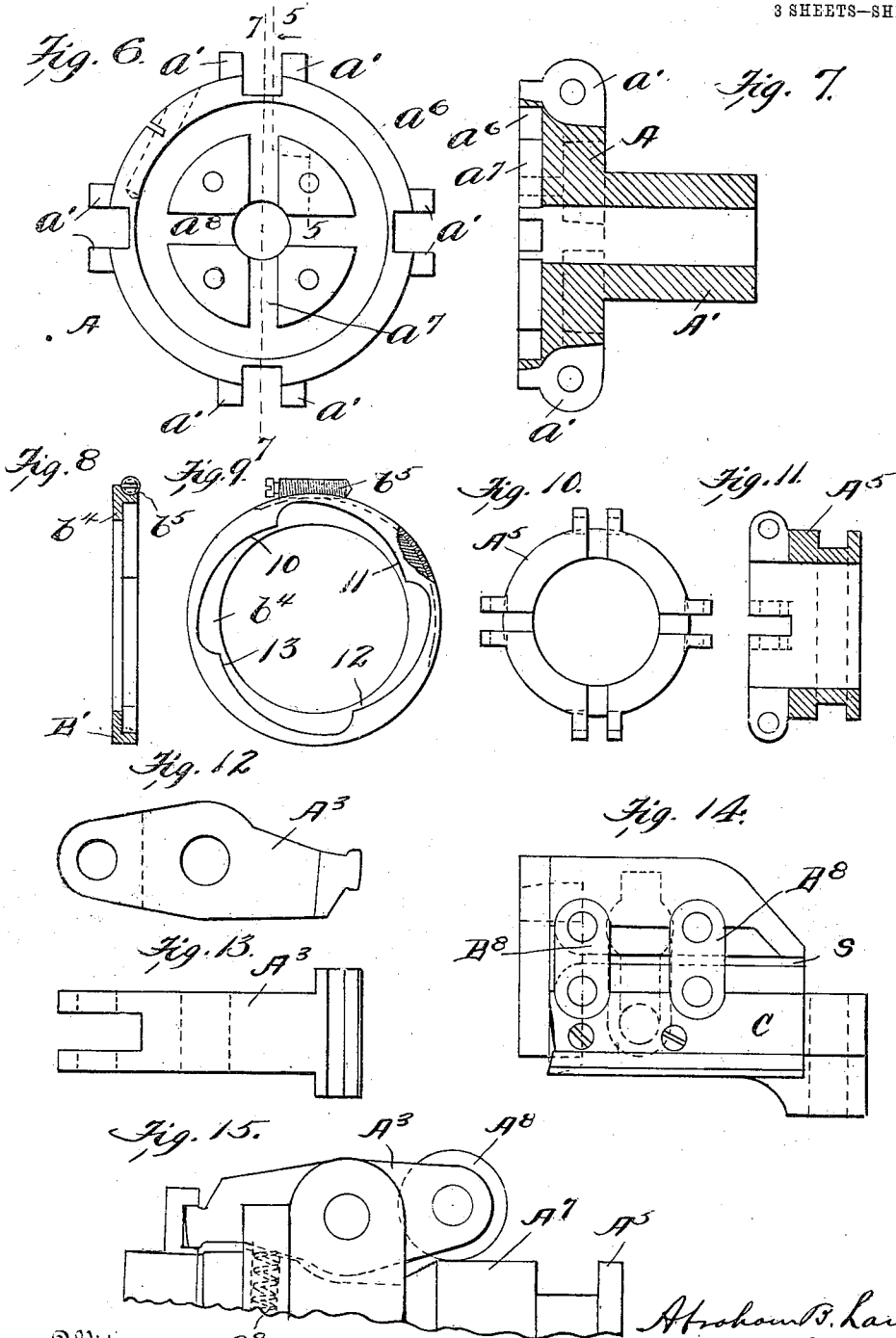
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

ABRAHAM B. LANDIS, OF WAYNESBORO, PENNSYLVANIA.

CUTTER-HEAD.

1,018,393.

Specification of Letters Patent.

Patented Feb. 20, 1917.

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To all whom it may concern:

Be it known that I, ABRAHAM B. LANDIS, a citizen of the United States, residing at Waynesboro, in the county of Franklin and State of Pennsylvania, have invented certain new and useful Improvements in Cutter-Heads, of which the following is a specification.

