

(No Model.)

4 Sheets—Sheet 1.

C. A. SINGER.  
CENTERING TOOL.

No. 335,845.

Patented Feb. 9, 1886.

Fig. 1.

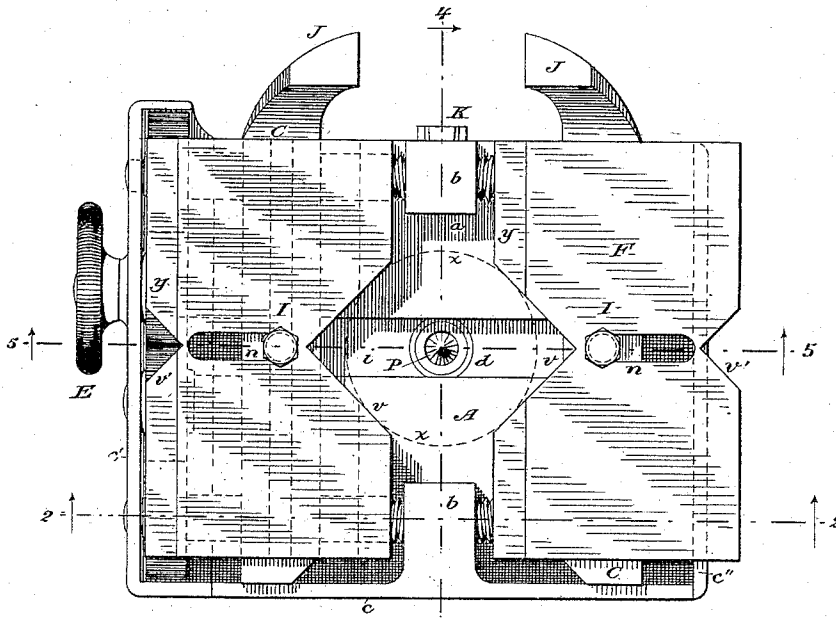
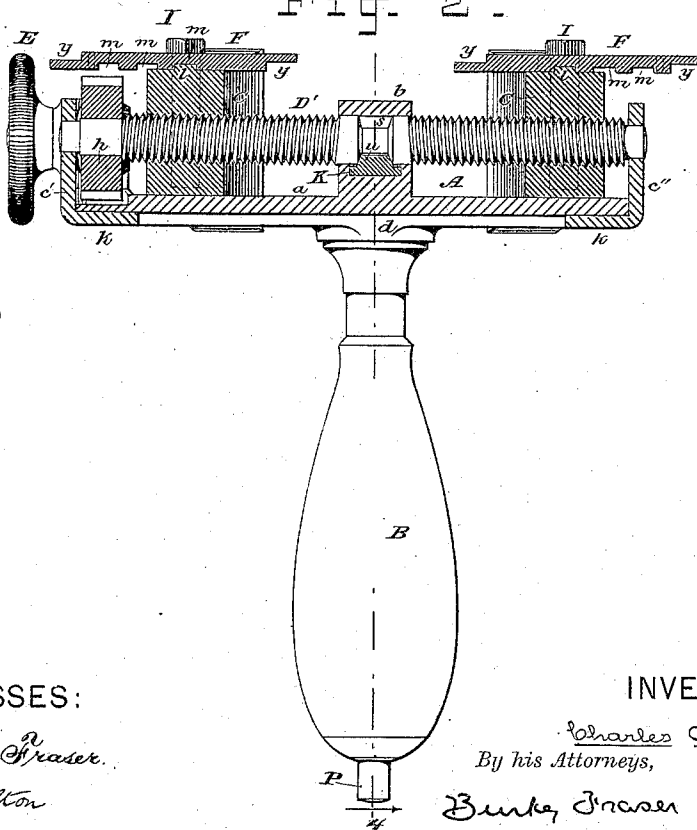


Fig. 2.



