

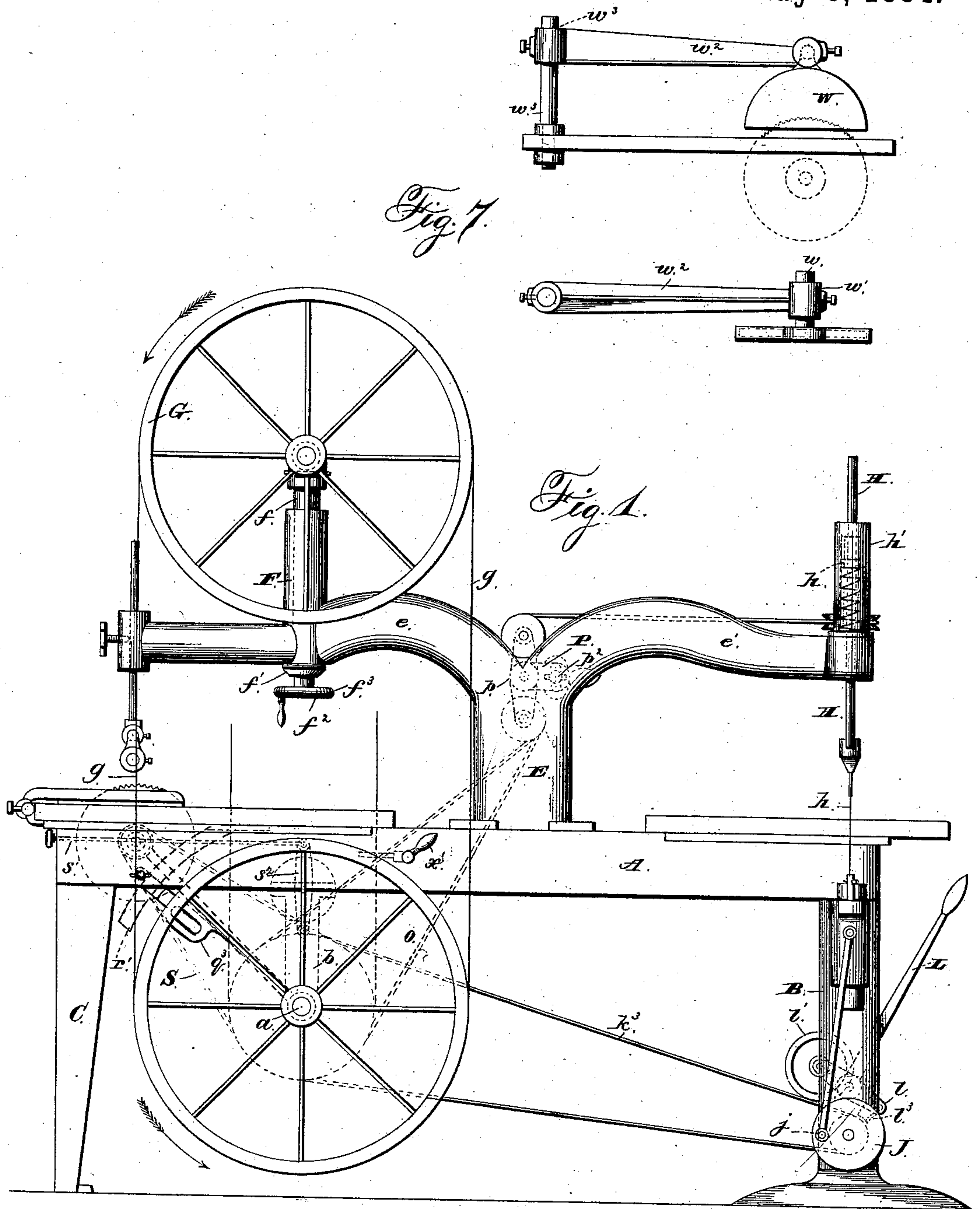
(No Model.)

2 Sheets—Sheet 1.

A. BEAN.  
UNIVERSAL JOINER.

No. 298,056.

Patented May 6, 1884.



WITNESSES

Jas. E. Hutchinson.  
Ed. Seward.