The object of my said invention is to provide a cutter-head for cutting threads on screws, etc., wherein the die after being set as to size may be fixed and made rigid as to position and is not affected by the opening and closing operation, thereby insuring uniformity in the size of the product. This object is accomplished by mounting and arranging the cutter-holders so that they will be adjusted, for opening and closing the die, tangentially with the work, or along lines that will not intersect the axis of the die, in supporting blocks which are fixed on rigid heads to be adjusted to regulate the size of the die at an angle therewith, the operation of the two adjusting mechanisms being independent one of the other, all as will be presently more fully described and claimed.

Referring to the accompanying drawings, which are made a part hereof, and on which similar reference characters indicate similar parts, Figure 1 is a front elevation of one of my improved cutter-heads, with the parts in operative position and showing the work in position for the die to operate upon. Fig. 2 a similar view of a part of the die showing the parts as fixed to cut left-hand threads instead of right-hand threads, as shown in Fig. 1. Fig. 3 a side elevation of one of said cutter-heads. Fig. 4 a detail side elevation of one of the blocks or supports for carrying the cutter-holders. Fig. 5 a detail section through one of said blocks as seen when looking in the direction of one of the arrows from dotted line 5—5 in Fig. 4, and including a section through the portion of the head A to which it is attached, as seen when looking in the direction indicated by the arrow from the dotted line 5—5 in Fig. 6. Fig. 4^a an underside plan view of one of the supports or blocks B. Fig. 5^a an end view of the same as seen when looking in the direction indicated by the arrow from the dotted line *x—x* in Fig. 4^a. Fig. 6, a front elevation of the supporting head stripped of all operative parts. Fig. 7 a longitudinal section on dotted line

7—7 in Fig. 6. Figs. 8 to 13 inclusive, details illustrating views of different parts separately, and Figs. 14 and 15, views of modifications.

In said drawings the portions marked A represent the main supporting head; B, the supports or blocks for supporting the cutter-holders; C, the cutter-holders; and D, the cutters.

The head A is of the form best shown in Figs. 6 and 7 and has a hollow shank A', to the rear end of which a plate A² is secured by screws *a* (see Fig. 3). Said plate A² is for bolting the head to the face plate on the machine spindle, in usual manner. At four points around the periphery of the head, equal distances apart, are formed ears *a'*, arranged in pairs, and between each pair is mounted a lever A³ on a pivot *a*². The rear end of each lever is connected by a link A⁴ with a sliding collar A⁵, by means of pivots *a*³ and *a*⁴ at the respective ends. Said collar A⁵ is mounted to slide on the hollow shank A' and is formed with a circumferential groove *a*⁵ in which a shifting fork (not shown) may engage and be operated by suitable mechanism to shift said collar back and forth. The face of said head A is formed with a circular groove *a*⁶ near its periphery, and two axial grooves *a*⁷ and *a*⁸, which extend across said face at right angles with each other and communicate with said circular groove.

The supports or blocks B are each of the form best shown in Figs. 4, 4^a, 5, and 5^a, and are bolted to the head A by bolts *b*, each of which extends through a perforation in said head and the head of each of which engages in a slot in the face of its respective block, a clamping nut *b*⁹ being provided on its outer end. Said slots cut into pockets which contain springs *b*⁷, which are interposed between said bolt heads and the outer ends of said pockets. Said slots are formed with enlarged portions *b*² adapted to admit the heads of the bolts, said enlarged portions being formed near the outer ends of the pockets so that the blocks may have a sliding movement on said bolts without danger of reaching the enlarged portions and thus disengaging the block from the head. The several blocks are each formed with inwardly projecting lugs *b*³ adapted to project into the grooves *a*⁷ and *a*⁸ in the face of the head. Each of said lugs is formed with a notch or transverse

groove in its outer end adjacent the face of the block. A cam ring B' is mounted in the circular groove a^6 in the face of the head A, being of the particular form best shown in Figs. 8 and 9, the over-hanging flange b^4 thereof being adapted to engage with the grooves in said lugs b^3 and the inner face being formed with cam faces 10, 11, 12, and 13, which are adapted to bear upon the outer faces of said lugs. Said overhanging flange b^4 rests in the grooves or notches in said lugs and completely covers the bearing joints between the cams and the lugs, and thus guards against any cuttings, dirt or grit becoming lodged therein. The springs b^7 rest at their inner ends upon the rigid bolt heads and their outer ends bear against the outer ends of the pockets and thus force the blocks B outwardly so that their lugs b^3 will bear firmly against the faces of the cams.

