No. 869,928. PATENTED NOV. 5, 1907.

R. McCARTY.

SCREW CUTTING MACHINE.

APPLICATION FILED JAN. 28, 1905.

2 SHEETS—SHEET 1.

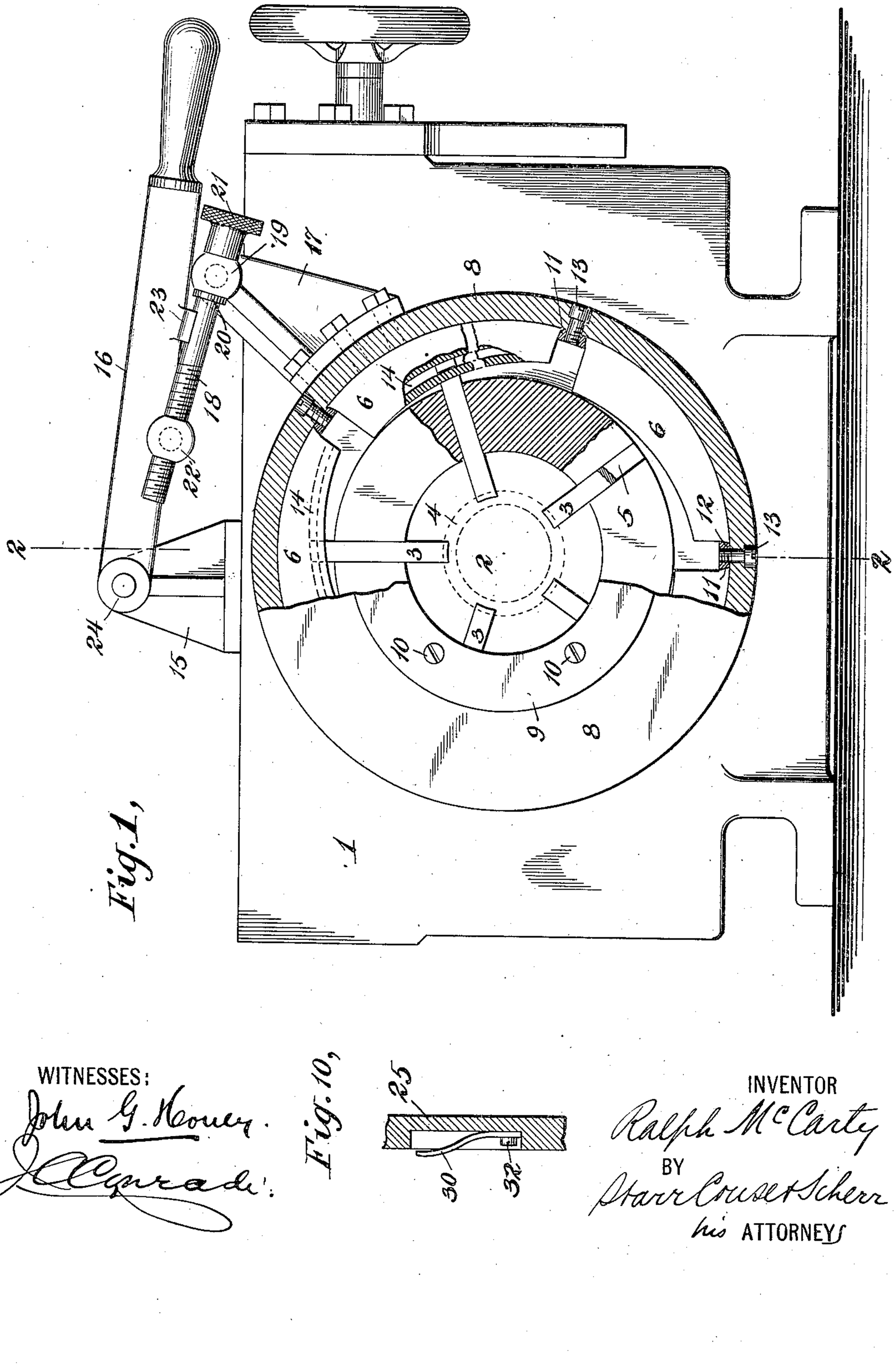

Fig. 1,

Fig. 10,

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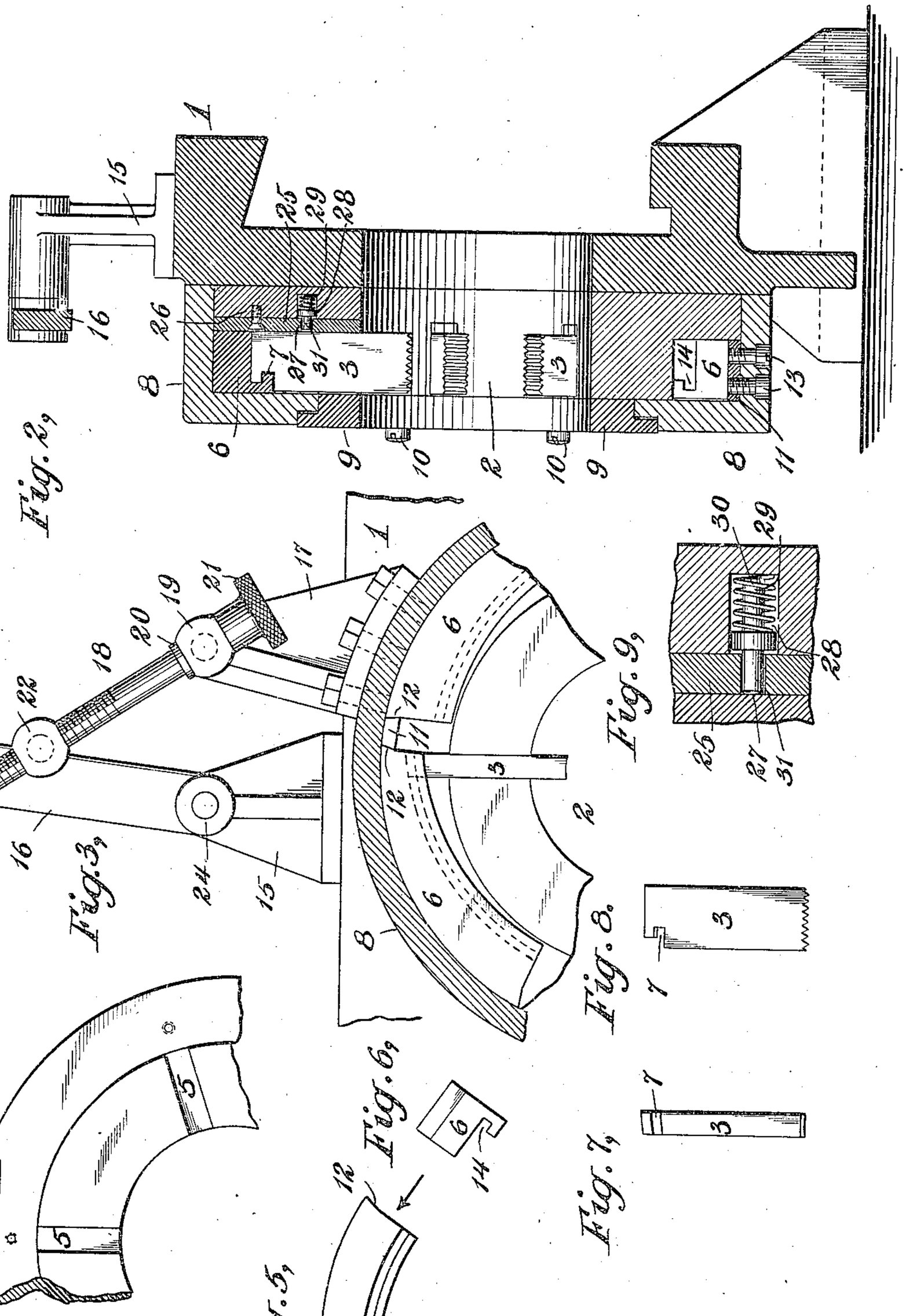

Fig. 2.