INVENTOR

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Attorney

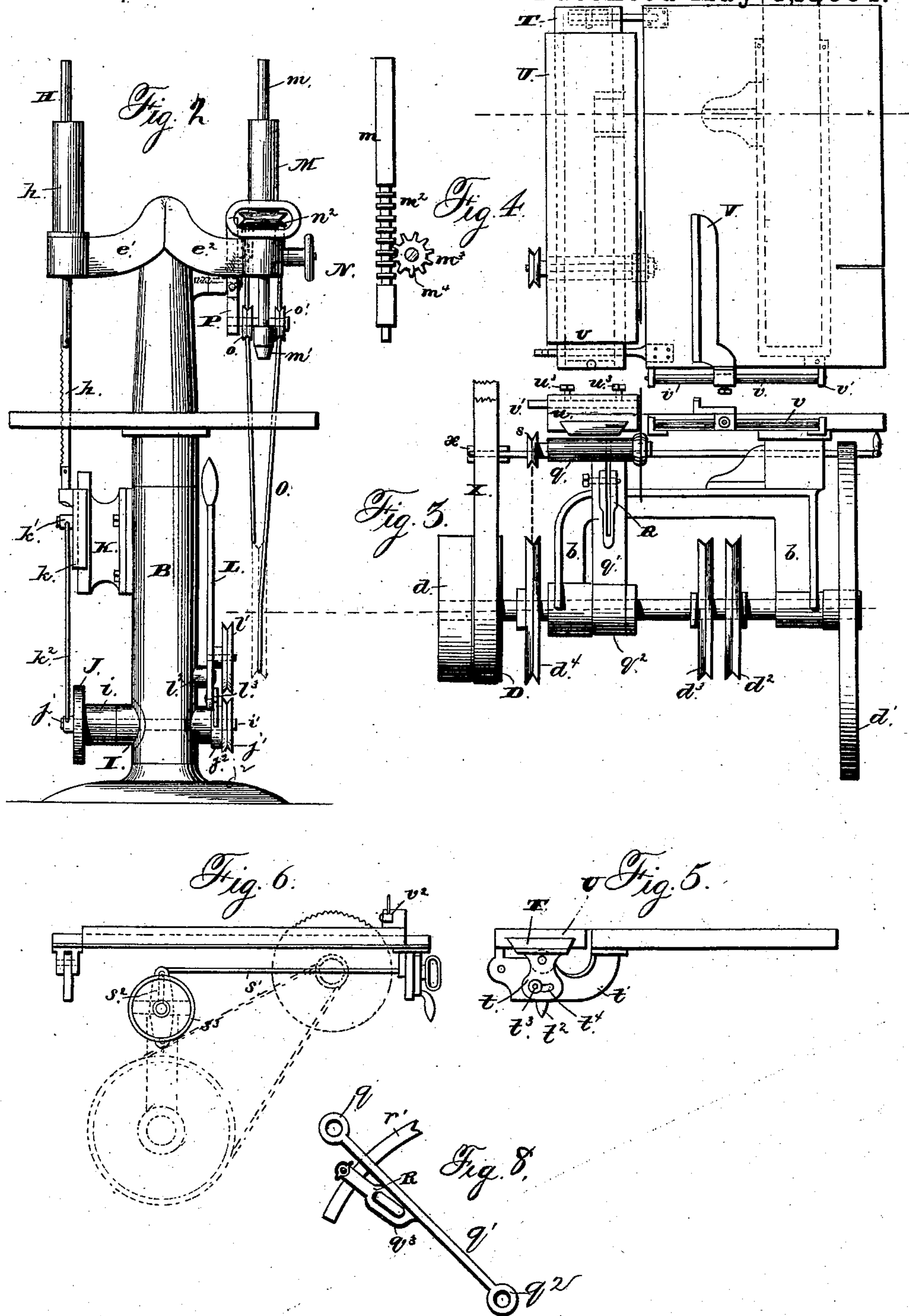
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Attorney



# UNITED STATES PATENT OFFICE.

AUGUSTUS BEAN, OF CONCORD, NEW HAMPSHIRE.

## UNIVERSAL JOINER.

SPECIFICATION forming part of Letters Patent No. 298,056, dated May 6, 1884.

Application filed January 26, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, AUGUSTUS BEAN, of Concord, in the county of Merrimac and State of New Hampshire, have invented certain new and useful Improvements in Universal Joiners; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in universal joiners, the object of the same being to provide a combination of those machines which are eminently useful in a pattern and cabinet shop, a further object being to so construct and combine the aforesaid machines as to furnish an effective and durable machine in each instance, and a combination which will afford economy in space, and can be furnished at a moderate price.

