(No Model.) 8 Sheets—Sheet 1.

C. S. THOMASON.

APPARATUS FOR USE IN GRINDING AND SHARPENING TOOLS.

No. 352,789. Patented Nov. 16, 1886.

Fig. 1.

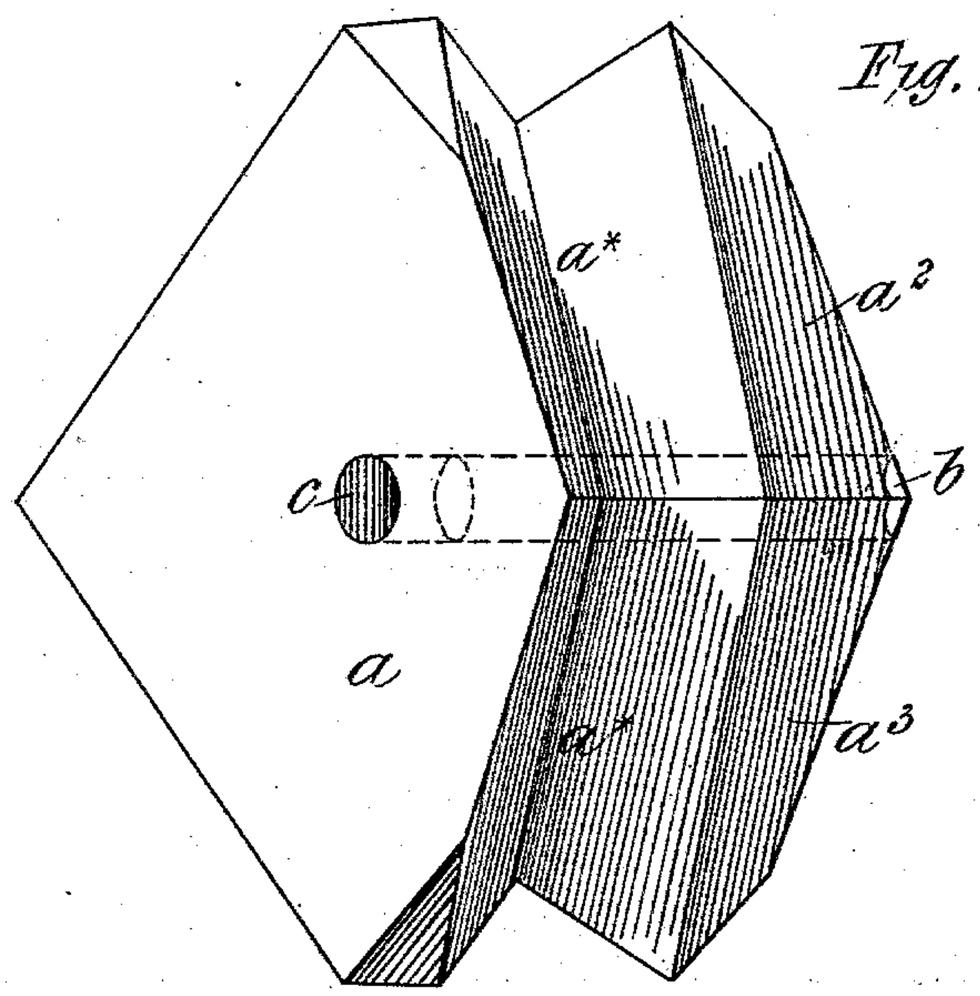
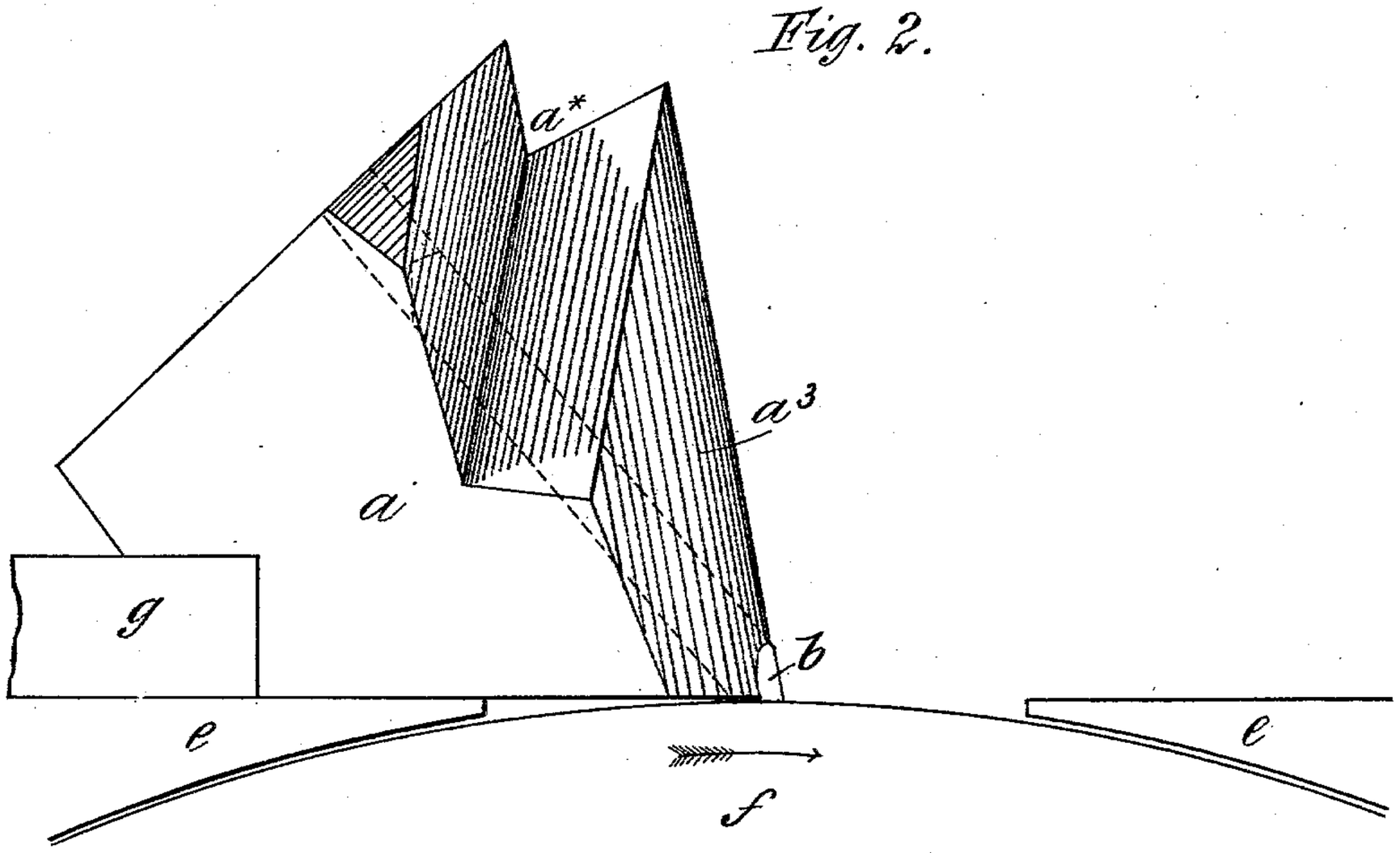


Fig. 2.



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(No Model.) 8 Sheets—Sheet 2.

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APPARATUS FOR USE IN GRINDING AND SHARPENING TOOLS.

No. 352,789. Patented Nov. 16, 1886.

Fig. 3.