Fig. 3.

Fig. 9.

Fig. 4.

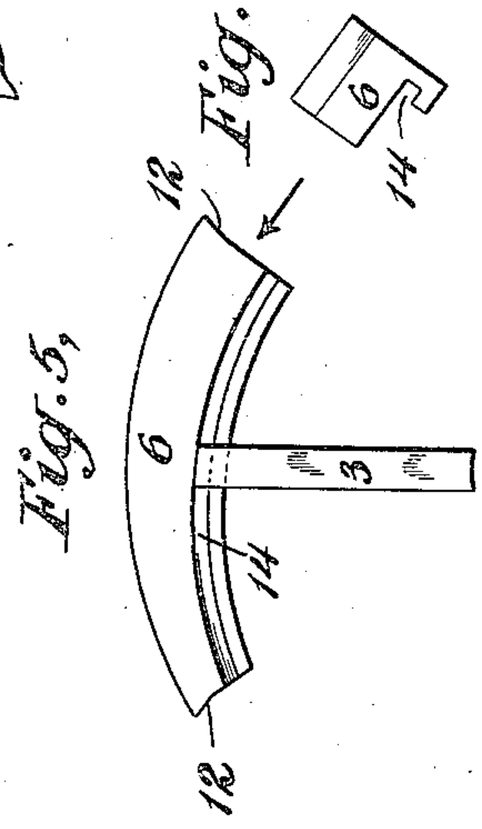

Fig. 5.

Fig. 8.

Fig. 7.

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SCREW-CUTTING MACHINE.

No. 869,928. Specification of Letters Patent. Patented Nov. 5, 1907.

Application filed January 28, 1905. Serial No. 243,083.

To all whom it may concern:

Be it known that I, RALPH MCCARTY, a citizen of the United States, and a resident of Lebanon, Pennsylvania, have invented certain new and useful Improvements in Screw-Cutting Machines, of which the following is a specification.

My invention comprises an improved cam-ring construction in screw-cutting machines and improvements in the cam-ring operating mechanism, as well as improvements in features of construction relating to the die-head.

In the accompanying drawings, Figure 1 is a view partly in elevation and partly in section, of the die-head of a pipe threading machine embodying my improvements, some of the parts being broken away. Fig. 2 is a vertical section of Fig. 1 along the line 2—2. Fig. 3 is a view like Fig. 1, except that the cam-ring operating mechanism is shown in raised position. Fig. 4 is a front elevation of a portion of the die-head, showing the die slots therein. Fig. 5 is a perspective view of a cam showing a die assembled therewith. Fig. 6 is an end view looking in the direction of the arrow at the cam in Fig. 5. Fig. 7 is an elevation of the notched side of a die. Fig. 8 is a perspective view of a die. And Fig. 9 is an enlarged view of the die supporting mechanism shown smaller in Fig. 2.

In the drawings the same reference characters designate corresponding parts throughout.

Describing, now, the drawings, which, it should be stated, illustrate only some of the forms within the spirit of my invention which my improvements may take, they show my improvements applied to a pipe threading machine having a stationary die-head 1 with the usual central opening 2, into which the dies 3 project, and through which the pipe 4 to be threaded is fed. This die-head is provided with radial slots 5, which are adapted to receive the dies, and to allow same to be reciprocated therein by the action of the cams 6, which engage notches 7 in the dies. These cams are carried by the cam-ring 8, which is rotatably mounted on the die-head, being held thereon by the face plate 9, which is secured stationarily to the die-head by the screws 10. The aforesaid cams 6 are non-integral with the cam-ring and (see Fig. 1) are circumferentially arranged on the inside thereof, being held rigidly in place by the wedges 11 located between adjacent cams and engaging the beveled ends 12 thereof and being adapted to force the cams snugly against the ring when the wedges are drawn in by the screws 13.

