To all whom it may concern:

Be it known that I, JOSEPH MELLING, a citizen of the United States, residing at Jackson, county of Jackson, State of Michigan, have invented a certain new and useful Improvement in Apparatus for Turning Irregular Forms, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to apparatus for turning irregular forms and a special object of my improvements is to provide an improved apparatus for turning the cans on the valve-actuating shaft of an internal combustion engine.

In the accompanying drawings:

Fig. 1 is a side elevation of an apparatus embodying my invention.

Fig. 2 is a plan of the same partly broken away.

Fig. 3 is a front elevation looking from the left of Fig. 1, parts being broken away as indicated by the broken line III—III.

Fig. 4 is a section in the plane indicated by the line IV—IV, Fig. 3.

a is the bed or frame of the apparatus. Rising from the upper portion of the frame a are guide plates b and a standard c. There is a number of pairs of parallel guide plates b as indicated distinctly in Figs. 2 and 3.

Between each pair of guide plates b is a reciprocating carrier d. d is a spring one end of which engages against the upper end of the standard c and the other end against a carrier d. d is a hanger integral with and extending downward from the carrier d. e is a friction wheel bearing in the lower end of the hanger d.

j is a tool holder pivoted at j upon a carrier d and extending in front of said carrier. j is a similar tool holder pivoted at j to the carrier d and similarly extending in front of said carrier. p are the tools held in the holders j and j. p is a connecting rod pivoted at p to the upper tool holder p and at p to the lower tool holder p. q is a friction wheel on the lower end of the connecting rod p.

103 p indicates a carriage adapted to reciprocate transversely of the base or frame a, into which it is dovetailed for that purpose, in front of the carriers d. p is a screw-threaded rod having a screw that may be turned by a handle p to move the carriage p in its ways. r and r are rods extending through the holders r and r. The shafts s, s are adapted to have cams s cut and formed thereon by the operation of the apparatus. The tools p, p are held and adjusted by the apparatus to shape the cans to their proper form.

105 f is a cam adapted to act upon the friction wheel e, in conjunction with the spring d, to reciprocate the carrier d. g is a gear wheel on the same shaft as the cam f. h is a gear wheel upon the power-receiving shaft h, its teeth engaging the teeth of the gear wheel g. i is a cam of approximately the shape indicated, its active surface engaging the friction wheel g at the lower end of the connecting rod f.

110 k is a gear wheel adapted to rotate the shaft s, its teeth engaging the teeth of the gear wheel h. n is a gear wheel adapted to rotate the shaft s. m is an intermediate wheel engaging the teeth of both the wheels k and n.

The operation of the above described device is as follows:

Power is applied to rotate the shaft h by means of a belt and pulley or otherwise. The motion of the shaft h is conveyed to the cam f and the shafts s and s through the gearing above described. The cam f now acts in conjunction with the spring d to reciprocate the carrier d. The cam i acts in conjunction with the spring d to reciprocate the connecting rod f and thereby to oscillate the tool holders j and j about their bearings f and f. In this way the motions imparted by the cams f and i to the tools f, f always holds said tools in the proper cutting position and cause them to properly and accurately shape the cans upon the cam shafts.

I have shown the tool holders and apparatus for working upon two shafts s and s at the same time; of course only one might be operated upon.

I have also shown a plurality of carriers d with their appurtenants for cutting a plurality of cans upon the same shaft.

The above construction brings the cam i close to the tool so that there is substantially
no lost motion between the tool and the cam. The force exerted upon the tool is mostly conveyed to the cam without being transmitted to the cam or parts secured thereon. The two tool holders, one arranged above the other, are directly connected so that they move in unison and the connections are strong and rigid so that the positions of the tools are certain under all working conditions.

The cam is of a simple form involving no sharp changes of direction, or great rate of acceleration of the actuated parts.

Claims:
1. In an apparatus of the kind described, a carrier adapted to be reciprocated, a pair of tool holders supported by said carrier, said holders having a freedom of motion independent of that of the carrier, means connecting said tool holders to constrain the relative movements of the same, a rotary work holder disposed within operable relationship of each tool holder.
2. In an apparatus of the kind described, a carrier adapted to be reciprocated, a pair of tool holders supported by said carrier having an oscillating motion independent of that of the carrier and at an angle to the motion of the carrier and a connecting rod pivoted to each tool holder to impart oscillating movement thereto, and a work holder disposed within operable relationship of said tool holders.
3. In an apparatus of the kind described, a carrier adapted to be reciprocated, a plurality of tool holders pivoted to said carrier, a connecting rod pivoted to each of said tool holders, a cam to reciprocate the carrier, a cam to reciprocate the connecting rod to oscillate the tool holders about their pivots in a direction at an angle to the movement of the carrier, and a work holder disposed within proximity of each tool holder to support a piece of work within operable relationship thereof.
4. In apparatus of the character described, a spring-constrained carrier, a cam to cooperate with the spring to reciprocate the carrier, a plurality of tool holders pivotally supported by the carrier for oscillating movement angularly the movement of the carrier, cam-controlled means to simultaneously oscillate said tool holders, a rotatable work support for each tool holder disposed to support a piece of work within operable relationship thereof.
5. In apparatus of the character described, a movable carrier constrained in a given direction by a spring, a cam to actuate said carrier against the resistance of the spring to cause in co-operation with the spring reciprocation of the carrier, a plurality of tool holders pivotally supported by the carrier, a cam-controlled member to simultaneously oscillate said tool holders angularly the direction of travel of the carrier, a work holder for each tool holder disposed to support a piece of work within operable relationship thereof.

In testimony whereof, I sign this specification.

JOSEPH MELLING.