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By his Attorneys,  
*Burke Praser & Connelley*

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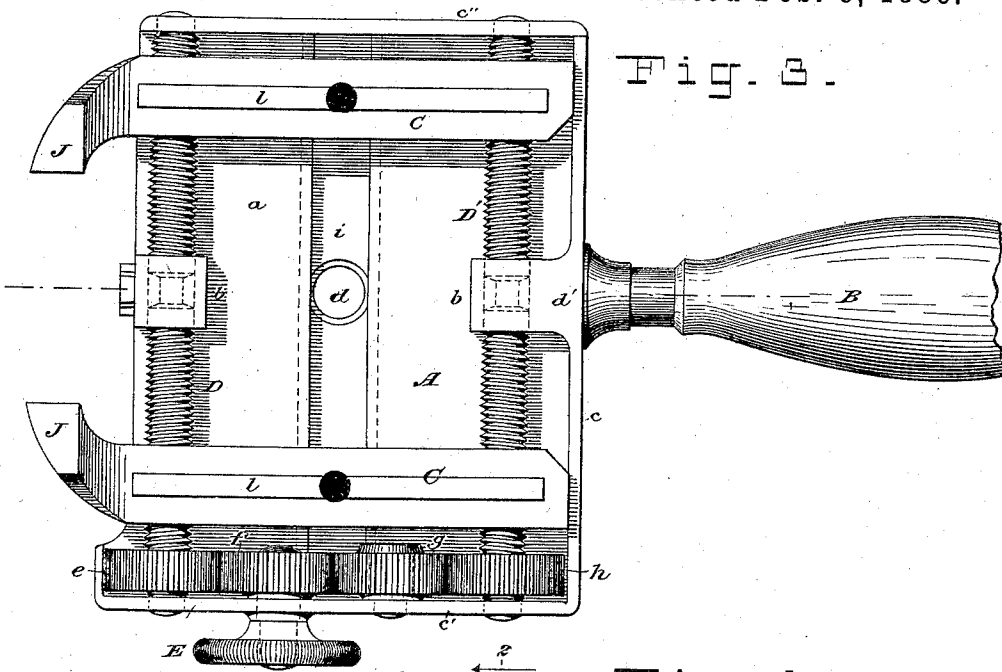


Fig. 3.

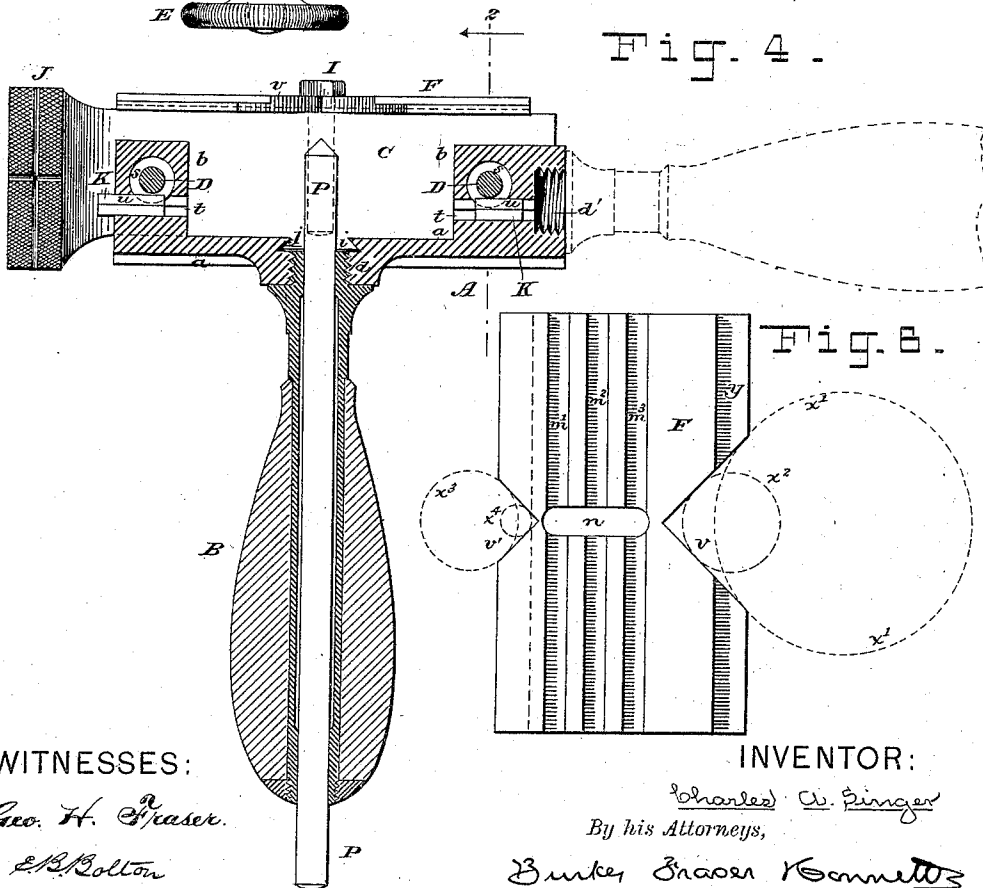


Fig. 4.