By making the cams nonintegral with the ring, instead of casting the whole in one piece, important advantages are secured, among others, that the cams can be made in the form of steel castings or forgings or out of malleable iron and then case-hardened. Since this is out of the question when the cams and the cam-ring are cast in one piece, it follows that by my improvement I am enabled to get more even wear and far greater life out of the cams. Moreover, it is found in the use of pipe-threading machinery that the cams at the bottom of the die-head wear much more rapidly than the others, and thereby allow the dies which they support to escape doing the work which they should do, and by throwing the burden on the remaining dies soon wears them out. This condition of affairs in case the lower cams were badly worn would require the ring in which the cams were integral to be thrown away, or in case these cams were only partially worn, would at least require that the ring be shifted so that the bottom cams were moved to the top, all necessitating much machine work and very likely re-fitting of the parts. With my improvement, however, it is obvious that any or all of the cams can be either entirely replaced or else shifted into new positions by the simple expedient of loosening up the wedges and in a moment removing the cams from the ring.

It will be noted that the means shown, for securing the cams to the ring is far preferable to securing the cams by screws let into them through the cam-ring, since this would require great care in the placing of the screw holes and absolute uniformity both in this particular and in the size of the cams, otherwise the parts would not be interchangeable and replaceable at random, without refitting and machine work. By using the wedging means shown, no such care or uniformity is required, because even should, for example, some of the cams be a little longer than they should be, the wedges will take care of this, and the only effect will be that the wedges, or some of them, cannot be drawn so closely against the ring.

Referring now to Fig. 1, it will be noted that the cam grooves 14 are so disposed that the dies will be pushed out of the die-head by a clockwise rotation of the cam-ring, whereas they will recede into it by rotation in the reverse direction. It is in this reverse direction that the cam-ring tends to rotate when pipe is being threaded, due to the natural thrust of the pipe on the dies. It is consequently necessary not only to provide means for rotating the cam-ring and consequently for reciprocating the dies into and out of their working positions, but also to lock them in these positions by means able to resist this thrust and tendency of the dies to rotate the ring out of its working position. Moreover, it is necessary to provide means for adjusting the degree of rotation of the cam-ring, in order that the dies may be projected to greater or less distances towards the center of the die-head. This is necessary, first, to accommodate the machine to thread different diameters of pipes, and, secondly, because as the dies become shorter and shorter due to repeated sharpenings, it is obviously necessary to rotate the cam-ring correspondingly further and further to the right, in order to project the shortened dies to the required distance into the center of the die-

head. The mechanism which I have devised for accomplishing these purposes of moving the cam-ring and the dies into and out of working position, and of locking same in that position, and of adjusting the degree of rotation of the cam-ring and consequently the degree of projection of the dies, will now be described. This comprises a bracket 15 secured to the die-head, and to which the lever 16 is pivoted at 24; also the bracket 17 secured to the cam-ring and rotating therewith, and to which is secured the threaded rod 18 by means of a swivel connection 19; the threaded rod being rotatably mounted in said swivel connection and secured against endwise motion therethrough by means of the collar 20, in conjunction with the head 21. The lever and the rod are operatively connected by means of the swivel nut 22 secured to the lever, the internal threads in said nut engaging the threads on the end of the rod. An abutment 23 is provided on the lever which is arranged to engage the rod and to prevent further relative motion of the lever towards the rod when the three pivotal connections 19, 22 and 24 are in alinement.

