H. K. PORTER.

MECHANICAL MOVEMENT.

No. 186,016. Patented Jan. 9, 1877.

FIG. 1

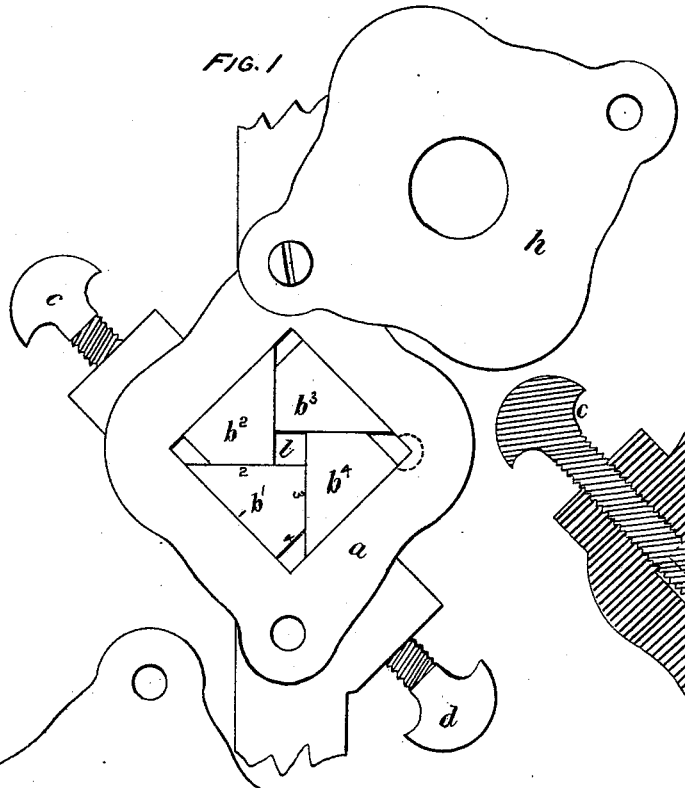


FIG. 3

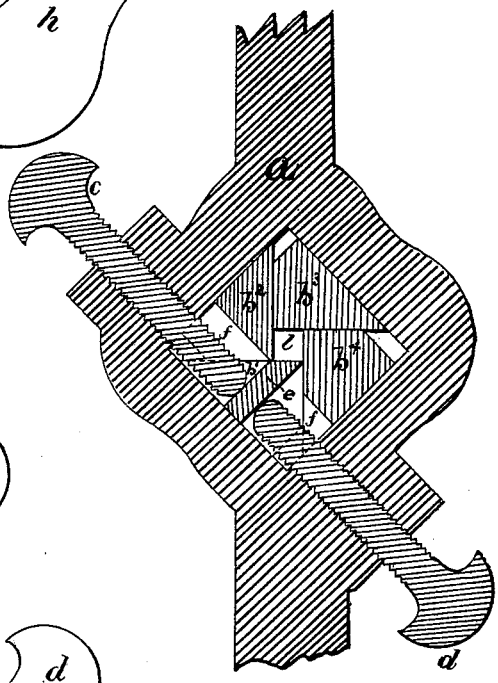


FIG. 2

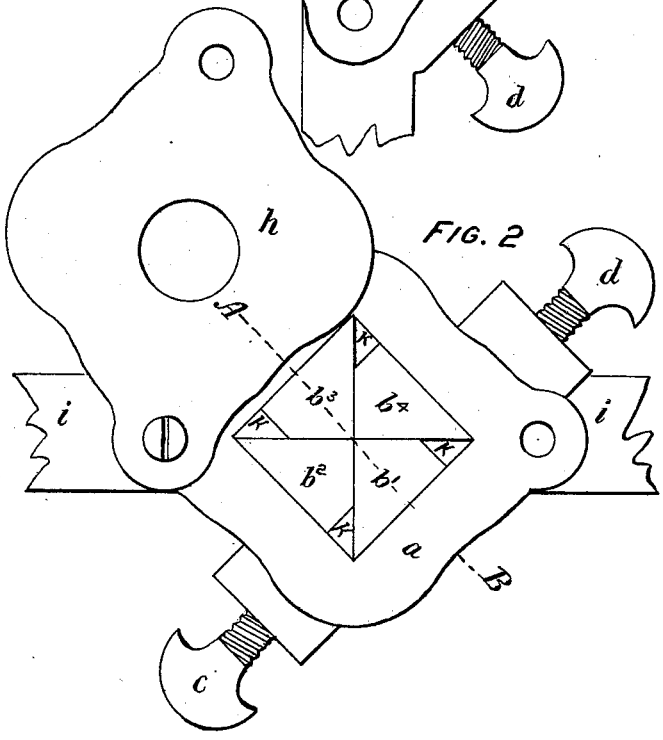
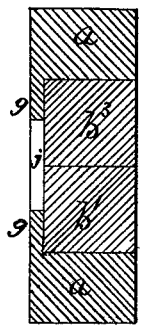


FIG. 4



WITNESSES.

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HENRY K. PORTER, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN MECHANICAL MOVEMENTS.

Specification forming part of Letters Patent No. **186,016**, dated January 9, 1877; application filed May 31, 1875.

To all whom it may concern:

Be it known that I, HENRY K. PORTER, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Mechanical Movement, of which the following is a specification:

The object of my invention is to provide a device, tool, or machine, having a series of triangular slides, the sum of whose central angles is equal to three hundred and sixty degrees, all being arranged to move together tangentially, and having always a common and unvarying center with solid boundaries, whereby a variable central aperture of corresponding sides may be had.

The invention is illustrated in detail in the accompanying drawings, as embodied in a tap-wrench formed with four of said slides.

Figure 1 is a top or plan view, and showing the dies partially opened. Fig. 2 is a similar view, showing the dies closed. Fig. 3 is a horizontal section taken through the axes of the actuating-screws. Fig. 4 is a transverse section taken on line A B, Fig. 2.

In the drawings, *a* is the frame, having a recess or internal space, with four equal sides, in which are inserted the dies *b*, each of which is formed with the four sides 1 2 3 4—line 1 bearing against frame *a*, lines 2 and 3 acting against two of the dies, and line 4 serving as a stop when the dies are fully expanded; and the limit of expansion is governed by the location of line 4 relatively between the points of intersection of lines 1 and 2 and 1 and 3.