Fig. 5.

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Fig. 5.

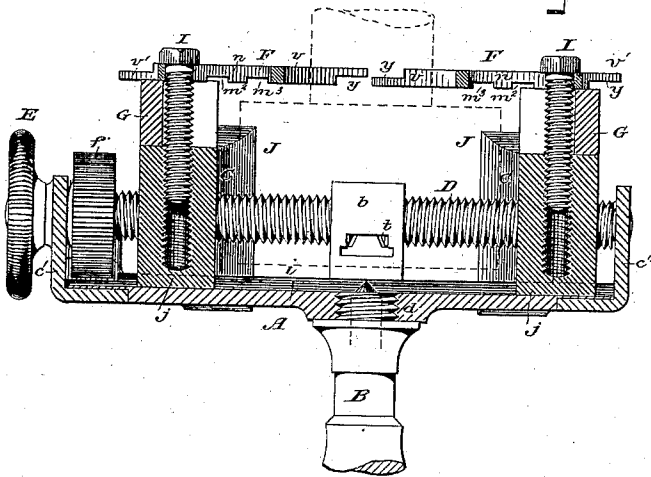


Fig. 6.

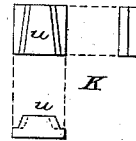


Fig. 7.

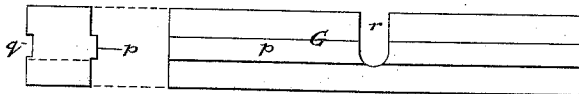


Fig. 10.

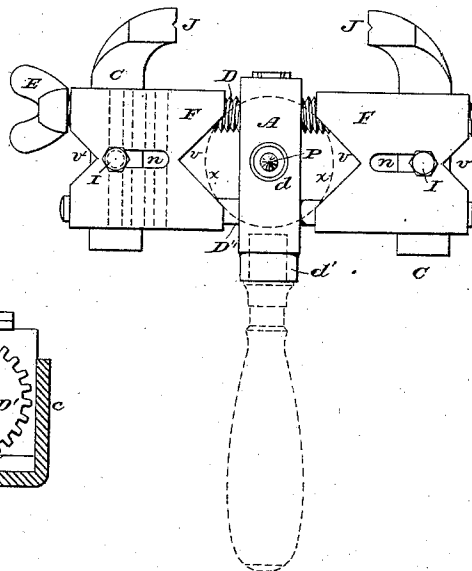
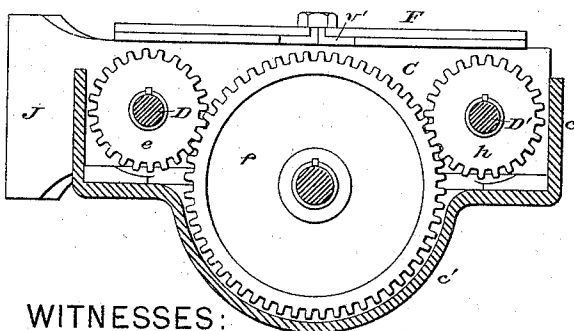


Fig. 8.



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Fig. 11.

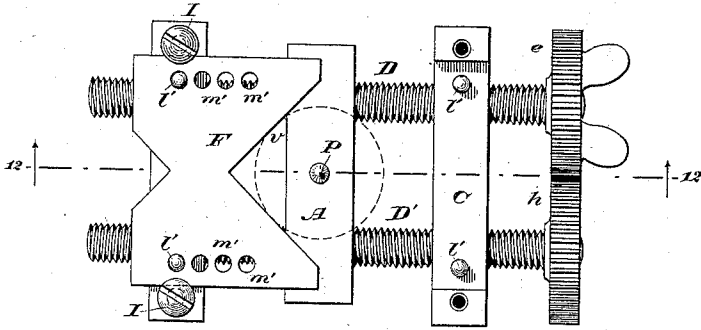
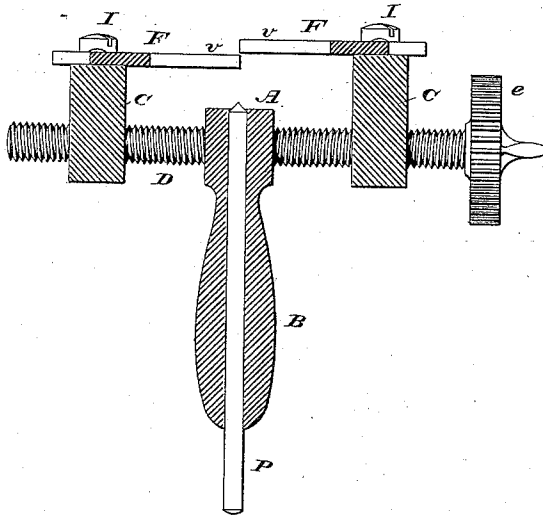