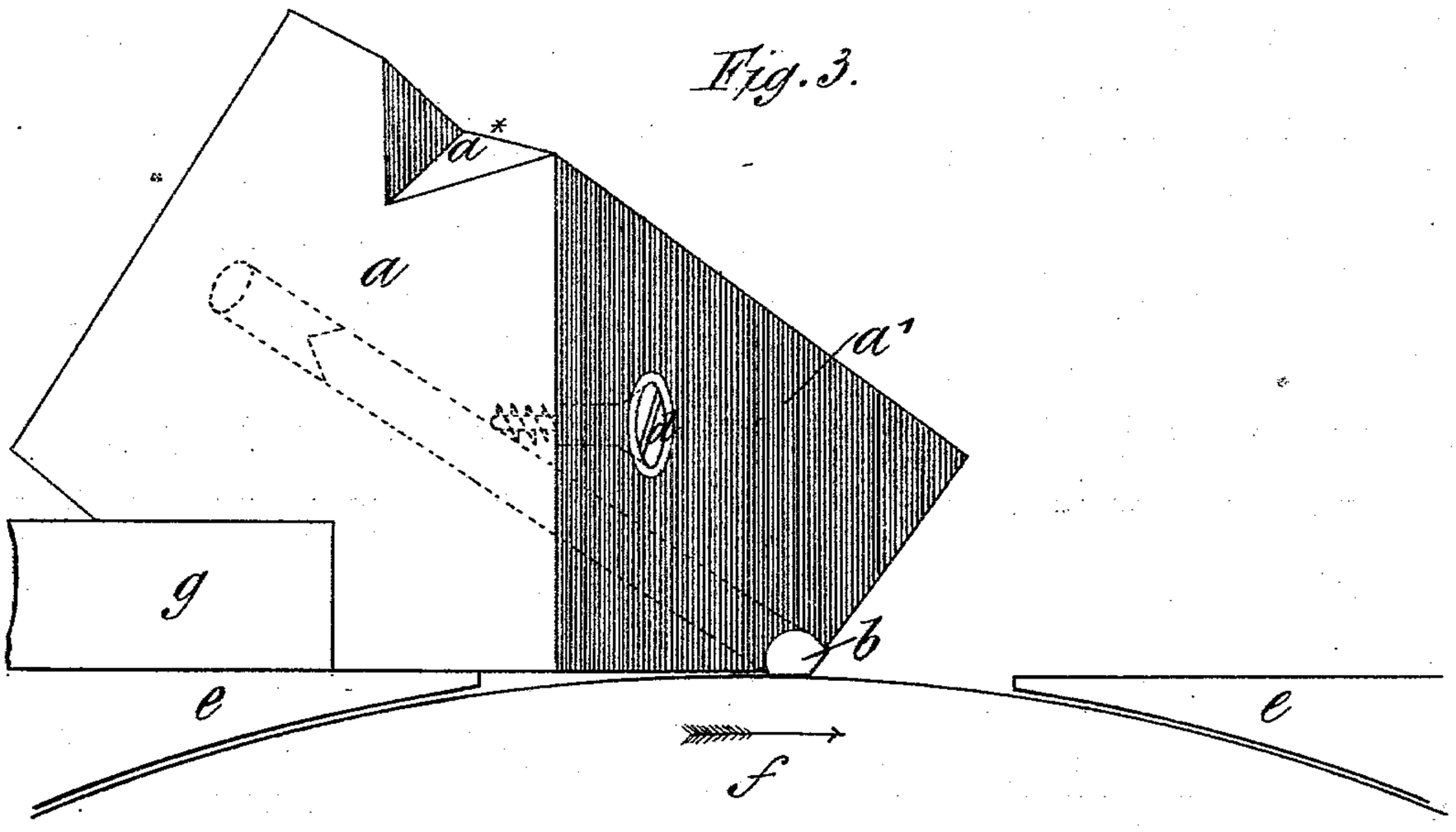
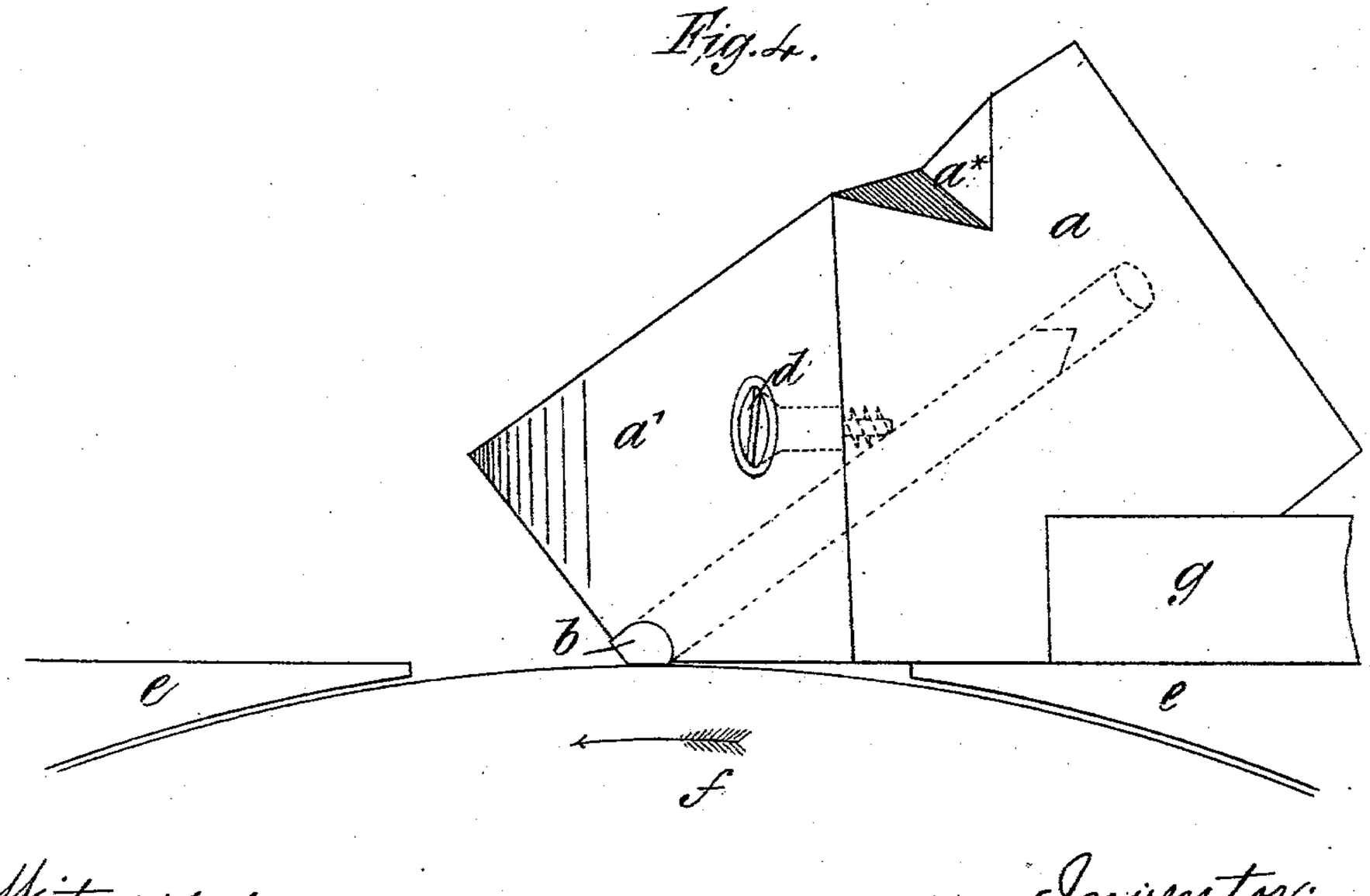


Fig. 4.



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(No Model.) 8 Sheets—Sheet 3.

C. S. THOMASON.

APPARATUS FOR USE IN GRINDING AND SHARPENING TOOLS.

No. 352,789. Patented Nov. 16, 1886.