Around a portion of the circumference of the ring B' is formed a wormthread with which a screw b^5 mounted in a tangential socket in head A, is adapted to engage. A detent b^6 is mounted in a radial perforation in head A and extends into the socket in which screw b^5 is mounted, its inner end engaging with a circumferential groove in said screw just under its head. Thus as said screw is turned, it is held from longitudinal movement, and operates through its engagement with the thread on the surface of the ring B' to turn said ring and adjust the cams 10, 11, 12, and 13, to force the blocks B toward the center of the head or to permit the springs b^7 to force them away from the center. By this means, the size of the die can be regulated as desired. When once regulated it may be made rigid, in so far as the position of the blocks B is concerned, by tightening the nuts b^9 on the bolts b to clamp said blocks rigidly to the face of the head A.

The cutter-holders C are each mounted in an open right-angle way on the lower inner side of each respective block B, being held in position by a gib c formed with an angle edge adapted to engage with a groove in the back of the holder, which groove is formed with inwardly inclined sides, so that as said gib is forced inwardly it will draw said holder into the corner of the angular way. Said gib is mounted in an adjacent groove in the block B, which groove is closed at both ends to keep out the dirt, and is secured in place by screws c' and c'' , each of which is screw threaded at its inner end and engages with a screw threaded perforation in the block B under said gib. The head of each screw is cylindrical and fits in a perforation in the outer part of said block and is adapted to bear against the outside face of said gib and secure it firmly in position. The outer end of each holder C is

formed with a transverse extension in the back side of which is a transverse groove c^3 said groove being near the outer end of the holder and beyond the block B, in which the inner end of the operating levers A³ engage. Thus the sliding of the collar A⁵ back and forth on the hollow shank A' will operate the levers and through the levers slide the holders C back and forth on the gibs c in their ways in the blocks B. By reason of the widened outer end of the holders C the grooves c^3 are of sufficient length, so that the adjustment of the blocks B to regulate the size of the die will not interfere with the engagement of the lever A³.

The cutters D are each mounted in right angle ways in the inner faces of the holders C in a similar manner as the holders are secured in the blocks B, having an angle groove in their backs which engages with the angle edge of the gibs d mounted in adjacent grooves in the holders C and secured by screws d' and d'' , which are adapted to force the cutters in toward the angle in the way and hold them in position. A screw-threaded seat is formed in the corner of said way which cuts through said corner and extends somewhat beyond its angle. A screw d^3 is mounted therein and its inner end is adapted to bear against the rear end of each cutter and hold it in position, and by turning it said cutters may be adjusted or fed up to the work as they wear away.

The operation of the device is as follows: The cutter head being assembled as shown, and mounted upon the spindle of the machine, in the manner well understood, the die is first set for the size of work to be produced by adjusting the screws b^5 , which turns the ring B' and the cams 10, 11, 12, and 13 carried thereby, so that the blocks B will be slid in the axial grooves a' and a'' , either by being forced inward by cams, or outward by the springs b^7 according to which way the screw b^5 is turned, as before described. After the size is obtained as desired then the bolts b may be tightened by turning up their nuts b^9 and thus making said blocks B rigid with the head A and guarding against any variation or vibration in the cutters. For rough work it may not be necessary to thus rigidly secure the blocks, but for fine work it is of great advantage. The machine being ready for work the ring A⁵ is slid to the position shown by whole lines in Fig. 3 (by automatic mechanism, not shown) which slides the cutter holders C inwardly and closes the die. The work proceeds until the length of threads is cut, when said ring A⁵ is thrown back to position shown by dotted lines in Fig. 3 and the cutter-holder thus slid outward in a direction tangent to the work, or along lines which will not intersect the axis of the die, which opens the die and permits the work

to be withdrawn. The work is placed in the work-holding jaws and the carriage fed back and forth in the usual manner, the die being opened and closed as desired in the

5 manner just described. By this arrangement a die is provided for the purpose in which the opening and closing mechanism operates without in any way affecting the die in so far as its size is concerned, which,
10 after being adjusted as desired, becomes fixed and thus insures that the product will be of uniform size. The opening and closing being on a line at a tangent with the work any slight variation in the cutter or
15 vibration in the mechanism for adjusting will make but slight impression on the work. When it is desired to cut left-hand threads, blocks B' and cutter-holders C', made to hold the cutters in the reverse position, are
20 mounted upon the bolts b in identically the same manner as described for the blocks B in the right-hand construction, it being only necessary to have specially formed blocks and holders and to change one for the other
25 to adapt the head for cutting right-hand or left-hand threads as desired.