Fig. 12.



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# UNITED STATES PATENT OFFICE.

CHARLES A. SINGER, OF NEW YORK, N. Y.

## CENTERING-TOOL.

SPECIFICATION forming part of Letters Patent No. 335,845, dated February 9, 1886.

Application filed November 6, 1885. Serial No. 192,037. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES A. SINGER, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Centering-Tools, of which the following is a specification.

This invention relates to tools or instruments for marking the centers of work to be turned in a lathe. Tools for this purpose have heretofore been made with two opposite jaws having angular or V-shaped notches sliding back and forth in a box or case and moved equally toward or from a central point by a right-and-left screw. When the work is inserted and clamped between the jaws, its center is brought to the center of the tool by the angular notches, whereupon a hinged punch-socket is turned down against the box, bringing the axis of a centering-punch in line with the axis of the work, and by a blow on this punch the center is marked or indented in the work.

My invention aims to improve upon that construction and provide a tool that shall be more accurate and less liable to wear and become loose, and that shall have greater capabilities for different kinds and sizes of work, and be provided with means for taking up wear.

It also aims to enable the centering-tool to be combined with a vise, thus providing two tools in one without impairing the efficiency of either.

In the accompanying drawings, Figure 1 is a plan view of my improved tool in use as a centering-tool. Fig. 2 is a vertical section thereof in the plane of the line 2 2 in Figs. 1 and 4. Fig. 3 is a plan view, looking in the same direction as Fig. 1, and showing the tool in use as a vise. Fig. 4 is a vertical mid-section of Fig. 1 cut on the line 4 4 in Figs. 1 and 2. Fig. 5 is a fragmentary section cut in the plane of the line 5 5 in Fig. 1, showing the jaws built up to take special work. Fig. 6 is an under side view of one of the centering-jaws. Fig. 7 is a plan and end view of one of the filling-pieces for building up the jaws, as shown in Fig. 5. Fig. 8 shows the key for taking up wear detached; and Fig. 9 is an end view, partly in section, showing a modified construction. Fig. 10 is a view answering to Figs. 1 and 3, and showing a modification. Fig. 11

is a plan view answering to Fig. 1 of a modified construction of centering-tool, and Fig. 12 is a mid-section thereof of the line 12 12 in Fig. 11.

I will first describe the construction shown in Figs. 1 to 8.

A designates the base or foundation frame of the tool on which all the other parts are mounted. In this construction it consists of a flat plate, *a*, with two bearing-blocks, *b b*, on its upper side, a flange, *c c'*, extending around three sides of it, and two screw-threaded sockets, *d* and *d'*, (best seen in Fig. 4,) one on its bottom and the other at its side. A handle, *B*, has a screw-shank which may be screwed into the socket *d*, as in Fig. 4, or into the socket *d'*, as in Fig. 3. Two parallel bars, *C C*, are arranged against the plate *a*, equally distant from the blocks *b b*, on opposite sides thereof. Two right and left threaded screws, *D* and *D'*, pass through the respective blocks *b b*, and pass through holes in the bars *C C*, which are correspondingly threaded to engage the screws. These are best shown in Figs. 2 and 3. The ends of the screws are reduced and enter holes in the flanges *c'* and *c''*, which serve to steady the screws, but not, in the construction shown, to prevent end-play.