With these ends in view my invention consists in certain features of construction and combinations of parts, as will be fully described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a side view, in elevation, of the combination. Fig. 2 is an end view, showing jig-saw and boring mechanism. Fig. 3 is an end view, showing the main shaft and position of wheel, table, saw-mountings, &c. Fig. 4 is a plan view of table. Fig. 5 is a side view of bearings for saw-table. Fig. 6 shows the arrangement of the belt-tightener for the table-saw belt; Fig. 7, the safety-guard and supporting-arm over the saw-table; and Fig. 8 is a detached view, in side elevation, of the saw-supporting arm.

A represents the bed of the supporting-table, resting upon the column B at one end, and upon the legs C at the other. The main shaft *a* is journaled in the arms of a bifurcated depending bracket, *b*, which is rigidly secured to the bed A. The shaft *a* is provided at one end with the driving-pulley D and loose pulley *d*, and at the other end with the large pulley *d'*, rigidly secured thereon. The shaft *a* is further provided with the two grooved pulleys *d*<sup>2</sup> and *d*<sup>3</sup>, between the arms of the bracket *b*, and with the grooved pulley *d*<sup>4</sup>, between the driving-pulley and bracket-arm, all rigidly secured thereon. The supporting-table A is provided near the middle with the upwardly-

extending column E, terminating in the laterally-extending curved branches *e*, *e'*, and *e*<sup>2</sup>. This column is constructed of any suitable material, preferably of cast-iron. The branch *e* is provided with the upward hollow extension F, in which the standard *f*, supporting the large pulley G, is adapted to fit and slide. The hollow extension F is provided with a box, *f'*, secured to its lower end, which has a perforation, in which the stem of the screw *f*<sup>2</sup>, having the hand-wheel *f*<sup>3</sup> secured to its head, is adapted to fit and be held. The large pulley G is in the same plane and directly over the large pulley *d'*, and together they serve to operate the band-saw *g*, which connects them. The screw *f*<sup>2</sup> engages a threaded perforation in the standard *f*, and serves to tighten or loosen the saw *g* by raising or lowering the pulley G. The branch *e'* is provided at its end with a vertical perforation, through which the rod H, to the lower end of which the jig-saw *h* is attached, is allowed to slide, and a spiral spring encircling the rod H is held between the collar *h* and the upper surface of the branch *e'* within the hollow projection *h'*. The object of this spring is to keep a sufficient tension upon the saw *h* to admit of its being run at a high speed. The column B, which supports one end of the table A, is provided with a transverse perforation, I, near its foot, through which the elongated box *i* passes. The box *i* serves as a bearing for the shaft *i'*, on one end of which the pulley J, provided with the wrist-pin *j*, is rigidly secured, and on the other end the grooved pulley *j'* and friction-pulley *j*<sup>2</sup> are rigidly secured. The column B is further provided with the laterally-extending bracket K, bolted or otherwise firmly secured thereto. The outer face of the bracket is grooved to form a guide for the slide *k*, the upper end of the latter being provided with suitable devices for securing the lower end of the jig-saw *h*. The slide *k* is provided with the pivotal bolt *k'*, to which one end of the connecting-rod *k*<sup>2</sup> is secured, the other end of the said rod being secured to the wrist-pin *j*. The jig-saw *h* is operated by a band, *k*<sup>3</sup>, from the grooved pulley *d*<sup>2</sup> on the main shaft, passing around the grooved pulley *j'*. A combined belt-tightener and friction-brake consisting of the handle L, the cross-head *l*, and the grooved pulley *l'*, journaled



