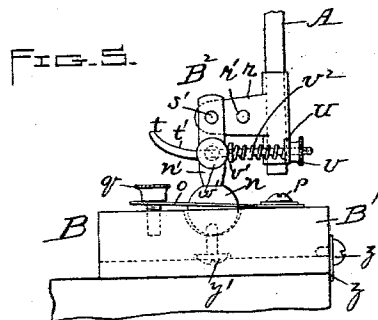
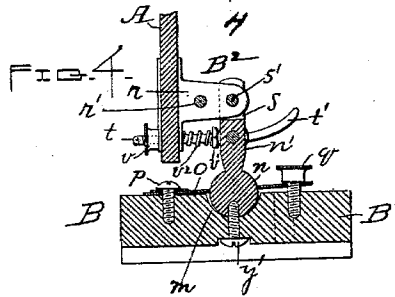
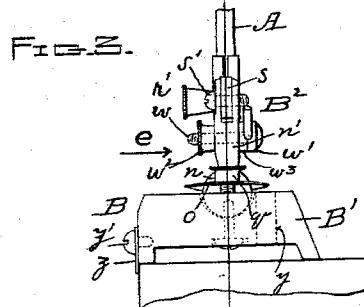
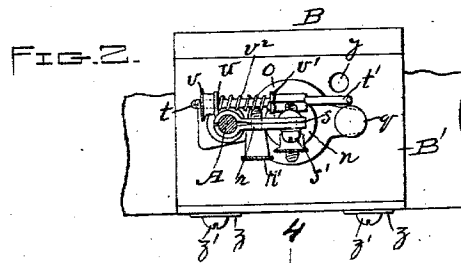
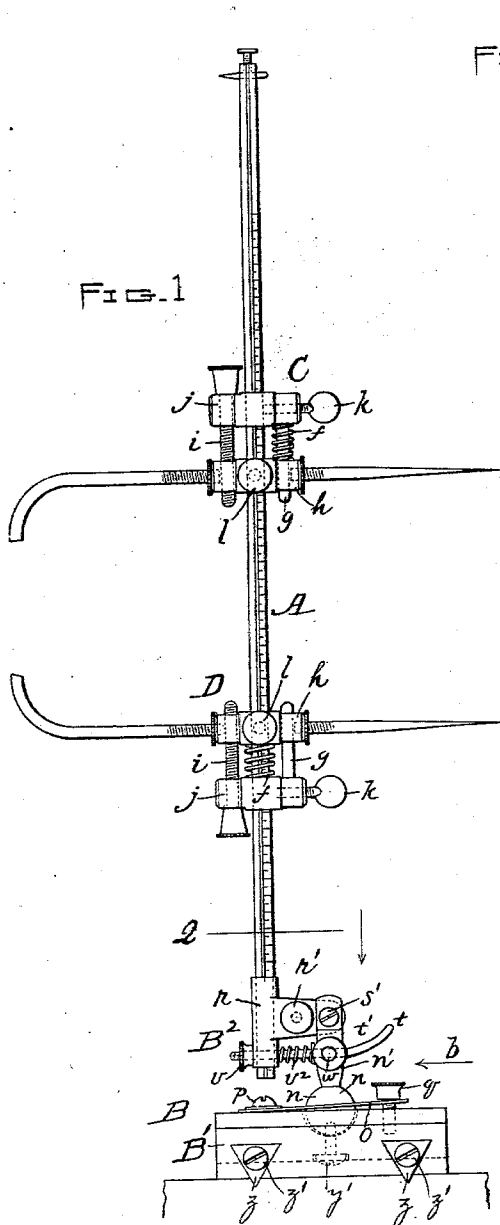


F. A. ROBBINS.
COMBINATION TOOL.
APPLICATION FILED APR. 12, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses:
W. B. Nourse.
E. N. Barker.

Inventor,
Frank A. Robbins.
By A. A. Barker. Att'y=

No. 717,716.