Fig. 4.a

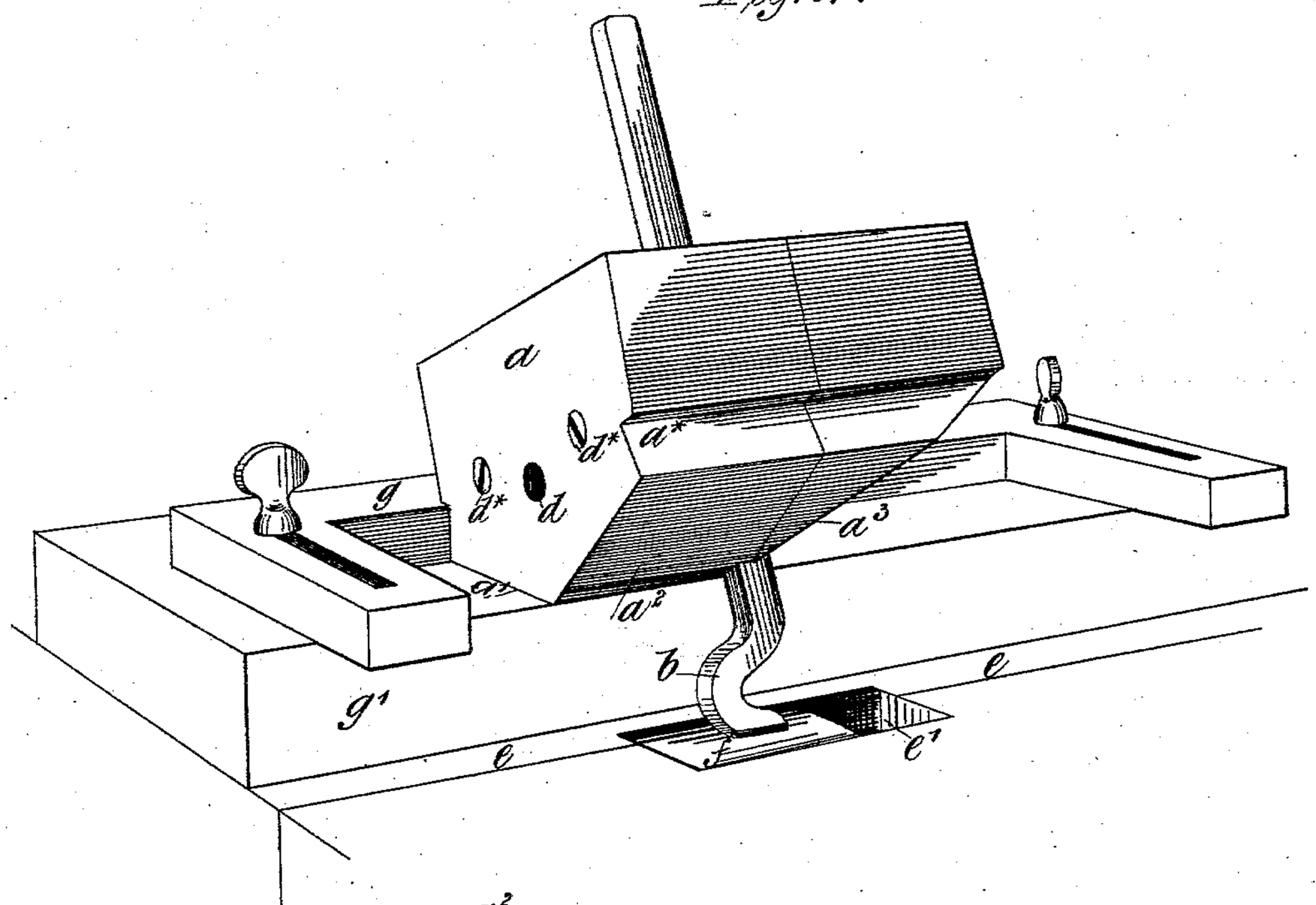
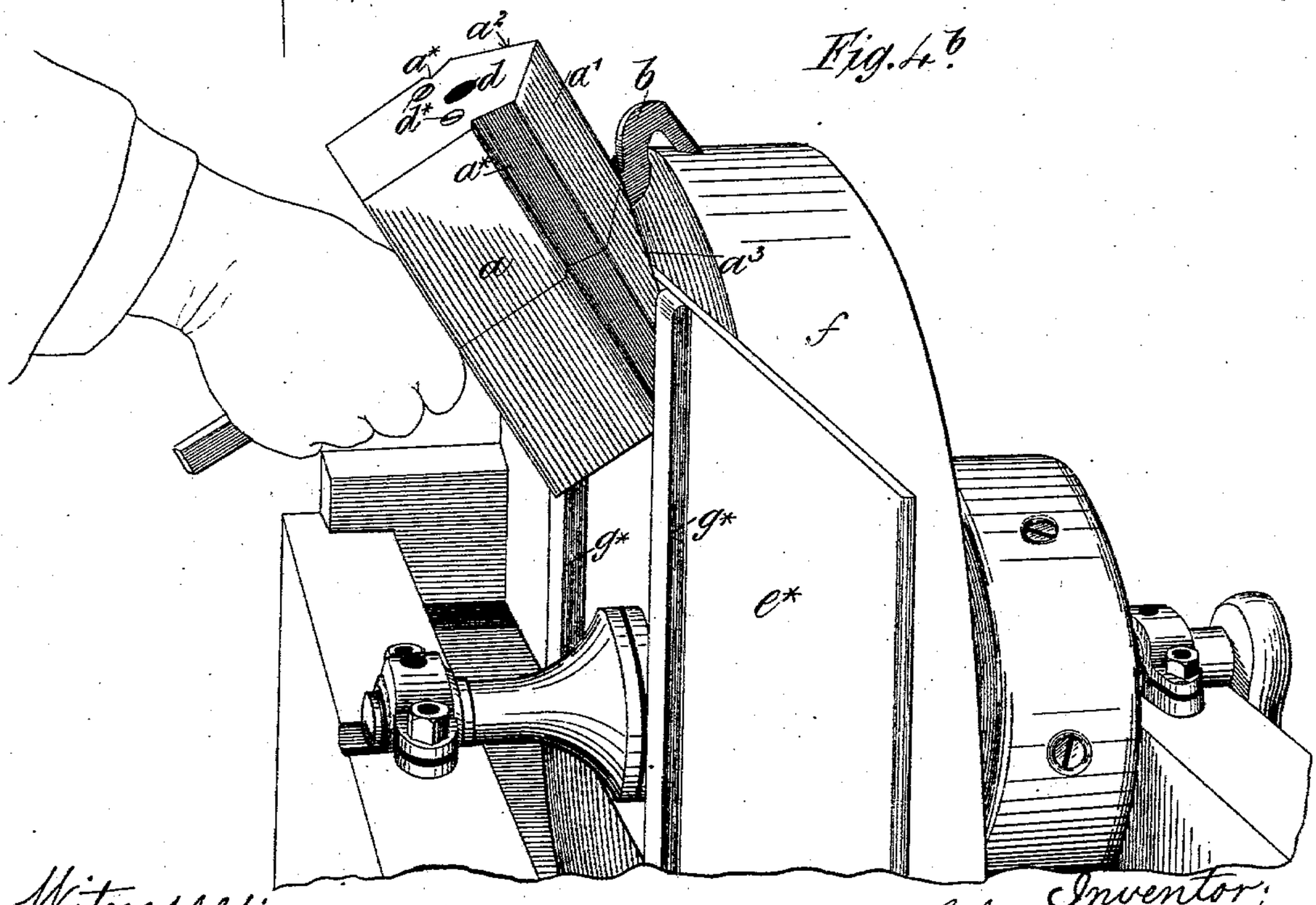


Fig. 4.b



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APPARATUS FOR USE IN GRINDING AND SHARPENING TOOLS.

No. 352,789. Patented Nov. 16, 1886.

Fig. 5.

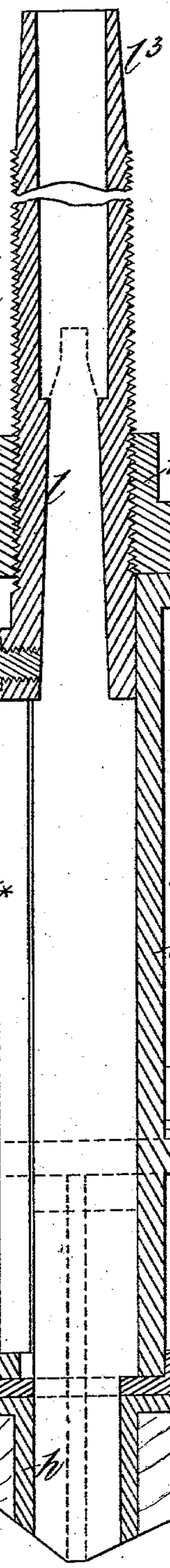


Fig. 10.

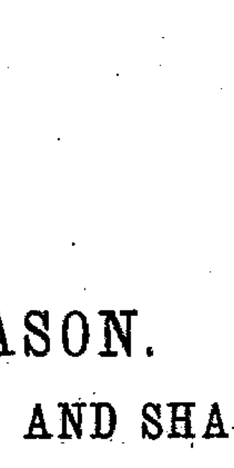


Fig. 11.

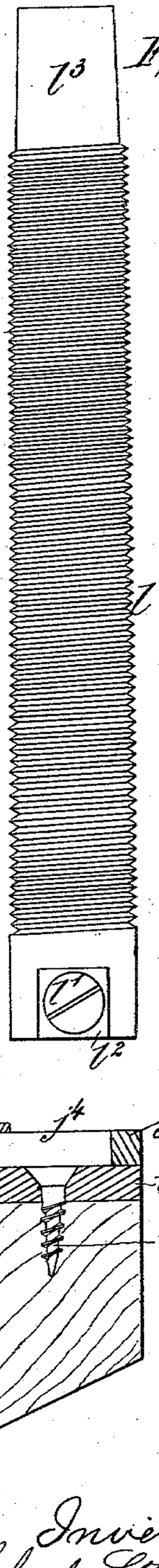


Fig. 12.

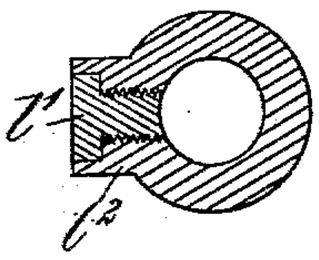
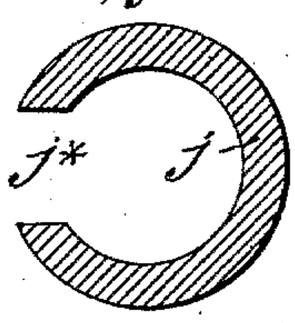


Fig. 13.



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APPARATUS FOR USE IN GRINDING AND SHARPENING TOOLS.

No. 352,789. Patented Nov. 16, 1886.

Fig. 6.