On one end of the screw *D* is fixed a pinion, *e*, which meshes with a driving-pinion, *f*, and this in turn meshes with an idler-pinion, *g*, which meshes with a pinion, *h*, which is fixed on the end of screw *D'*. The pinion *f* is fixed on an arbor which passes through the flange *c'*, (which forms its bearing,) and on its outer end is fixed a milled wheel, *E*, or a crank, or other device for turning the pinion. On turning this wheel the two screws are turned simultaneously in opposite directions, and being oppositely threaded, they act to propel the parallel-bars *C C* toward or from each other, as the case may be. This construction keeps the parallel bars from getting out of parallel by one screw moving faster than the other.

Fig. 9 shows a modification wherein the idler-pinion *g* is omitted and the driving-gear *f* is enlarged to mesh with both pinions *e* and *h*.

The true and even movement of the bars *C C* is insured by the provision of a dovetailed or undercut guideway, *i*, planed out on the

upper surface of the plate *a*, as best shown in Fig. 3, and a dovetailed projection *j* on the under side of each bar C, as best shown in Fig. 4, which enters and closely fits this guide-way. Any strain tending to lift the bars away from the plate *a*, or to move them in the direction of their length, is resisted by these guides *ijj*, thus relieving the screws of such strains. In order to enable the parts to be put together, the end flanges, *c'* and *c''*, are made removable from the remainder of the base A. The guide-way *i* is planed entirely across the plate *a*, leaving its ends open, and the dovetailed projections *jj* are entered into these open ends, the bars C C being drawn inward by rotating the screws D D'. The pinions *e* and *h* are thus fastened on the ends of the screws D D', and the end flanges, *c'* *c''*, are then applied to the base A and fastened by small screws (not shown) passed through bottom flanges, *k k*, (forming part of the end flanges, *c'* *c''*,) into the plate *a*.

The parallel bars C C are extended at their outer ends beyond the base A, and their ends are formed as vise-jaws J J. By screwing the handle B into the socket *d'*, as shown in Fig. 3, the tool is complete for use as a vise.

I will now proceed to describe the remaining features, which complete the tool for use as a centering-tool. To each parallel bar C is fastened a centering-jaw, F, having an angular or V-shaped notch, *v*, in its side toward the center of the tool. The two jaws F F are equally distant from the center, and their notches *v' v* are exact counterparts of each other, their opposite angular sides being alike on opposite sides of the center line—line 5 5 in Fig. 1. Thus any circular piece of work entered between the jaws and grasped in their angular notches will be brought into the exact center of the tool, as denoted by the dotted circle *x* in Fig. 1. The axis of the work is thus brought into exact coincidence with the axis of the handle B when the latter is entered in the socket *d*, as shown in Fig. 4. The handle B is bored through in its longitudinal axis, and a centering-punch, P, is made to fit closely in this bore. The punch should be capable of sliding longitudinally in the bore, but should be so close a fit therewith that it will not drop out. Its inner end is pointed and hardened, and its outer end projects beyond the end of the handle, so that it may be struck with a hammer. The work to be centered being placed between the jaws F F, the jaws are drawn together by turning the screws until the work is clamped between the jaws, and thereby centered. The punch P is then moved in until its point touches the center of the work, and its outer end is struck with a hammer to cause its point to indent the center in the work. The work is then taken out of the tool, and its opposite end is centered and marked in the same manner, whereupon it is placed in the lathe, the lathe-centers being placed in the indentations marked. In large work the indented centers are en-

larged and deepened by drilling before the work is hung in the lathe.

It will be observed that when the handle B is screwed firmly into the socket *d* it forms in effect a part of the base A—as much so as if made in one piece therewith. In fact, for a tool to be used only for centering, and not as a vise, this handle would be made integral with the base A, as shown in Fig. 12. In either case the handle forms a rigid accurately-centered long bearing for the guiding of the centering-punch P. This bearing for the punch is thus connected rigidly to the bearings that support the screws D D' and guide the moving jaws. The result of this construction, which is characteristic of my invention, is that the utmost rigidity and accuracy are secured, with no liability of displacement of the centering-punch out of the geometrical center of the tool by lost motion in the connection between the bearing for the punch and the bearings for the screws and jaws. I accomplish this result by making these respective bearings essentially all in one piece, instead of in two pieces hinged together or otherwise articulated, as heretofore.

The jaws F F might be made integral with the parallel bars C C; but it is much preferable to construct them as separate parts which can be detached from the bars. In this way several sets of jaws may be provided, each adapted for different sizes or kinds of work. To avoid the necessity of undue multiplication of jaws, and render a single pair applicable, as far as possible, to all the different requirements of a centering-tool, I have devised the special construction shown.