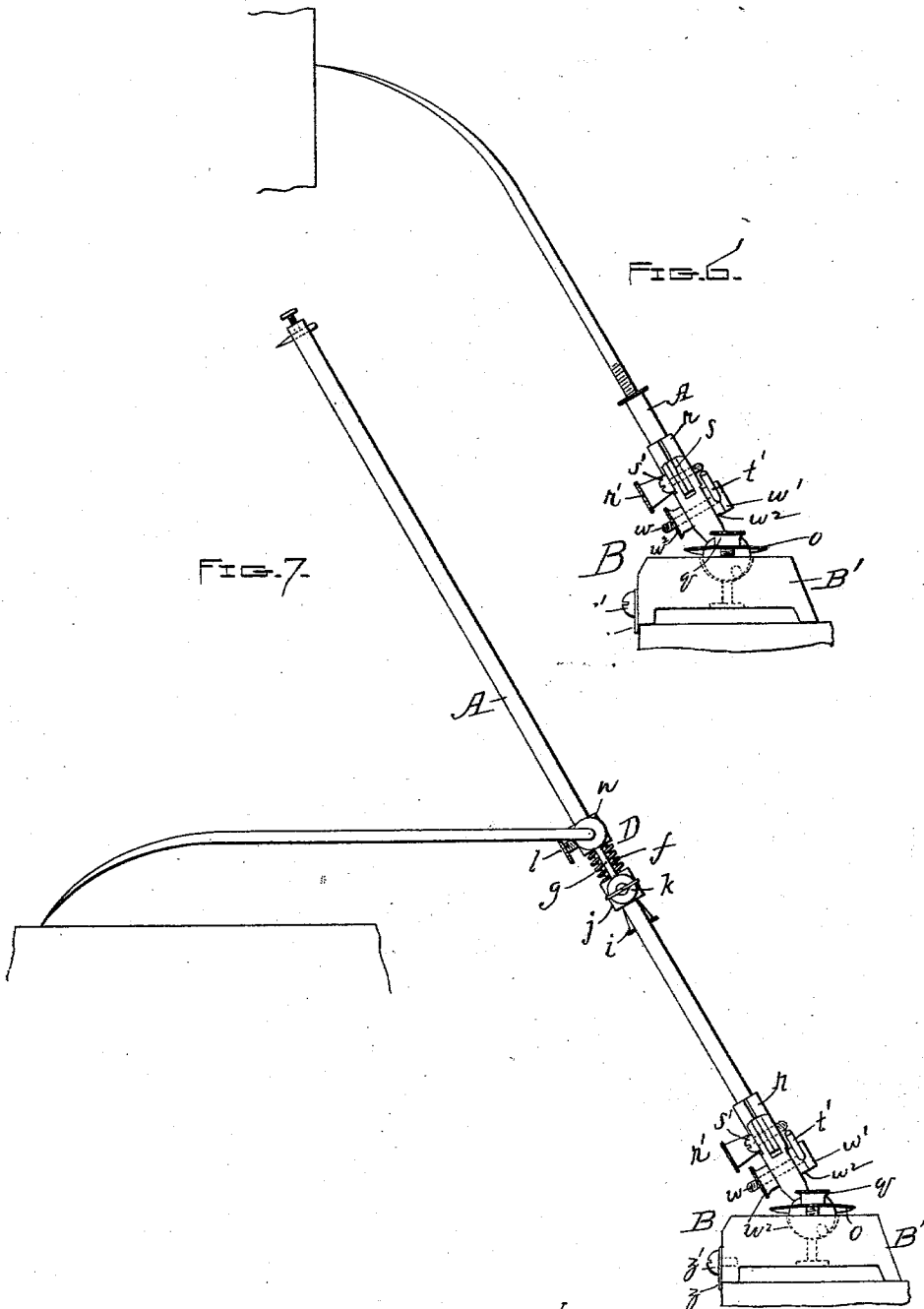
PATENTED JAN. 6, 1903.

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2 SHEETS—SHEET 2.



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W. B. Nourse.
E. N. Barker.

Inventor,
Frank A. Robbins
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UNITED STATES PATENT OFFICE.

FRANK A. ROBBINS, OF WORCESTER, MASSACHUSETTS.

COMBINATION-TOOL.

SPECIFICATION forming part of Letters Patent No. 717,716, dated January 6, 1903.

Application filed April 12, 1902. Serial No. 102,573. (No model.)

To all whom it may concern:

Be it known that I, FRANK A. ROBBINS, of the city and county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Combination-Tools; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 represents a side view in elevation of my said improved combination-tool, showing said tool adjusted to a vertical position. Fig. 2 is a horizontal section through the beam of the tool, taken on line 2, Fig. 1, looking down as indicated by the arrow and showing a plan of the base of said tool. Fig. 3 is a side view of said base and part of the beam looking in the direction of arrow *b*, Fig. 1. Fig. 4 is a central vertical section taken on line 4 4, Fig. 3, looking in the direction of arrow *e*, same figure. Fig. 5 is a side view of the base of the tool and part of the beam, showing the opposite side from that shown in Fig. 1; and Figs. 6 and 7 represent side views of the tool with the parts adjusted to inclined positions and showing modifications in the construction, which will be hereinafter described.