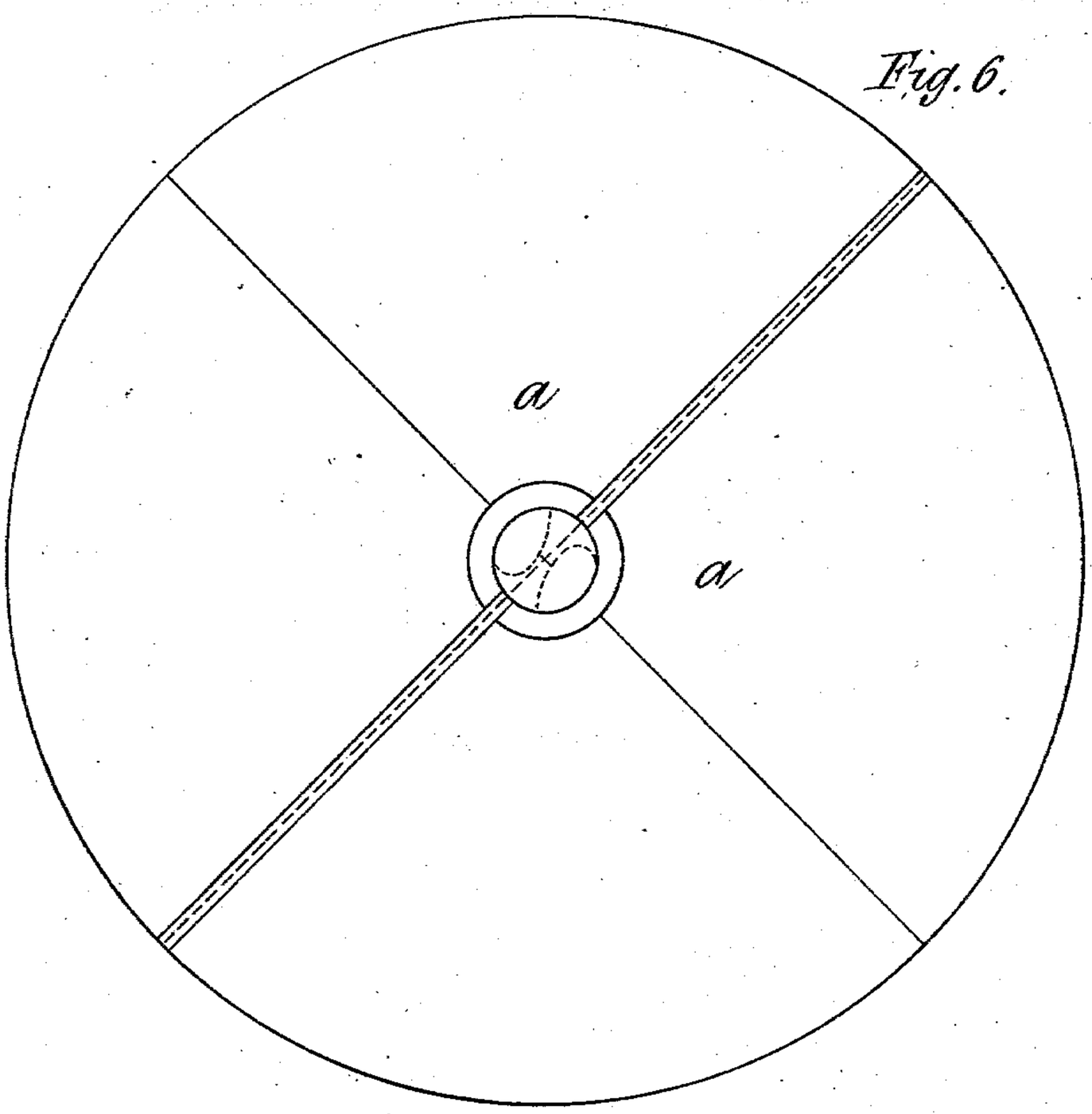
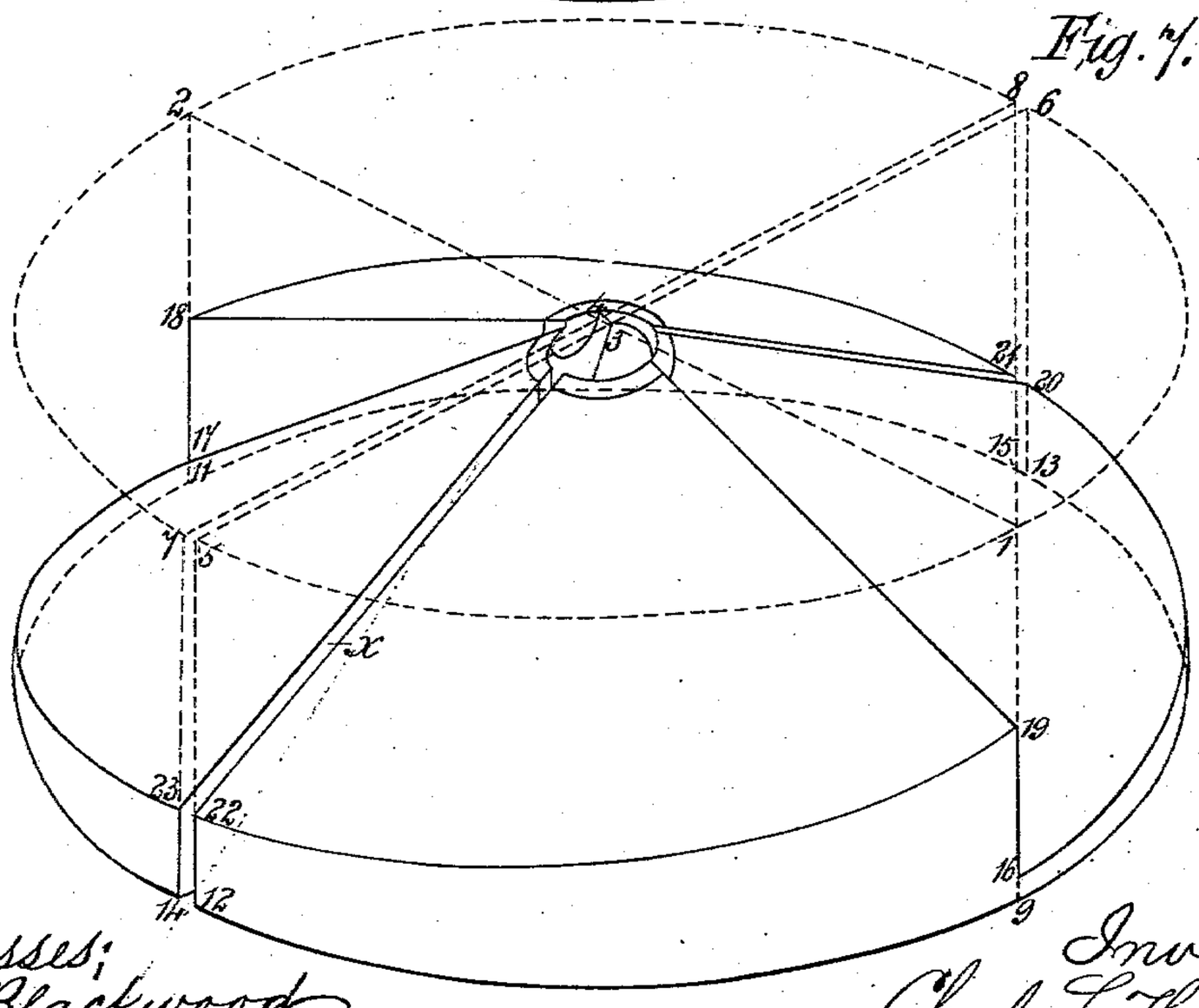


Fig. 7.



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(No Model.) 8 Sheets—Sheet 6.

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APPARATUS FOR USE IN GRINDING AND SHARPENING TOOLS.

No. 352,789. Patented Nov. 16, 1886.

Fig. 8.