The jaws F F are preferably constructed as flat plates of hardened steel which are fastened to the bars C C by screws I I. The correct placing of the jaws is insured by means of intermeshing projections and depressions on the bars and jaws, respectively, so that the jaws may be detached and again replaced without risk of impairing their adjustment. Furthermore, these interlocking provisions are duplicated or multiplied, in order that the centering-jaws may be set at different points farther in or out on the bars C C, and in addition to this the jaws are made reversible, being provided with notches *v v* on opposite sides to engage objects of different sizes.

The bars C C are each formed with a longitudinal raised rib, *l*, on its upper side, (best shown in Fig. 3,) the two ribs *ll* being exactly parallel with each other. The jaws F F are each formed with one, two, or more corresponding grooves, *m m*, in their under sides, as best shown in Fig. 6. When the jaws are applied, these ribs and grooves interlock, as shown in Fig. 2, thus holding the jaws in the proper positions on the bars C C. The longitudinal displacement of the jaws is prevented by the screws I I, which are in the exact center (on the line 5 5 in Fig. 1) and pass through slots *nn* in the jaws. By unscrewing the screw

I a short distance the jaw F may be lifted from the bar C sufficiently to clear the groove *m* from the rib *l*. The jaw may then be moved toward or from the center until one of the other 5 grooves engages the rib, whereupon the screw will be tightened down again. This adjustment of the jaws is of advantage to adapt the tool to center different kinds of work. For instance, if a large circle is to be centered, 10 the jaws F F are set as far apart as possible on the bars C C to enable them to span it. To take in a smaller circle the bars C C are simply moved toward each other by the screws D D' without readjusting the jaws; but if a piece 15 of work has a large head or flange at the end, and it is desired to center by its neck, the bars C C have to be moved wide apart to admit the head between them, while the jaws F F have to be set as near to the center as possible, in 20 order that they may reach the neck which they are to center. When the head to be admitted is of very large diameter, the jaws F F may require to be entirely detached from the tool until the head is entered, after which they will 25 be replaced. It will be understood that when one of the jaws F is held by any one of its grooves *m* the other jaw must be held by the corresponding one of its grooves to keep it equally distant from the center. Three 30 grooves are shown, (marked *m*<sup>1</sup>, *m*<sup>2</sup>, and *m*<sup>3</sup>, respectively.)

The jaws F F have angular notches on opposite sides, as shown. On one side is the notch *v* for large circles, and on the other side 35 is the notch *v'* for smaller circles. Fig. 6 shows the relative sizes of the circles which the two notches will center. The notch *v* has a capacity from a two-inch circle, (indicated at *x*<sup>1</sup>), down to a three quarter-inch circle, (indicated at *x*<sup>2</sup>.) The notch *v'* has a capacity for 40 a three-quarter-inch circle, (indicated at *x*<sup>3</sup>), and from that down to a one-quarter-inch circle, (indicated at *x*<sup>4</sup>.) These are the preferable proportions for a tool designed to take in 45 these sizes. Anything larger than two inches can best be centered by a square, and anything smaller than one-fourth inch is usually held in a drill-chuck and does not require centering.

50 When the tool has been used for large circles and it is desired to use it for smaller ones, the screws I I are loosened and the centering-jaws are turned around, bringing their notches *v' v'* toward the center.

55 The two jaws F F are both in the same horizontal plane. To increase the range of circles which they can take, their approaching edges are rabbeted to half-thickness for a short distance back, as shown at *y y* in Figs. 2 and 5, 60 so that these portions overlap when brought together.

By referring to Figs. 3 and 4 it will be seen that the space between the blocks *b b* is clear and open, so that any work may be passed in 65 until it strikes the plate *a*. This feature admits the heads of bolts and other projections

on the ends of the work that it is desired to reach over in centering. With the proportions shown a two-inch hexagon bolt-head can be taken in and centered by the neck, provided the head be not more than seven-eighths 70 thick. If it exceeds this size, (or whatever size the tool may be proportioned for,) the jaws F F must be raised to enable them to reach over it. This is done by unscrewing 75 the screws I I about three-fourths of their length, lifting up the jaws F F and inserting between them and the bars C C two filling-pieces, G G. (Shown detached in Fig. 7.) The screws are then tightened down, when the 80 parts are as shown in Fig. 5, where the work being centered is shown in dotted lines. Each of the pieces G G has a groove, *g*, in its under side to fit the rib *l* on the bar C, and a rib, *p*, on its upper side to enter one of the grooves 85 *m* in the jaw F, whereby the parts are retained accurately in their proper relative positions. The pieces G have also each a notch, *r*, to pass over the screw I.

