

No. 656,180.

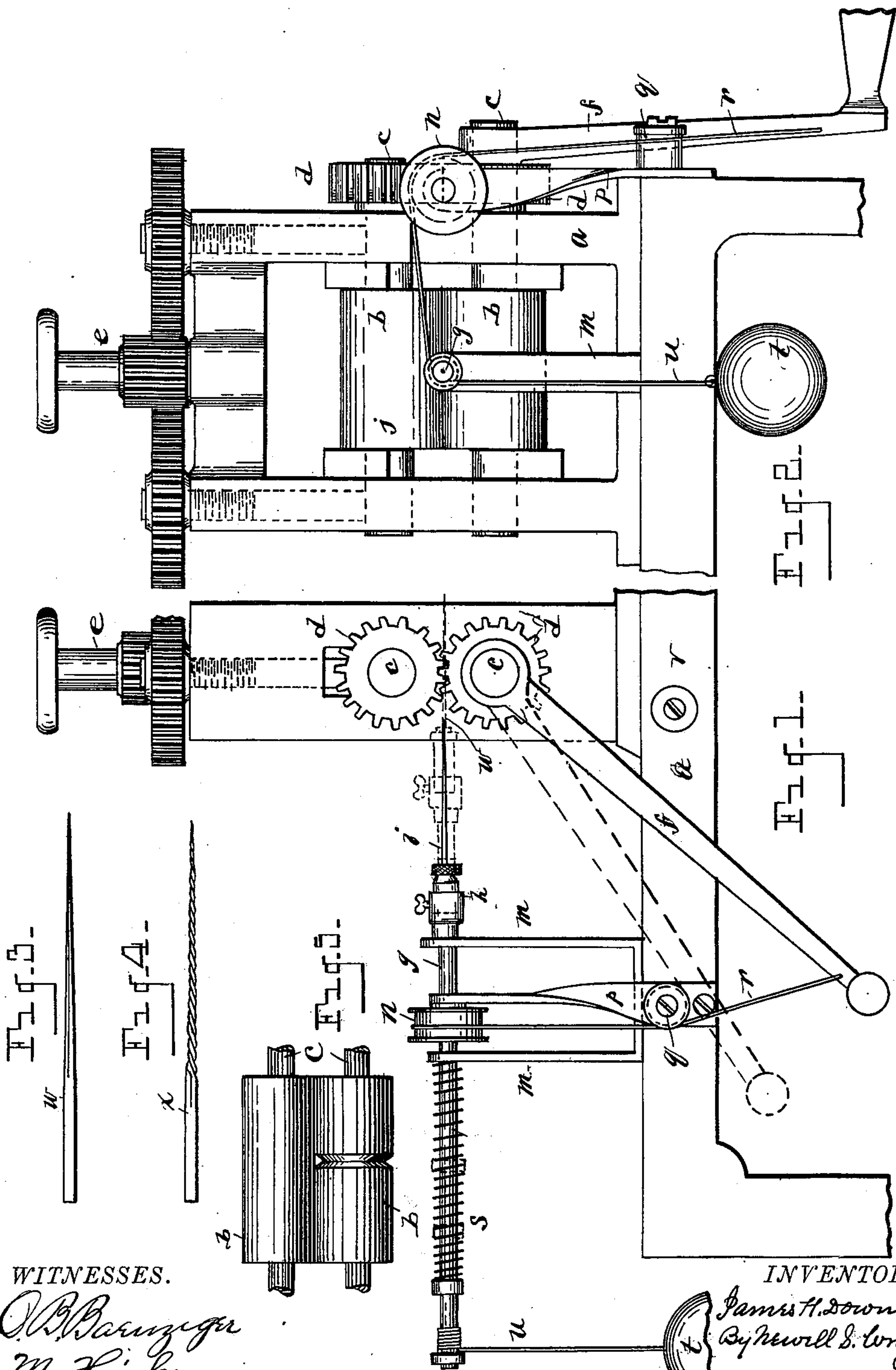
Patented Aug. 21, 1900.