In Fig. 14 I have shown the cutter-holder mounted on the block B by means of parallel links B^s pivoted to each other, as shown,
30 with a space s between the adjacent edges of the two parts sufficient to allow a movement of the holder on said links to open and close the die.

In Fig. 15 I show a modified arrangement
35 for opening and closing the die consisting of a cam formation A^r on the ring A^s adapted to engage with a roller A^s on the outer end of lever A^s, and as said ring is slid back and forth, as in the other construction, it
40 operates said lever and the holder in the same manner as before, except that the holders would be moved to open the die by a spring a^s, as will be readily understood.

Having thus fully described my said invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a cutter head, the combination, of a die comprising tangentially arranged cutters mounted to slide in supports, said supports mounted to slide on the main head,
50 the movement of said cutters and said supports being on lines at an angle to each other, and operating means, substantially as set forth.

55 2. A cutter head comprising a die composed of cutters mounted to move on supports, said supports mounted to move on the head, the movement of the cutters being at an angle to the movement of the supports and tangential to the work, and operating
60 means, substantially as set forth.

3. A screw-cutting die comprising a cutter mounted in a holder, said holder adapted to move on a line with the threading-grooves
65 of said cutter, a support to receive said

holder mounted to be adjusted radially, whereby the size of the die may be regulated, and operating means, substantially as set forth.

4. A screw-cutting die comprising a body, 70 a cutter support on said body, a cutter holder mounted in said support to move on a line substantially tangent to a circle the axis of which is the axis of the die, for opening and closing the die, the support in
75 which said holder operates being mounted to be adjusted radially by means of a cam, and said cam, substantially as set forth.

5. A screw-cutting die comprising a body, a support mounted thereon, means for adjusting said support across the body, a cutter holder mounted on said support to move on a line substantially tangent to a circle the center of which is the axis of the die, for opening and closing the die, a lever for
85 moving said holder, and means for operating said lever, substantially as set forth.

6. A screw-cutting die comprising a body, supports mounted on said body to be adjusted transversely across its face, a rotary ring
90 having cam faces engaging with each support to fix and adjust them, means for turning and securing said ring, cutter-holders mounted on said supports to be adjusted on lines tangential to a circle the center of
95 which is the axis of the die, means for adjusting and securing said holders, cutters in said holders, and means for adjusting and securing said cutters, substantially as set forth.

7. A screw cutting die comprising a body, a cutter secured to a holder, said holder secured to a support and adapted to move on said support on a line substantially parallel to the thread-forming grooves of said
105 cutter, said support, means for securing said support to the body, and a cam adjusting said support on lines radial to the work for securing various sizes of work, substantially as set forth.

8. A screw cutting die comprising a body, a cutter secured to a holder, said holder adapted to move on a line substantially parallel to the thread-forming grooves of said
115 cutter, a support on which said holder operates, means for securing said support to said body, said body having a groove adapted to control the movement of said holder on a line radial to the work, a cam for adjusting said support, and a worm for operating
120 said cam, substantially as set forth.

9. A screw-cutting die comprising a body, a cutter having thread-forming grooves on the face thereof, a beveled edge groove on the back thereof, a clamp securing said
125 cutter to a holder, said holder having a beveled edge on its back for securing it to a support, said holder mounted on said support to move on lines substantially parallel with the thread-forming grooves of said cutter, said
130

support mounted on said body, and a lever for operating said holder, substantially as set forth.

10. A screw-cutting die comprising a cutter, a cutter holder, said holder mounted to move on a line substantially parallel with the thread-forming grooves on said cutter and seated on a support against two sides of an angle having a beveled edge groove in the back thereof, said support and a tapered gib engaging said groove by which said holder is held in contact with both sides of said angle, substantially as set forth.

11. A screw-cutting die comprising a cutter, a cutter holder, said holder mounted to move on a line substantially parallel with the thread-forming grooves of said cutter, said holder formed with a transverse groove in its rear end, a lever engaging said groove for moving said holder, said transverse groove being formed of a length to adapt said cutter for radial adjustment for different sizes of work without disengagement with said lever, substantially as set forth.