My invention relates to improvements upon a prior invention filed in the United States Patent Office January 20, 1902, bearing Serial No. 90,391, and which was allowed February 25, 1902.

My present invention comprises certain improvements in the beam-trammels and in the construction of the base, whereby the beam supporting said trammels and other parts may be adjusted to any desired angle, as will be hereinafter more fully set forth.

In order that others may better understand the nature and purpose of my said invention, I will now proceed to describe it more in detail with reference to the accompanying drawings, in which—

A represents the beam, B the detachable base thereof, and C D the trammels mounted on said beam.

My improved tool may be adjusted to be used, as in my former invention above referred to, as a surface-gage, as inside and outside calipers, and also as compasses or di-

viders, as circumstances may require in practice.

My improvement in the beam-trammels consists in providing a spring *f* and guide-pin *g* for holding the part *h* of the trammels C D in proper position at right angles to the beam A, so that said part *h* may slide easily without binding on said beam when adjusted by means of the thumb-screw *i*, arranged at one side of and parallel to the beam and fitted to turn in said part *h* and in the part *j* of each trammel when the latter is held rigid on the beam by means of the transverse set-screw *k*, the part *h* also being provided with a set-screw *l* to secure it in place after adjustment. The guide-pin *g* is also arranged parallel to the beam upon the opposite side from the thumb-screw *i*. It is secured in one part *h* or *j* and fitted to slide in an opening in the other. The spring *f* may be arranged over the beam between said parts *h* and *j*, as is indicated in the trammel D, or it may be arranged over the guide-pin *g*, as is shown in the trammel C, both effecting in practice substantially the same result. I therefore reserve the right to arrange said spring in either or any other substantially equivalent position desired.

My principal improvement is upon the base of the tool for the purpose of accomplishing the result previously stated of providing means for adjusting the beam into any desired position or angle. Said base is constructed as follows: It comprises a block B' and a swivel holding device B², said block serving to hold said swivel device and as a weight to hold the tool in position from tipping over. In my former invention referred to the beam is fastened rigid in the base, and the feature of adjustably fastening said beam so that it may be moved to any desired angle is the main purpose of my present invention, as above stated. I accomplish said result by the employment of a ball-and-socket joint, the socket *m* being formed in the top surface of the block B' and in which the ball *n* rests, being held therein from coming out and at the same time admitting of its turning there- in by means of a horizontal spring holding-plate *o*, fastened at one end at *p* to block B' and provided with an adjusting-screw *q* at its other end, which passes through an opening

in the plate and turns in a threaded opening in the block. Said spring-plate is also provided with a central opening a little smaller in diameter than the ball *n*, in which said ball fits and is thereby held in position, said ball being held rigid in its socket by turning the adjusting-screw *q* down into the block to force down plate *o* and released to permit it to turn in said socket by loosening said screw and allowing the end of the plate to spring up enough to free the ball from the downward pressure. A stud *n'* is extended up from the ball *n* to form a support for the clamp *r*, which holds the lower end of the beam, the upper end of said stud being slotted at *s*, as is shown in Figs. 3 and 4, to receive the outer end of the clamp and the two parts pivoted by the screws *s'*. Said stud *n'* also forms a support for the segment-shaped end *t'* of a screw-rod *t*, which is supported at its opposite end in an opening in a flange *u*, projecting laterally from clamp *r*. Said rod *t* is threaded a portion of its length at said end and is provided outside of said flange *u* with a nut *v*. Its opposite curved or segment-shaped smooth end *t'* is fitted to slide in an opening formed in the head *w'* of a transverse screw *w*, which is provided with a nut *w²* at its opposite end. Between said head *w'* and the stud *n'* is arranged a washer *w³*, fitted over screw *w*, and the opening to receive the curved end *t'* is preferably formed partly in head *w'* and said washer *w³*, as is indicated in Fig. 3. Between head *w'* and flange *u* next to said head a nut *v'* is fitted over screw-rod *t*, and between said nut *v'* and flange *u* is also arranged over screw-rod *t* a spiral spring *v²*, the purpose thereof and nut *v'* being to hold said screw-rod *t* in position longitudinally and of the nut *v* to adjust the same longitudinally. The curve of the smooth segment-shaped end *t'* of rod *t* is so arranged and the parts so pivoted, as will be observed, that a free swinging movement may be imparted to the clamp *r* and parts attached thereto, the same moving on its fixed pivot *S'* and the curved end *t'* sliding longitudinally in the opening in head *w'* and washer *w³*. When the parts have been swung over to bring the beam at the desired angle, the nut *v'* is turned up tight against the stud *n'*, and thereby locks the parts in their adjusted positions.