J. H. DOWNIE.

MACHINE FOR MANUFACTURING NERVE BROACHES, &c.

(Application filed May 25, 1900.)

(No Model.)



WITNESSES.

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# UNITED STATES PATENT OFFICE.

JAMES H. DOWNIE, OF DETROIT, MICHIGAN.

## MACHINE FOR MANUFACTURING NERVE-BROACHES, &c.

SPECIFICATION forming part of Letters Patent No. 656,180, dated August 21, 1900.

Application filed May 25, 1900. Serial No. 17,924. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES H. DOWNIE, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Machines for the Manufacture of Nerve-Broaches and Canal-Reamers; and I 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, reference being had to the accompanying drawings, which form a part of this specification.

My invention has for its object the production of a machine for the manufacture of nerve-broaches and canal-reamers for dental purposes; and it consists of the construction, combination, and arrangement of devices hereinafter described and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a view in side elevation. Fig. 2 is a view in vertical section. Fig. 3 is a detail view of a blank from which the broach is formed by said machine. Fig. 4 is a view of a completed broach manufactured by said machine. Fig. 5 is a detail view in elevation showing a modification in the construction of the rolls.

The object of my invention more particularly is to provide a machine for constructing a twisted nerve-broach and canal-reamer from a suitable blank formed from a piece of wire or other suitable metal, the wire being first flattened in the machine at one end thereof, the flattened end of the wire then being twisted to form the completed broach or reamer.

In the drawings, *a* represents any suitable supporting-frame.

*b b* represent any suitable rolls, the shafts *c c* of which are journaled in the frame *a*, said shafts being provided at one end with gears *d d*, meshing the one with the other. Any suitable means may be provided for setting the rolls to a desired distance the one from the other—as, for example, a screw *e*. Any suitable rolls may be employed in carrying out my invention. Upon the shaft of one of the rolls is a lever or handle (indicated at *f*) for operating the rolls.

To twist the blank to form the broach or

reamer, I employ a twisting-shaft *g*, provided with any suitable clutch or device (indicated at *h*) to engage a broach or reamer holder, (indicated at *i*.) The shaft is reciprocatory through an auxiliary supporting-frame *m*, the shaft being also rotatable in said auxiliary frame. A pulley *n* is supported upon a standard *p*, secured to the frame *a*, an additional pulley *q* being also employed. A cord is connected at one end with the lever or handle *f* and is led over the pulleys *q* and *n* and engaged upon the shaft *g*, so as to be wound upon said shaft and unwound therefrom as the handle or lever *f* is oscillated in one direction and the other.

Upon the shaft *g* is a tension-spring *s*, its tension being exerted to retract the shaft in a direction away from the rolls. A weight *t* is connected by a cord *u* with the outer end of the shaft *g*, the cord *u* winding upon the shaft *g* and unwinding therefrom as said shaft is rotated. The oscillation of the lever or handle *f* may be limited in any desired manner, as by the roll *q* and a stop *v*.

A blank from which the broach or reamer is constructed is indicated at *w* and a completed tool at *x*. The blank *w* is preferably squared and tapered at one end before being put into the machine.

The operation of the device is as follows: The blank *w*, inserted in a holder *i*, is first drawn in between the rolls by proper movement of the lever or handle *f*, as by an upward movement of said lever. This movement of the blank in between the rolls flattens the squared and tapered end of the blank as the end of the blank is drawn in to a desired distance between the rolls. For given sizes of broaches the blank is flattened to a uniform thickness. The shaft *g*, with its clutch or analogous device *h*, is then advanced toward the rolls and engaged with the holder *i*. This may be done by simply forcing forward the shaft *g*. An opposite movement of the lever *f* will obviously reverse the direction of the rolls, causing the movement of the blank in a direction away from the rolls. At the same time the cord *r* is unwound from the shaft *g*, causing a rotation of the shaft, thereby twisting the flattened end of the blank *w* to form the completed tool. It will be obvious that while the shaft *g* is being rotated the flattened end of



the broach is held firmly in position between the rolls, so that as the flattened blade of the blank moves outward from between the rolls it is being twisted, the twisting being continuous until the outer extremity of the blank leaves the rolls. At the same time the spring *s* retracts the shaft *g*, corresponding to the outward movement of the blank, thereby preventing the blade of the tool from buckling.