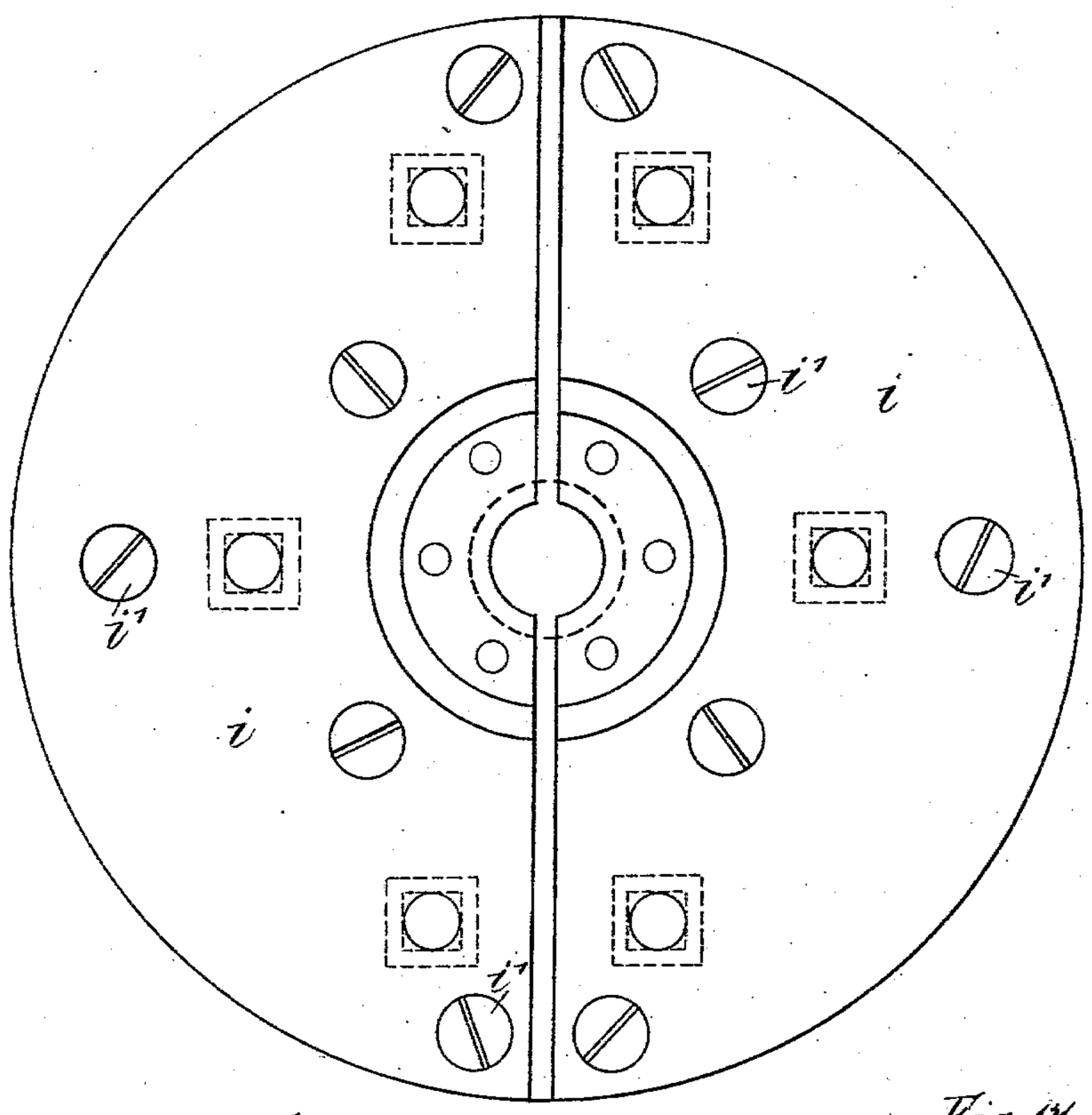


Fig. 16.

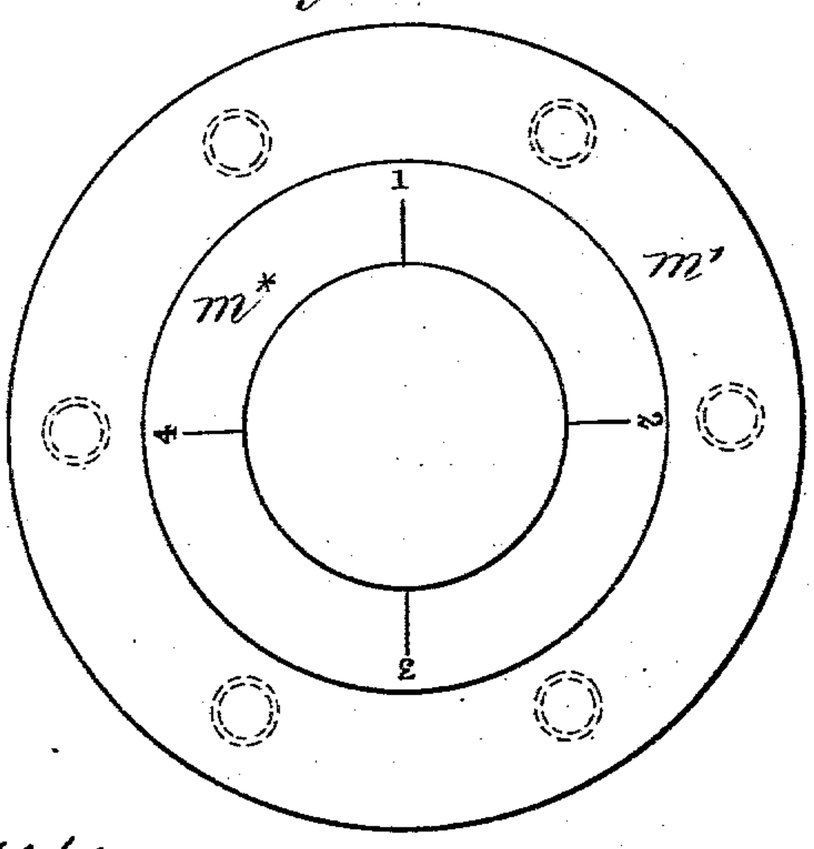
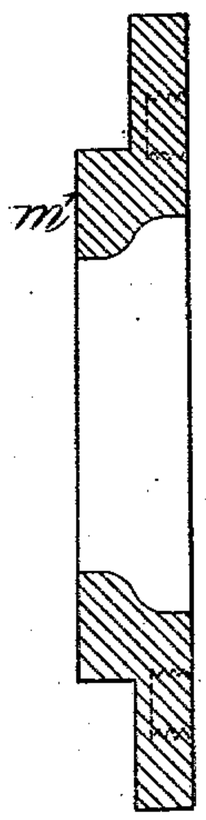


Fig. 17.



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APPARATUS FOR USE IN GRINDING AND SHARPENING TOOLS.

No. 352,789. Patented Nov. 16, 1886.

Fig. 9.

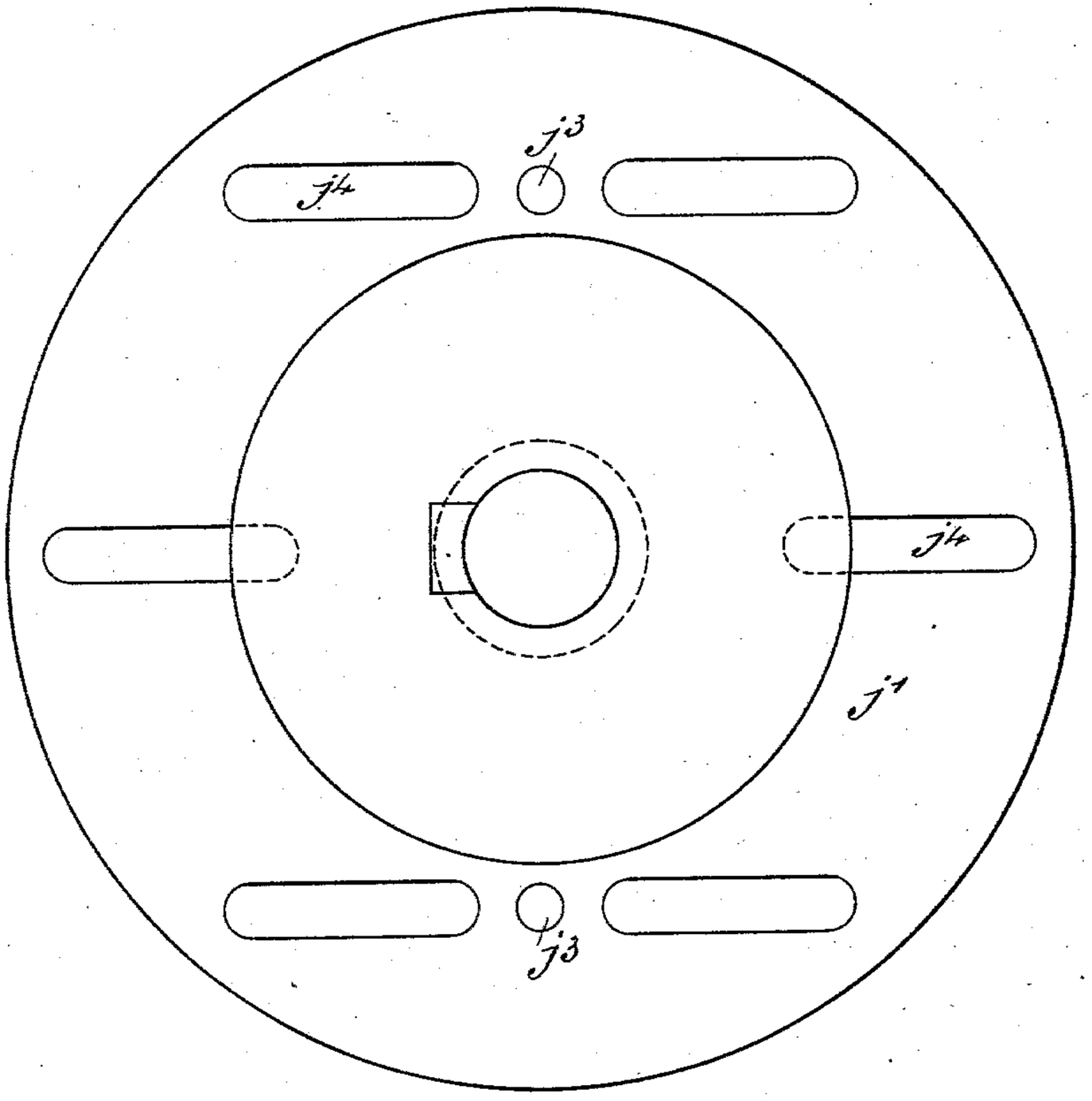


Fig. 15.