12. A screw cutting die comprising a cutter, a cutter-holder, said holder seated on a support against two sides of an angle therein, a beveled edge groove being formed in the back of said holder, said support, and a gib by which said holder is held in contact with both sides of said angle, substantially as set forth.

13. A screw-cutting die comprising a cutter, a cutter holder, a support on which said holder moves to open and close the die, a head having grooves in its face by which said support is held against lateral movement and a cam for controlling the position of said support for various sizes of work, substantially as set forth.

14. A screw-cutting die comprising a cutter, a cutter holder, a support on which said holder moves to open and close the die, a head having grooves in its face by which said support is held against lateral movement, a cam for controlling the position of said support for various sizes of work, a worm for operating said cam, and means for securing said support to said head, substantially as set forth.

15. A screw-cutting die comprising a cutter holder with a two-sided angle corner, a cutter having a grooved face for forming screw threads and a groove with a beveled clamping edge in its back, a clamp inserted in a slot in the cutter holder with a projecting edge engaging said groove and forming a bearing for the support of said cutter, screws passing through the outer wall of said slot through said clamp and screwed into the inner wall of said slot, said screws bearing against said clamp and forming the backward holding thereof so that said cutters may be drawn backwardly and down-

wardly to a solid seating, substantially as set forth.

16. A screw-cutting die comprising a cutter, a cutter holder, said cutter having a beveled-edge groove, a clamp inserted in a slot in said cutter holder, the edge of said clamp forming a bearing for the support of said cutter, screws passing through the outer wall of said slot through said clamp and screwed into the inner wall of said slot, said screws forming the backward holding for said clamp, whereby the angle on the edge of said groove serves to draw the cutter backwardly and downwardly to a solid seating, substantially as set forth.

17. A screw-cutting die comprising a cutter, a cutter holder, a support with a two-sided angle-way upon which, said holder moves, means for securing said cutter to said holder, said holder having a groove with a beveled edge in its back, a gib with a projecting angle edge inserted in a slot in said support, said gib forming a support for said holder, screws passing through the outer wall of said slot, through said gib, and screwed into the inner wall of said slot, said screws forming the backward holding of said gib, whereby the angle of said edge and the groove in the back of said holder serve to secure said holder to the two surfaces of said way, substantially as set forth.

18. A screw cutting die comprising a die-head, a cutter, a cutter-holder, a support for said holder, said holder arranged to move in a direction substantially parallel with the thread-forming face of said cutter for the purpose of opening and closing the die, said support secured to the face of the head, said head having means for holding said support in a lateral position, and a cam for adjusting the position of said support for various sizes of work, substantially as set forth.

19. A screw-cutting die comprising a cam for adjusting the cutter for cutting various sizes of work consisting of a ring set into a recess in the face of a head, said ring having its cam cut in its rear side and its front overhanging said cam to cover the face against admission of dirt or cuttings, a cutter support having a tongue fitting the grooves in the head, and a projection from said tongue to engage said cam, substantially as shown and described.

20. A screw-cutting die comprising cutters mounted on supports to move tangentially to a circle the axis of which is the axis of the die by one set of mechanism, and said supports mounted to be adjusted radially with the work by a separate set of mechanism, substantially as set forth.

21. A screw-cutting die comprising a fixed head, cutter supports mounted on said head, means for adjusting said supports radially with the work, means for securing said supports rigid in adjusted position, the cutters

mounted on said supports, and means for moving said cutters on lines which will not intersect the axis of the die, substantially as set forth.

- 8 22. A screw-cutting die comprising a head, cutter supports mounted on said head in radial grooves, means for adjusting said support in said grooves, means for securing said supports in adjusted position, cutter
10 heads mounted in ways on said supports which extend in lines tangentially to a circle the axis of which is the axis of the die, means for moving said holders in said sup-

ports to open and close the die, the cutters mounted in said holders and means for se- 15 curing said holders in position, substantially as set forth.

In witness whereof, I have hereunto set my hand and seal at Washington, D. C., this twenty-second day of January, A. D. 20
nineteen hundred and seven.

ABRAHAM B. LANDIS. [L.S.]

Witnesses:

A. M. PARKINS,
E. W. BRADFORD.