It will be evident that as the lever *f* is moved in one direction the cord *u*, connecting the weight *t* with the shaft *g*, is wound thereupon, and vice versa. The construction and operation of the machine will now be readily understood. It will be seen that as the lever *f* is forced upward no rotation is given thereby to the shaft *g*, and the cord *r* would thereby be slack but for the weight *t*, the cord *u* being wound upon the shaft *g* in a direction reverse to the winding of the cord *r*. The weight *t* thereby serves to wind the cord *r* upon the shaft *g* as the lever *f* is moved upward. It will be evident, furthermore, that the twisting of the blade of the blank begins at the inner end of the flattened portion thereof, and as the blank is fed out of the rolls a uniform twisting is given to the tapered end of the tool, said end being twisted as it comes out of the end of the rolls. It will be seen also that the tool as it is fed out from the rolls is absolutely straight. While I have described a tool squared before its introduction between the rolls and a flattening of the tapered end of the tool as it is fed into the rolls, I do not limit myself solely thereto, as the blank may be of other forms, if desired.

In Fig. 5 I have shown one of the rolls formed with a V-shaped annular recess, whereby the rolls are adapted to twist a three-sided blade, and I contemplate such a construction as coming within the scope of my invention. Other forms of blades may also be twisted in a similar manner by my invention.

What I claim as my invention is—

1. A machine for manufacturing a dental implement embodying in combination a pair of rolls to flatten a blank from which the implement is formed as it advances between the rolls, a reciprocatory twisting-shaft, means to engage a blank with the shaft, and means to simultaneously rotate said shaft and said rolls as the blank recedes from the rolls.

2. A machine for manufacturing a dental implement embodying in combination a pair

of rolls to flatten a blank from which the implement is formed as it advances between the rolls, a reciprocatory twisting-shaft provided with means for engaging a blank therewith, a lever or handle connected with one of said rolls to actuate the rolls, and a cord connecting said lever or handle with said shaft to simultaneously rotate said shaft and said rolls as the blank recedes from the rolls.

3. A machine for manufacturing a dental implement embodying in combination a pair of rolls, a lever or handle for rotating one of said rolls, gears upon the shafts of said rolls meshing the one with the other, a rotatable and reciprocatory twisting-shaft provided with means for engaging a blank therewith, means to simultaneously rotate said twisting-shaft and said rolls, said twisting-shaft provided with a tension device.

4. A machine for manufacturing a dental implement embodying in combination a pair of rolls geared one with the other, a handle or lever for operating said rolls, a twisting-shaft provided with means for engaging a blank therewith, a support for said twisting-shaft through which said shaft is reciprocatory, means to simultaneously rotate said shaft and said rolls, and a weight provided with a cord connecting the weight with said shaft.

5. A machine for manufacturing a dental implement embodying in combination a pair of rolls geared the one with the other to flatten a blank from which the implement is formed as it advances between the rolls, a lever or handle to operate said rolls, a reciprocatory twisting-shaft provided with means to engage a blank therewith, and a cord connecting said lever or handle with said shaft to simultaneously rotate said shaft and said rolls as the blank recedes from the rolls.

6. A machine for manufacturing a dental implement embodying in combination a pair of rolls arranged to receive a blank therebetween and flatten it as the rolls are rotated in one direction, and means to twist said blank as the rolls are rotated in the opposite direction.

In testimony whereof I sign this specification in the presence of two witnesses.

JAMES H. DOWNIE.

Witnesses:

N. S. WRIGHT,  
M. HICKEY.