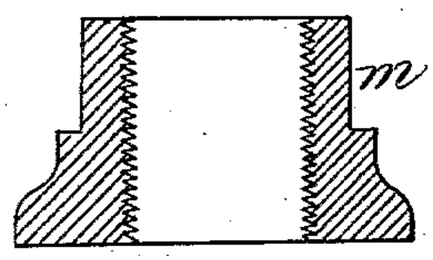
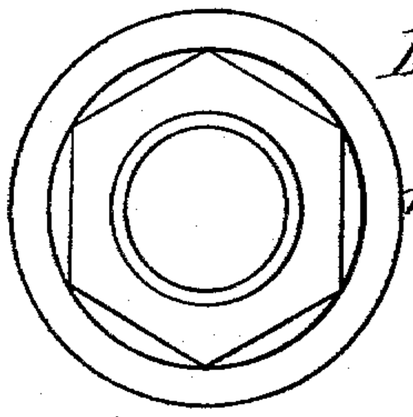


Fig. 14.



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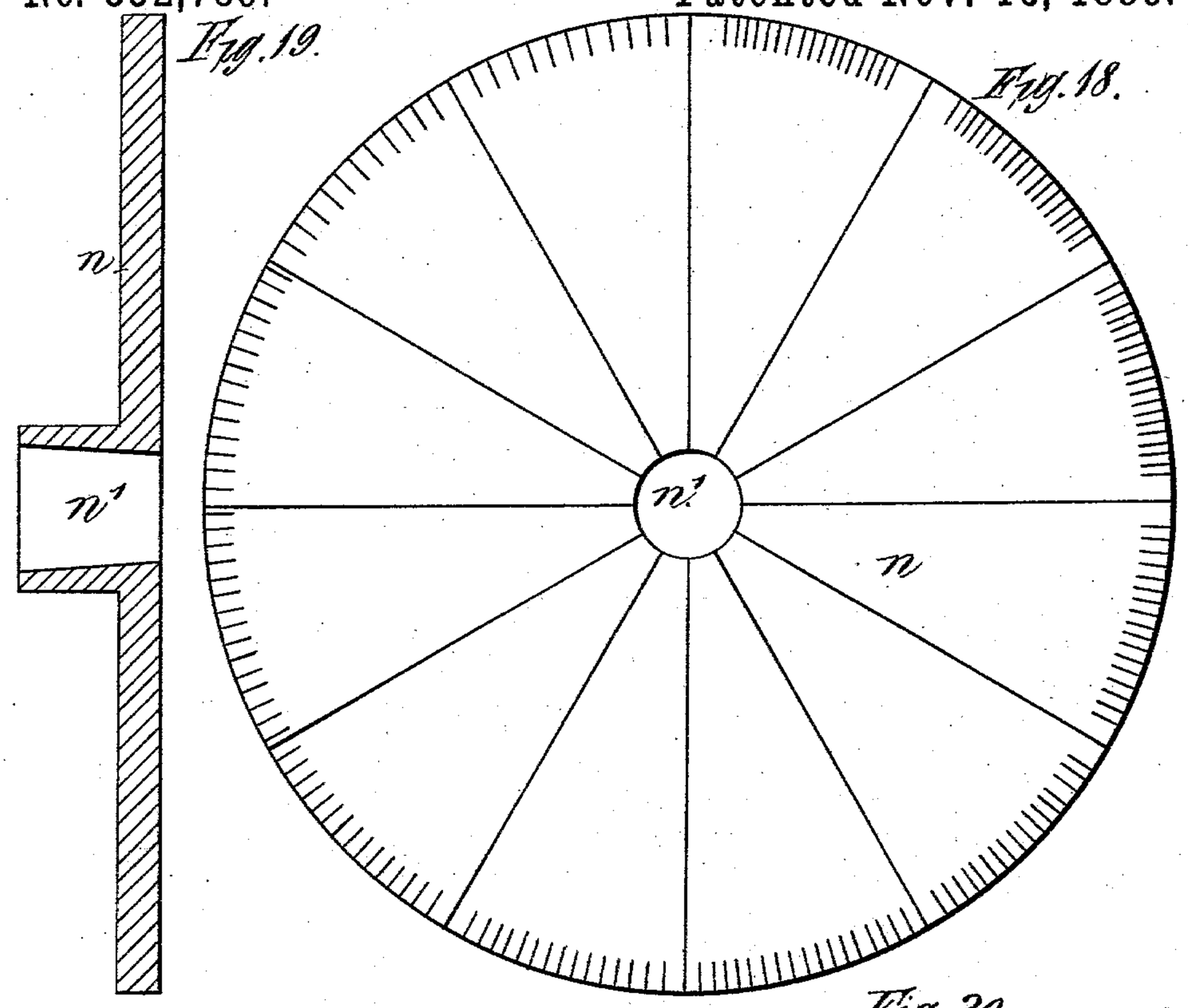

Fig. 19. Fig. 18.

Fig. 20.

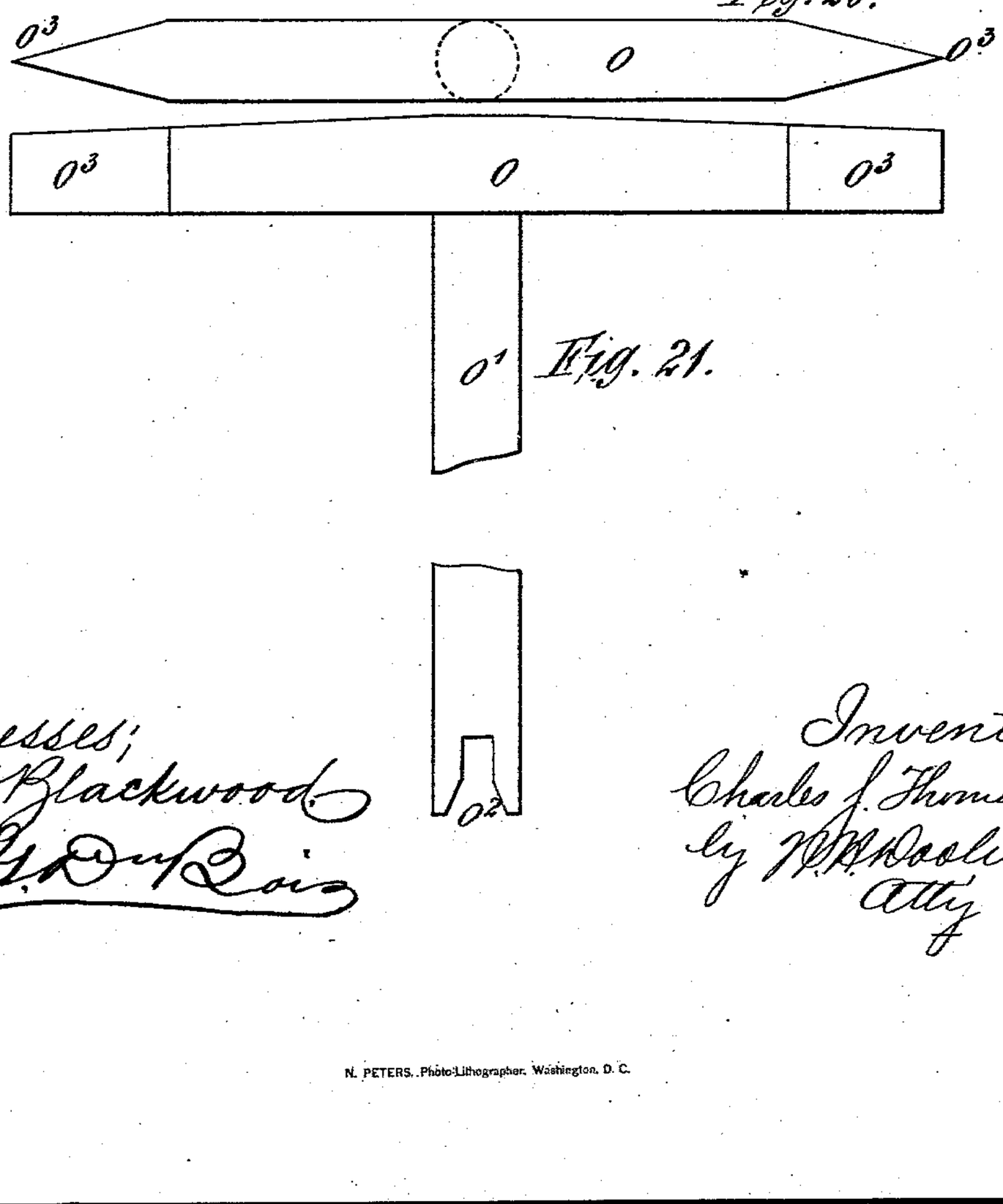

Fig. 21.