It will be evident that by operating the lever in one direction or the other, that the cam-ring will be rotated either towards the right or the left to control the position of the dies. Also, that by forcing the lever down so that its abutment 23 rests on the rod, the cam-ring will be locked against accidental opening while the machine is in operation, because all three pivots being in line, the tendency of the cam-ring to rotate to the left due to the thrust of the dies will have no leverage to raise the lever. Moreover, it will be further evident that by screwing the threaded rod in one direction or the other, the distance between the pivotal connections 19 and 22 can be varied at will, and consequently the degree of rotation of the cam-ring and the distance of projection of the dies into the die-head regulated. One of the features of this mechanism is that the three pivots remain alined for all possible positions of adjustment of the cam-ring and dies. Another feature is that the operating end of the lever and the adjusting means for varying the degree of rotation of the cam-ring, are both conveniently located on the same side of the machine, the operator throwing the lever down until its abutment strikes the threaded rod and then if he desires to vary the position of the cam-ring is able to rotate the threaded rod without changing his position. It should be stated that it is not essential that the three pivotal connections 19, 22 and 24 should be in positions of absolute alinement when the cam-ring is locked. Thus, for example, a substantial alinement will be sufficient where the center of the middle pivot 22 is located slightly below a straight line joining the centers of the pivots 19 and 24. This, however, should not be carried too far, because it will be seen to have the effect of rotating the cam-ring slightly to the right before it takes on its ultimate rotation to the left as the lever is raised from its position of abutment, this having the bad effect of driving the dies further into the pipe the instant before they are withdrawn, and, of course, damages them.

Describing, now, another feature of my present improvements, I have provided in the bottoms of the die-slots, plates 25, preferably of hardened steel, secured in place by the screws 26. Each of these plates is perforated at 27, and recesses 28 corresponding in position to said perforations are let into the die-head. In each of these recesses is located a spring pressed plunger 29, the head 31 of which extends through the perforation in the hardened plate, and, consequently, presses against the dies located in the slots. The purpose of this device is that it makes it impossible for the dies to drop out of the slots, even when the cams are rotated so far as to disengage the dies from the cam-slots, and is a desirable feature, when, for instance, it is desired for any reason to remove one or more of the dies without removing the others.

A modification of the aforesaid die-supporting-mechanism is shown in Fig. 10, and comprises a flat spring secured in a recess in one of the walls of the die-slot,—for example, in the hardened plate 25,—which spring is arranged to press against the die and thereby support it in the die-slot.

Having thus described my improvements, what I believe to be new and desire to claim is:

1. In a screw-cutting machine, the combination of a cam-ring, a plurality of cams arranged circumferentially in the interior of said ring and removably secured thereto, the ends of said cams being beveled; and wedges adapted to be secured to the ring and disposed between and adapted to engage the beveled ends of the cams to secure said cams to the ring.

2. In a screw-cutting machine, a die-head provided with die-slots having recesses formed in the bottoms thereof, plates secured to the bottoms of said slots and provided with perforations corresponding with the recesses in the die-head, dies located in the die-slots, and spring pressed plungers located in said recesses and adapted to extend through said perforations in the plates to yieldingly press against the dies.

3. In combination, a die; a rotary cam adapted to control said die; a lever secured to a stationary part by a pivot; said stationary part; an intermediate pivot on the lever located between its first named pivot and its free-end; a stop on the lever between its intermediate pivot and its free end; an arm pivotally connected with the lever by the aforesaid intermediate pivot and with the rotary cam by a pivot which is in substantial alinement with the pivot of the lever and its intermediate pivot when the lever has been depressed until its stop abuts against the top of the arm; and adjusting means adapted to vary the length of said arm between its respective pivotal connections with the lever and with the rotary cam.

4. In combination, a die; a rotary cam adapted to control said die; a lever secured to a stationary part by a pivot; said stationary part; a screw-threaded swivel-nut on the lever located between its said pivot and its free-end; a stop on the lever between its screw-threaded swivel-nut and its free-end; a rod screw-threaded at one end to engage the threads of the screw-threaded swivel-nut and pivotally connected thereby with the lever; a plain swivel-nut connection between the rod and the rotary cam adapted to receive the unthreaded end of the rod and permit rotation of the rod within it, and constituting a pivotal connection between the rod and the rotary cam which is located in substantial alinement with the pivot of the lever and the pivot of the screw-threaded swivel-nut, when the lever has been depressed until its stop abuts against the top of the rod; and means adapted to prevent longitudinal motion of the rod through the plain swivel-nut.

5. In combination, a cam-ring; a plurality of cams secured against the interior of the ring by wedges located between the cams; said wedges; and securing means between the wedges and the ring.

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

RALPH McCARTY.

Witnesses:
HARRY H. SHUCKER,
LEIGHTON F. KRUM.