in one end of the cross-head, is pivoted at or near the middle of the cross-head to a laterally-extending stud,  $l^2$ , the latter being firmly secured to the column B above the box  $i$ . The cross-head  $l$  is provided with a wooden block,  $l^3$ , or other suitable device, at its lower end, adapted to engage the rim of the friction-pulley  $j^2$ . By moving the handle L in one direction, the grooved pulley  $l'$  presses on the band  $k^3$ , tightening the same, and causing the shaft  $i'$  to rotate and the jig saw to be reciprocated. By moving the handle L in the opposite direction, the band  $k^3$  is loosened, and the friction-block  $l^3$  is brought in contact with the pulley  $j^2$ , and the jig-saw quickly brought to a standstill. The branch  $e^2$  is provided at its end with the upwardly-extending perforated guide M, within which the spindle  $m$  fits, and is allowed a vertically-sliding motion. The spindle  $m$  is provided with a chuck,  $m'$ , at its lower end, to hold a bit or drill, and is cut away for a sufficient distance to form a series of rings,  $m^2$ , the latter being constructed to mesh with the teeth on the pinion  $m^3$ . The pinion  $m^3$  is secured on the short shaft  $m^4$ , the latter being journaled in perforations made in the end of the branch  $e^2$ , and provided with the hand-wheel N, secured on its outer end. The end of the branch  $e^2$  is cut away to receive the pinion  $m^3$ . The spindle  $m$  is further provided with a longitudinal groove to receive a spline or projection on the surface of the perforation made in the pulley  $n^2$ , to allow the latter to slide vertically on the spindle  $m$ . The guide M is cut away or provided with an open section, to receive the pulley  $n^2$ . The spindle  $m$  is caused to rotate with the pulley  $n^2$  by the spline engaging the groove. Motion is communicated to the spindle  $m$  by a band, O, from the grooved pulley  $d^3$ , which is led to the pulley  $n^2$  by two sets of double pulleys,  $o$  and  $o'$ , journaled in a bracket, P, secured to the column E. The feed and return of the bit or drill is regulated by the hand-wheel N, which turns the pinion  $m^3$ , the latter engaging the rings on the spindle and raising or lowering the same at pleasure, while the rotary motion of the spindle is not interrupted.

P is a T-shaped lever, pivoted at  $p$  to the standard E, and provided with a handle, by means of which the belt can be tightened as necessity demands. The head or cross arm of this lever is provided at its extremity with outwardly-projecting arbors  $o^2$ , on which the wheels  $o$   $o'$  are journaled. The belt O passes upwardly from its driving-wheel to the front of the lower pulley  $o$ , then over the said pulley to the rear of the upper pulley  $o'$ . From thence it passes around the pulley  $n^2$  back to the upper pulley  $o'$ , then around the rear of said pulley to the front of the lower pulley  $o$ , and from thence to the driving-wheel. The handle portion of said lever is provided with an elongated slot,  $p^2$ , through which the threaded end of a stud-bolt passes. This bolt enters the standard E, or a plate secured to the standard, and holds the lever rigidly in

position. By loosening the bolt, the lever can be moved so as to move the lower set of rollers  $o$   $o'$  toward the boring-tool, and the upper set away from the said tool. This tightens the belt, while the reverse movement of the parts loosens the same. The arbor of the circular saw Q is journaled in an elongated box,  $q$ , the latter being secured to the upper end of the swinging arm  $q'$ , while the lower end of the said arm terminates in the collar  $q^2$ , which embraces one of the boxes in which the main shaft is journaled. The swinging arm  $q'$  has a handle,  $q^3$ , for convenience in moving the arm. The arm  $q'$  is furthermore provided with the bifurcated bracket R, the sides of which are perforated—one threaded and the other not—to receive the thumb-screw  $r$ . A flat piece of metal,  $r'$ , or other suitable material, bent to form an arc, has one end secured to the table A, while the other end extends through the arm  $q'$  and between the jaws of the bracket R. By means of the thumb-screw  $r$ , the jaws of the bracket R are drawn together and caused to hug the arc  $r'$ , thereby holding the arm  $q'$  in any required vertical adjustment in the arc of the circle whose radius is the length of the arm  $q'$ . A rotary motion is communicated to the saw by a band, S, from the grooved pulley  $d^4$  passing around the grooved pulleys on the end of the saw-arbor. A horizontal rod,  $s'$ , provided with a handle at one end and pivoted to a movable arm,  $s^2$ , at the other end, is secured to the table A so as to admit of a limited sliding motion. The movable arm  $s^2$  is pivoted to the depending bracket  $b$ , and provided with the loose pulley  $s^3$ , mounted on a stud-bolt near the middle of the said arm. By pulling outward on the rod  $s'$ , the pulley  $s^3$  is pressed on the band S, thereby tightening the same and causing the saw to rotate. The rod, when shoved in, will release the pulley  $s^3$  from the band S, thereby loosening the band and allowing the saw to stop. The dovetailed rest T for the saw-table is provided with the bifurcated projections  $t$  on its under side, firmly secured to the rest. Between the jaws of these projections are pivoted the ends of the curved supporting-arms  $t'$ , the latter being firmly secured to the main table by bolts or other suitable means. One of the jaws of the projections  $t$  terminates in a handle,  $t^2$ , and is provided with a curved slot,  $t^4$ , through which extends a threaded stud,  $t^3$ , the latter being set in the arm  $t'$ . By means of a thumb-nut working on the stud  $t^3$ , the table is secured in any required rotary adjustment allowed by the slot  $t^4$ . A sliding table, U, is provided with a groove on its under side adapted to receive the dovetailed rest T. The table U is provided with a squaring-block,  $u$ . The latter has a groove along its face, in which the gage  $u'$ , held in place by the screws  $u^3$ , is adapted to slide. By tilting the saw-table and securing it in different adjustments, the several angles allowed by the length of the curved slot  $t^4$  can be sawed. On the other side of the saw from the tilting table a guide, V, is se-