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UNITED STATES PATENT OFFICE.

CHARLES SIMEON THOMASON, OF INDORE, INDIA.

APPARATUS FOR USE IN GRINDING AND SHARPENING TOOLS.

SPECIFICATION forming part of Letters Patent No. 352,789, dated November 16, 1886.

Application filed March 30, 1885. Serial No. 160,630. (No model.) Patented in England September 27, 1884, No. 12,898.

To all whom it may concern:

Be it known that I, CHARLES SIMEON THOMASON, a subject of the Queen of Great Britain and Ireland, and residing at Indore, Central India, have invented a new and useful Apparatus for Use in Grinding or Sharpening Cutting-Tools and other Articles to Facilitate the Production of Accurate Forms, (for which I have received Letters Patent for Great Britain, September 27, 1884, No. 12,898,) of which the following is a specification.

This invention of apparatus for use in grinding or sharpening cutting-tools and other articles to facilitate the production of accurate forms has for its objects to obtain for tools and other articles—such, for example, as glass door-knobs—mathematically-correct angles at the junctions of their cutting-faces forming cutting-edges, by means of mechanical guides, such as may be produced at considerably less cost than such as have heretofore been designed for the same purpose, and which in their application shall require less skilled labor than has been found necessary with appliances heretofore usually employed.

For the above-mentioned purposes there is provided a suitable horizontal plane table or grinding-platform, through which is formed such an aperture as will allow the periphery of any suitable grinding-wheel (it may be stone or emery) to substantially coincide with the upper surface of the plane, the axis of the wheel or grinder being parallel with such surface and capable of adjustment as wear takes place. On the plane table or grinding-platform is arranged a sliding guide or tail-rest, which may be fixed at any required distance from the grinding-wheel; also, there are provided suitable guide-blocks formed to suit the class of tool to be sharpened—such as facet tools, drills, and the like. The guide-blocks, which vary in form according to the requirements of particular applications, are such that with only one adjustment of the tool in the block complete and accurate grinding and sharpening of the tool may be insured. When in the guide-block, the tool has its axis coincident with, parallel to, or at some fixed inclination to, that of the guide-block. The guide-block is constructed with cuts or facets, forming guiding-surfaces, which constitute in some cases practical prolongations of the several faces of a correctly-formed tool held by it in such a way as to insure parallelism of the faces of the tool and of the guide-block when the head of the former is protruding in the direction of its axis beyond the guide-block, while in other cases, as will hereinafter appear, one or more of the guiding-surfaces may be at an angle to one or more of the faces of a correctly-formed tool. When necessary, the tail of the guide-block and the tail-rest on the grinding-platform are mutually adapted to insure a proper presentation of the tool to the grinder.

In the accompanying drawings, illustrating my invention, Figure 1 is a plan or top view of a guide-block (when its axis is inclined in a vertical plane) for grinding or sharpening facet tools having three faces, and Fig. 2 is a side view of the same, showing its position relatively to the grinding-wheel when grinding one face of the tool. Figs. 3 and 4 are similar views to Fig. 2, showing the positions of the guide-block when grinding the other two faces of the tool. Figs. 4^a and 4^b are perspective views illustrating the adaptation of my invention to holding cranked or hooked tools while being sharpened. Fig. 5 is a central vertical section of the holder when arranged for sharpening twist-drills. Fig. 6 is an under side view of the mechanism shown in Fig. 5. Fig. 7 is a diagrammatic view illustrating the formation of the grinding-surfaces of the guide-block shown in Fig. 5. Fig. 8 is a plan view of the top of the guide-block. Fig. 9 is a plan view of the block-holder. Fig. 10 is a detail view of a front edge-gage. Fig. 11 is a detail side view of the tool-carrier. Fig. 12 is a cross-section of the tool-carrier. Fig. 13 is a cross-section of the block-holder. Figs. 14 and 15 are sectional and plan views, respectively, of the tool-carrier-regulating nut. Figs. 16 and 17 are plan and sectional views, respectively, of the regulating-nut-retaining plate. Figs. 18 and 19 are plan and sectional views, respectively, of the adjusting index-plate, and Figs. 20 and 21 are plan and side views, respectively, of the tool-regulating key.

a is the guide-block; *b*, a facet tool secured in a hole, *c*, in said block by a screw, *d*. *e* is a grinding-platform, and *f* a grinding-wheel. *g* is the guide or tail-rest, consisting of a rectangular bar or strip, with end bars or strips at right angles thereto, capable of ad-

justment on the platform *e*. a' a^2 a^3 are the guiding-faces of the guide-block, their relative angular position corresponding with or parallel to that of the three faces required to be ground on the tool. a^* a^* a^* are recesses or notches in the guide-block, adapted to fit the guide or tail-rest *g*, whereby the tail of the block may be conveniently held on the guide or tail-rest *g*, thus insuring a uniform presentation of the tool to the grinder. When a tool, *b*, requires to be ground it is secured in the block *a* by the screw *d*, or other convenient arrangements, so that the end of the tool slightly projects. The face of the tool corresponding with the face a' of the guide-block may then be ground so as to coincide with the said face a' by holding said face on the platform *e*, whereby the facet of the tool lies upon the grinding-wheel *f*, as shown in Fig. 2, while the faces of the tool corresponding with the faces a^2 a^3 of the block may be similarly ground by holding the guide-block in the positions shown in Figs. 3 and 4 respectively.

In Figs. 4^a and 4^b, *a* is the guide-block, as before, in which the hooked facet tool *b* is conveniently fixed by forming the guide-block in two portions, the division-line being across the hole through which the tool is inserted. d^* d^* are screws for uniting the two halves of the block, and *d* is a screw for fixing the tool *b* therein.

As will be seen from Figs. 4^a and 4^b, the guide-block is provided with three guiding-surfaces at a' a^2 a^3, the planes of two of them, a' a^2, being parallel to the planes of two of the faces of the tool when correctly formed, while the plane of the third guiding-face, at a^3, is, in the example shown, at right angles to that of the upper or third face of the tool, as will be readily seen from Fig. 4^b.

In Fig. 4^a, *e* is the grinding-platform, and *f* the grinding-wheel, as before; e', the aperture through which grinding or sharpening of the tool is effected, as before. g' is a block or plank on the platform *e*, to raise the block *a* when grinding tools of the kind shown; or, in lieu of the plank, an ordinary adjustable grinding-table may be employed. *g* is the guide or tail-rest, as before, for use when grinding the two side faces of the tool. a^* a^* are the recesses in the guide-block, as before. When the upper face of the tool has to be ground, the guide is to be held against the side of a vertically-arranged platform or partition, e^*, as shown in Fig. 4^b, arranged as shown, the tendency of the block to rotary movement, caused by the grinding-wheel, being prevented by side guides, g^* g^*. These side guides, g^*, keep the tool true to the grinding-line and the guide-block true to the perpendicular.

The operation of grinding the hooked tool *b* will be readily understood from Figs. 4^a and 4^b. In some cases it may be more convenient to rest a facet or guiding surface of the guide-block fair on the grinding-table and to effect the true grinding of the tool by applying pressure to it, the tool in this case being loose in the guide-block and not fixed therein, as before; but the plan of fixing the tool in the block is to be preferred.

It will be obvious that by suitably arranging the guiding or grinding faces of the block with reference to each other and to the grinder various other forms of facet tools may be readily and accurately ground.

In the apparatus used when grinding or sharpening twist-drills, *a* is the guide-block, formed of any suitable material—such as wood or vulcanite—its interior being turned or bored, as shown in Fig. 5, and its exterior or guiding surface being formed as hereinafter described. *h* is a block-point lining, of brass or other convenient material, fixed in the point or end portion of the guide-block. The guide-block *a* is in some cases divided into two or more adjustable parts to admit of grinding drills of different sizes, but of a series or set, as in the case of different sizes of twist-drills with taper shanks fitting into one socket.