The clamp *r* is preferably made in two parts or halves, held together by their outer ends fitting in the aforesaid slot *s* and by the pivot-screw *S'* and clamping-screw *r'*. The end of said clamp *r* opposite from its pivot is made of the proper shape to fit the beam *A*, one half fitting over one side and the other half over the other side of said beam, as is shown in the drawings. By said construction it is obvious that by loosening screw *r'* the beam *A* may be moved longitudinally in the clamp and then fastening it in its adjusted position by tightening up said screw again.

To facilitate holding the parts more rigidly

when the tool is used with the beam in a vertical position, as is shown in the first five figures of the drawings, the lower end of said beam may be inserted in a vertical opening *y* in the block *B'*, and the ball *n* may also be held by means of a screw *y'*, (see Fig. 4,) extending up vertically through said block from the under side and into an opening in said ball. In order that the base-block *B'* may be gaged exactly alike to the edge of the planer-bed or other part upon which the tool is to be used to bring said tool in the same relative position at different points, I have provided one side of said block with the gage-plates *z*, held in position by the screws *z'* and upon which they are fitted to turn. They are of irregular shape, in this instance of triangular shape, so that when turned part way their bottom edges will come above the level of the bed upon which they rest and which when further turned those portions of largest diameter will project down over the edge of the bed, as is shown in Figs. 1 and 3, and thus gage the block, and consequently the operating parts supported thereon, to the edge of said bed. These devices may be used or not with the other parts of my invention, not being an essential feature thereof.

From the foregoing description it will be seen that a very useful and practical tool is produced for the use of mechanics and is capable of great variation in its uses. It may be applied successfully to almost if not quite every condition in which a surface-gage is required to be used, being adapted to be adjusted to any desired angle. It is also adapted to the further uses, as in my former invention referred to, of outside and inside calipers and for compasses.

In Figs. 6 and 7 I have shown the tool with the beam at an angle and applied to different uses, Fig. 6 being shown with a short beam and as applied to gaging a vertical surface and Fig. 7 for gaging a horizontal surface. In Fig. 6 I have also shown the tool with no beam-trammel, the gaging-point being screwed into the end of the short beam, while in Fig. 7 one beam-trammel is shown instead of two, as in Fig. 1.

While I prefer in practice the details of construction shown and described, I of course reserve the right to make such modifications therein as circumstances may require coming within the scope of my invention.

Having described said invention, what I claim therein as new, and desire to secure by Letters Patent, is—

1. The combination of the spring *f* and guide-pin *g*, with the beam *A*, the adjusting-screw *i*, the parts *h* and *j* of the trammels and their set-screws, substantially as and for the purpose set forth.

2. The combination of beam *A* and base-block *B'*, with ball *n*, having a stud *n'*, spring-plate *o*, its adjusting-screw *q*, means for fastening said spring-plate to block *B'*, clamp *r*, pivoted to stud *n'*, at one end, and

made to receive and hold said beam at its other end; clamping-screw r' ; curved, screw-rod t , fitted in openings in the head of screw w and in a flange u on clamp r ; nuts v, v' , on said curved, screw-rod t , and spiral spring v^2 arranged thereover, between the nut v' and said flange u , substantially as and for the purpose set forth.

3. The combination of beam A and base-
10 block B', having the vertical opening y , with ball n , having a stud n' and means for fastening said ball in position rigidly in said block; spring, holding-plate o , its adjusting-screw q , means for fastening said spring-

plate to block B', clamp r , pivoted to stud n' 15
at one end, and made to receive and hold said beam at its other end; clamping-screw r' , curved screw-rod t , fitted in openings in the head of screw w and in a flange U on clamp r ; nuts v, v' , on said curved screw-rod 20
 t , and spiral spring v^2 arranged thereover between the nut v' and said flange U, substantially as and for the purpose set forth.

FRANK A. ROBBINS.

Witnesses:

A. A. BARKER,
E. N. BARKER.