cured. One end of this guide embraces the rod *v*, and is provided with a set-screw, by which the guide is held in lateral adjustment on the rod. The said rod is secured transversely to the main table in the upwardly-extending ears *v'*. By means of this guide, boards may be sawed of any required width within the limits of the table. The saw-guard *W* is a hollow semi-cylindrical case, made sufficiently large to cover the portion exposed above the table of the largest saw used. This shield or guard *W* is preferably made of thin cast metal, and is provided with a laterally-extending projection, *w*, which fits in a sleeve, *w'*, in the end of the horizontal arm *w<sup>2</sup>*. The arm *w<sup>2</sup>* is provided with the vertical socket *w<sup>3</sup>*, which is adapted to slide on the upright standard *w<sup>4</sup>*, the latter being firmly set in the table-bed *A*. By means of set-screws in the said socket and sleeve, the guard *W* may be held in the required vertical or limited rotary adjustment. The object of this guard is to prevent the dust and chips from being thrown into the face and eyes of the operator, and thus prevent annoyance and injury. Power is communicated to the entire machine by a belt, *X*, from a counter-shaft passing around the driving-pulley *D* on the main shaft *a*. When it is desired to stop the machine for any purpose, the belt *X* is shipped onto the idle or loose pulley *d* by means of the shipper *x*. The handle *x'* of the shipper *x* is within easy reach of the operator when standing in front or on the band-saw side of the machine.

It will be seen from the foregoing description that I have secured in this combination an improved adaptation of the several machines described, and brought them within the reach of the man of moderate means. This combination, moreover, is not limited to the four uses mentioned, as, for example, a rotary cutter of any required design may be put in the place of the circular saw, or a cutter set in the chuck on the spindle to form a groove in boards passed under it.

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

1. The combination, with a jig-saw operated by a revolving shaft, a friction-wheel and a pulley secured to said shaft, and a belt, of a lever pivoted at its lower end, provided with a cross-head, a friction-block secured to said cross-head and adapted to bear against the friction-wheel, and a belt-tightening wheel mounted at the opposite end of said cross-head and

adapted to be forced against the belt, substantially as set forth.

2. In a universal joiner, the combination, with a circular saw mounted in a swinging frame, of a curved arm secured to the table-bed of the universal joiner, and devices for locking the swinging saw-frame to the curved arm in a limited rotary adjustment, substantially as set forth.

3. In a universal joiner, the combination, with a circular saw mounted in a swinging frame, and a curved arm secured to the supporting-frame of the universal joiner, of a clamp secured to the swinging frame and constructed to embrace the said curved arm, and thereby lock the swinging frame in a limited rotary adjustment, substantially as set forth.

4. In a universal joiner, the combination, with a circular saw adjustable in the arc of a circle, and operating mechanism, of a tilting table provided with a downwardly-extending slotted plate, and devices for moving and holding the table in a limited rotary adjustment, substantially as set forth.

5. The combination, with a circular saw adjustable in the arc of a circle, and suitable operating mechanism, of a laterally-tilting and longitudinally-sliding table situated alongside of the saw, substantially as set forth.

6. The combination, with a circular saw adjustable in the arc of a circle, of a laterally-tilting and longitudinally-sliding table situated on one end of the saw, and a stationary table situated on the opposite side of the saw, substantially as set forth.

7. In a universal joiner, the combination, with a table supporting the main shaft, of a column or standard supported on the table and terminating in three horizontal branches, which latter support, respectively, a band-saw, a jig-saw, and a boring-tool, substantially as set forth.

8. The combination, with a table and a shaft journaled thereto, of the column *E*, having three horizontal branches, *e*, *e'*, and *e<sup>2</sup>*, which support, respectively, the band-saw, the jig-saw, and boring-tool, the said saws and boring-tool being operated by the shaft, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

AUGUSTUS BEAN.

Witnesses:

FRED H. GOULD,  
NATHANIEL E. MARTIN.