In the drawings, the guide block *a* and block-point lining *h* are each in two portions mounted upon and secured to two block-plates, *i*, (shown in plan or top view in Fig. 8,) by means of screws i' or the like. When screwed onto the block-plates, one central cut or slot parallel to the axis of the block and passing through the block-point lining, the block, and the block-plate, bisects the whole. The two portions thus formed are clamped onto the plate j' of a holder, *j*, (shown in plan or top view in Fig. 9,) by the clamping-screws j^2 in Fig. 5, the distance between the two halves being regulated by front edge-gages, *k*, (one of which is shown in elevation in Fig. 10,) inserted from above through the holes j^3 in the bottom plate, j', of the holder *j*, or, in the absence of such gages, by the drill itself which is to be ground. The diameters of these front edge-gages protruding below the plate j' are proportioned to the lengths of the front edges of the series of drills for which the guide-block is designed. Thus for drills from nineteen thirty-seconds of an inch to one-half inch it would properly be 0.085 inch; for fifteen thirty-seconds of an inch, 0.075 inch; for seven-sixteenths of an inch, 0.065 inch; for thirteen thirty-seconds of an inch, three-eighths; for eleven thirty-seconds of an inch, 0.06, and for the remainder of the series 0.05 inch. In the lower plate, j', are slots j^4, which, when the clamping-screws are slackened, admit of the two halves of the guide-block being widely separated, so as to admit of different sizes of drills having taper shanks being placed in or removed from an externally screw-threaded carrier, *l*. (Shown separately in elevation in Fig. 11.)

l' is a screwed bolt to secure drills in the carrier. (See Figs. 5 and 11, and in horizontal section in Fig. 12.)

The drill-holder *j* is slotted at j^*, as shown in horizontal section in Fig. 13, to admit of a projection, l^2, on the carrier *l*, sliding therein

and preventing the rotation of the said carrier.

m is a nut or regulator, (shown separately in plan or top view and in vertical section in Figs. 14 and 15, respectively,) through which the carrier *l* screws. It is prevented from endwise movement by a regulator-plate, *m'*, (shown in plan or top view and in cross-section in Figs. 16 and 17, respectively,) secured to the holder *j*, as shown, by screws m^2. The nut *m* is capable of movement in a rotary sense, for the purpose of moving the screw-carrier *l* therethrough, as will be readily understood.

To facilitate accurate adjustments, there is in some cases employed an index-plate. Such a plate may with advantage be used in conjunction with twist-drill guides.

n is the index-plate. (Shown, respectively, in plan or top view and in cross-section in Figs. 18 and 19.) It is provided with a taper hole, *n'*, at its center, which fits the taper end portion, l^3, of the carrier *l*.

o is a key (see Figs. 20 and 21) provided with a shank, *o'*, bifurcated at o^2 to fit the upper end of twist-drills inserted in the holder *l*. The ends o^3 of the key-handle are pointed and serve as pointers to the divisions marked on the key index-plate *n*.

In forming the lower exterior guiding-surface of the guide-block *a* the block-point lining *h* is first fixed in position, the block-point lining being in the first instance simply a flanged cylinder of a length sufficient to reach to the point end of the block, and truly bored throughout its length with the largest drill of the series, which in the example taken is nineteen thirty-seconds of an inch in diameter. The block is fitted with a dummy-tool of hardened steel, having a front edge exactly equal to that of the largest drill of the series. In the case of a nineteen-thirty-seconds-inch drill, this front edge is taken as 0.085 inch in length. The slopes from the front edge of the dummy-tool are somewhat in excess of those of the drill-point, and the dummy-tool must fit tightly in the block-point lining with its front edge flush with the front end face of the block. In the diagrammatic view, Fig. 7, which is a projection from Fig. 6, the completed block is shown in full lines and the original block is shown in dotted lines, as well as the lines of construction.

The block with the point end upward is placed on a table and the main diameter 1 2 is drawn in the same direction as 3 4—the front edge of the dummy-tool. From the point 3 draw 3–5 and 3–6 to the circumference and perpendicular to the main diameter; also from point 4 draw 4–7 and 4–8 to the circumference. From the points 1 2 5 6 7 8 draw the vertical lines 1–9 2–11 5–12 6–13 7–14 8–15 to the circumference of the block at its base. On 1–9 set off 9–16, and on 2–11 set off 11–17, each equal to one-eighth of an inch. From 16 on the far side of the cylinder trace 16–18, half a turn of a right-handed screw, and on the near side of the cylinder similarly trace 17–19 half a turn of a similar screw. Let the tracing of the screw on the far side intersect 6–13 at 20, 8–15 at 21, and the tracing of the screw on the near side intersect 5–12 at 22, and 7–14 at 23. The portions of the block and block-point lining to be removed in addition to the slot are such as overlie 4 18 21, 3 20 16, 3 19 22, 4 23 17, the basis of these portions radiating from 3 and 4 to the screw-tracings round the cylinder. The guide-block thus formed is mounted on the block-plate *i* in the manner hereinbefore stated.

The method of using the apparatus is as follows: Let it be supposed that a one-half inch drill requires to be ground—first slack the clamping screws j^2 and separate the two portions of the guide-block *a* to a convenient distance; now insert the drill up the holder-tube *j* until the taper shank rests home in the carrier *l*; onto the bottom of the tube and over the drill's point fix in its place the cap of the drill or block-point lining *h*, which has been truly drilled by it, so that each drill has its own cap; insert in the holes j^3 (from above) the two front edge-gages, *k*, pertaining to the one-half-inch drill; bring the two portions of the guide-block *a* as close together as the two front edge-gages will permit; clamp the two halves of the guide-block to the lower plate, *j'*, of the holder *j*, and remove the two front edge gages; insert the key *o* down the carrier *l* from the top, and with it turn the drill until its front edge lies in the main diameter of the block, with the screw *l'* fix the drill firmly in the carrier *l*; place the apparatus and drill in position on the grinding-platform and turn the regulator-nut *m* so that the drill-point just touches the grindstone on the grinding-line. For the exact adjustment of the drill the operator should now remove the key and fit the key index-plate *n* on the top of the carrier *l*, then again insert the key *o* and turn round the key index-plate *n*, until the center mark of the sector pertaining to the one-half-inch drill lies immediately under one of the pointers o^3, at the end of the cross-head of the key. Now, by turning the regulator *m* the drill must be projected as much as it is intended to grind away. Supposing the leading-screw of the carrier to have a pitch of sixteen threads to the inch, each quarter-turn of the regulator *m* will take a mark on it over one division of the regulator index-plate or surface *m**, (see Fig. 16,) thus advancing the drill one sixty-fourth of an inch. For every division of the regulator index-plate thus passed over the key-pointer must be passed over a division on the key index-plate *n*, the grip on the drill having been temporarily slackened for the purpose. This movement of the key will give the front edge of the drill the necessary amount of clearance of the main diameter, which will disappear when the grinding has been continued to the full extent, bringing the face of the block (in every position when rotated on its axis) in fair contact with the grinding-platform. Before starting the grindstone the drill should be fixed in its carrier. Guide-blocks,

such as hereinbefore described, may be employed for grinding objects other than cutting-tools—such, for example, as door-knobs having facets formed thereon.

It will be observed that the following are among the advantages of my invention:

First. The block when once made is made complete with its single socket and all facets fixed.

Second. Its several positions with reference to the grinding-line are determined by adjustments on or off the grinding-table.

Third. Supposing the guide-block to be in correct position for any particular facet, (in which case the facet will be slightly tilted and not in fair contact with the grinding-table,) the tool will be adjusted by being protruded from or rotated in its socket, and then when clamped the grinding is completed when the guide-facet is brought into fair contact with the grinding-table.

Four. It differs from other guides in that with a fixed socket it admits of the tool being presented to the stone at the desired angle in the desired plane, instead of only in one plane. This difference is most important, as this peculiarity of my guide, besides materially simplifying its use, admits of a rotatory movement being imparted to it, which adapts it to the sharpening of such articles as the twist-drill.

What I claim is—

1. A holder for grinding tools, consisting of a block having an aperture therein in which the tool to be sharpened is securely and rigidly held, said block being formed with a series of faces corresponding to the faces which are to be ground on the tool.

2. A grinding-wheel, a platform or rest arranged in connection therewith, and a guide or tail-rest on said platform, in combination with a holder in which the tool to be sharpened is held, said holder having recesses or notches formed therein, which recesses or notches are engaged by said guide or tail-rest, which co-operate therewith, substantially as set forth.

3. A tool-holding block having an aperture therein in which the tool is held, said block being divided into two parts through the tool-aperture, and screw-threaded projections j^2, carried by said block, in combination with a block-holding plate provided with slotted apertures through which said projections pass, and securing-nuts which fit on said projections, substantially as set forth.

4. An apertured tool-block and a tubular projecting tool-holder, the tool to be ground being held within said holder and the aperture of said block, in combination with a tool-carrier within said tubular holder in which the shank of the tool is held, and means, substantially as described, for imparting a longitudinal movement to said carrier within said holder, substantially as set forth.

5. A tool-holder having tubular projection j and a ring, m, having a female screw-thread carried by said projection and being capable of rotary motion, in combination with a tool-carrier, l, carried within said tubular projection, said carrier having an exterior screw-thread entering the female screw of the ring m, substantially as set forth.

CHARLES SIMEON THOMASON.

Witnesses:

H. C. HUDSON, *Surg. I. M. D.*

F. V. NICHOLS, *Surg. Med. Staff.*