It is obvious that if the screws D D' were to 90 have any longitudinal play or looseness in their bearings the accuracy of the tool would be to that extent impaired. To prevent such play and take up lost motion resulting from wear, I provide the device which I will now 95 describe. The mid portion of each screw DD' is not threaded, and its middle is turned down to form a groove, *s*, with preferably inclined sides. The blocks *b b* are slotted through just 100 under the screw, transversely thereto, the slot or way *t* thus formed having parallel walls. A key, K, (shown in Fig. 8,) is inserted in this slot, its body portion being made parallel and a tight fit with the slot, so that to move it therein it requires to be driven lightly. On 105 the key K is formed a wedge-shaped or tapering rib, *u*, the tapering sides of which are preferably inclined to conform to the inclined sides of the groove *s*, as shown in Fig. 2. The contacting surfaces of this rib and groove serve 110 as the only abutments to prevent end-play, and as they wear, the key is driven in a little farther, thus bringing a wider portion of the rib into the groove *s*. The essential feature of this construction is that the key shall have 115 parallel bearings in the block *b*, and shall be tapered where it engages the groove *s* in the screw.

When my improved tool is used as a centering-tool, the handle must be in the socket 120 *d*; but when used as a vise the handle may be in either socket *d* or *d'*, although for the latter use it is preferable to have the handle in the socket *d'*. At such time the punch P should be withdrawn and laid away. 125

Fig. 10 shows a combined or convertible vise and centering-tool, wherein the box-like form of the base A is departed from, thereby rendering the tool more simple. The base A is simply a straight bar, its end portions forming the bearings for the screw D, which operates the bars C C, and for a guiding-pin, D"; 130

which is fixed, and engages plain holes in the bars to steady them. The middle of the base-bar A is perforated for the passage of the punch, and screw-threaded to form the socket *d* for the handle, and in one end of the bar is formed the socket *d'*. The jaws F F are reversible and adjustable, as already described.

The tool shown in Figs. 11 and 12 has no vise-jaws, being designed for centering only. It has two screws, D D', placed near enough together to enable the pinions *e* and *h* on their ends to intermesh directly with each other. The base or foundation frame A consists of a transverse bar forming the center bearings for the screws and formed in one piece with the handle B. The attachment of the jaws F F to the parallel bars C C is modified. In place of the medial screw I, two screws, I I, are provided entering the bar C near its opposite ends, with their heads overhanging the opposite sides of the jaw F. The bar C has two pins, *l' l'*, projecting from its surface, (in place of the rib *l*,) and the jaw F is provided with a series of holes, *m' m' m'*, near its opposite sides, (in place of the grooves *m m*.) The holes *m' m'* are drilled to register exactly with the pins *l' l'*. To change the adjustment of the jaw F both screws I I are loosened, the jaw is lifted off the pins *l' l'* and moved to bring another pair of holes *m' m'* into engagement with the pins, or it may be drawn out, turned around, and replaced, after which the screws are again tightened down. This construction avoids cutting the medial slot *n* between the points of the two notches, which is apt to weaken the jaws. The rabbeting of the edges of the jaws is avoided by setting one on a higher plane than the other, as shown in Fig. 12, so that they may overlap.

It is obvious that my invention may be otherwise modified in details of construction without departing from its essential features.

I am aware that centering-instruments have been made with three caliper-jaws pivoted to a central stock, and moved to embrace the work by a sliding ring with a centering-punch sliding through the stock; but such tools are liable to inaccuracy on account of the springing of the caliper-jaws.

My invention relates only to tools of that class wherein notched plates or jaws are moved equally toward or from a common center by a right-and-left screw or screws, with a centering-punch sliding in a bearing and capable of being driven against the work. I am aware that such jaws so moved have been applied to a lathe to center the work before drilling the center hole.

What I claim as new is—

1. The combination, to form a centering-tool, of a rigid base or foundation frame forming bearings for the screw and punch, the centering-punch arranged in said bearing and movable longitudinally therein, a right-and-left screw having bearings in said base, two parallel bars engaged by said screw, and an-

regularly-notched centering-jaws attached to and moving with said parallel bars, substantially as and for the purposes set forth.

2. A convertible vise and centering-tool, comprising a rigid base, A, having sockets *d* and *d'*, a handle, B, capable of being united rigidly to either of said sockets, and bored through longitudinally to form a bearing for the centering-punch, the said punch capable of sliding in said handle, the right-and-left screw D, having bearings in said base, the parallel bars C C, formed with vise-jaws J J, and engaged by said screw, and centering-jaws F F, fastened removably to the bars C C, substantially as set forth.

3. The combination of the body A, formed with a guideway, *i*, the handle B, the right-and-left screws D D', and the parallel bars C C, provided with the projections *j j*, engaging said way, whereby the bars C C are guided in their movement toward or from each other, substantially as set forth.

4. The combination of the body or foundation-frame A, consisting of plate *a* and flanges *c* and *c'*, and forming bearings for the screws, with the right-and-left screws D D', the parallel bars C C, resting on said plate *a* and engaged by said screws, and gearing for driving said screws simultaneously, substantially as set forth.

5. The combination, in a centering-tool, of a base or foundation frame, A, consisting of plate *a*, having flanges *c*, *c'*, and *c''*, bearings *b b* for the screws, and sockets *d* and *d'* for the handle, with the handle B, capable of engagement with either of said sockets, the screws D D', having bearings in said base A, the gearing connecting said screws together, the parallel bars C C, engaged by said screws, and the punch P, having a bearing through said handle B, substantially as set forth.

6. The combination, to form a centering-tool, of a centering-punch, P, and the base or frame A, forming a bearing therefor, and comprising a flat plate, *a*, with its surface in a plane perpendicular to the axis of the punch-bearing, and bearings *b b* for the screws, with the right-and-left screws D D', mounted in said bearings, the parallel bars C C, and the centering-jaws F F, substantially as set forth.

7. The combination, to form a centering-tool, of a centering-punch, P, the base or frame A, forming a bearing therefor, and comprising a flat plate, *a*, with its surface in a plane perpendicular to the axis of the punch-bearing, and bearings for the screws above said plate, the screws D D', and parallel bars C C, arranged above said plate, and the centering-jaws F F, attached to said bars, whereby the work to be centered may be brought against said plate *a* between the screws D D', and between the bars C C, as described.

8. The combination, in a centering-tool, of a centering-punch, a right-and-left screw, a rigid base, forming bearings for said punch and screw, parallel bars engaged by said screw,



angularly-notched centering-jaws attached adjustably to said bars, and interlocking provisions on said jaws and bars, respectively, whereby the correct adjustment of said jaws relatively to said bars is insured, substantially as set forth.

9. The combination, in a centering-tool, of parallel bars engaged by a right-and-left screw to move them equally toward and from a common center, the said screw, angularly-notched centering-jaws attached adjustably to said bars and a series of interlocking provisions on said bars and jaws, respectively, whereby the jaws may be set to different positions, on said bars, nearer to or farther from the common center, substantially as set forth.

10. The combination, in a centering-tool, of parallel bars engaged by a right-and-left screw to move them equally toward and from a common center, the said screw, reversible centering-jaws having angular notches on opposite sides attached to said bars, and interlocking provisions on said jaws and bars, respectively, whereby the correct readjustment of the jaws after their reversal is insured, substantially as set forth.

11. The combination, with parallel bars C C, having ribs *l l*, and right-and-left screw for operating said bars, of centering-jaws F F, having grooves *m m*, and the screws I I, substantially as set forth.

12. The combination, with the parallel bars C C and right-and-left screw for operating them, of centering-jaws F F, interlocking provisions on said bars and jaws, respectively, whereby the correct adjustment of said jaws relatively to said bars is insured, the fastening-screws I I, and the removable filling-pieces G G, adapted to be entered between the bars and jaws, and having provisions on their opposite sides interlocking with said provisions on the bars and jaws, respectively, substantially as set forth.

13. In a centering-tool, the combination, with a right-and-left screw having an annular groove, and the bearing for said screw formed with a keyway with parallel sides, of a key having parallel portions tightly fitting said keyway, and an inclined portion entering said groove in the screw and bearing against the sides thereof, substantially as and to the effect set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

CHARLES A. SINGER.

Witnesses:

ARTHUR C. FRASER,  
GEO. BAINTON.