The actuating-screws *c d* are threaded in the frame *a*, as shown in Fig 3, their points acting against the seat *e*. (Shown in die b^1, Fig. 3.) The dies or slides b^2 and b^4 are shown in this figure as having spaces *f f* cut in them to allow their moving past the screws *d e*. *g g* represents a flange or plate formed upon the frame, and upon which the dies rest. *h* is a cap shown partly removed, and which, when in position, holds the dies in place. A hole in this plate corresponds with hole *j* in plate *g*, and allows a free passage for any tool, which is inserted between the dies.

By retracting screw *e* and advancing screw *d* the apex of lines 2 3 meet at a common center, as shown in Fig. 2, and the difference between the internal area of frame *a* and the aggregate area of dies *b* is embraced in spaces *k*.

By reversing the described action of the actuating-screws this open space is transferred, in any desired degree, to the center, as shown at *l*, Figs. 1 and 3.

By the combined action of these screws the dies may be "locked" with the central hole of any desired size, or by the action of screw *d* any properly-formed body may be firmly screwed between the dies in the central aperture *l*.

The handles *i i*, or any other device, may be employed for the manipulation of this invention.

It will be apparent that three, or any desired number, of dies or slides may be employed; and that this invention is susceptible of various uses and modifications.

Instead of the actuating-screws *c d* other devices may be employed, and the invention may be embodied in lathe or other chucks of all sizes, or for pump-pistons, instruments for demonstrating the largest square contained in any given circle, and for other purposes.

I claim as my invention—

1. A mechanical movement consisting of a series of triangular slides, the sum of whose central angles is equal to three hundred and sixty degrees, arranged to move together tangentially within solid boundaries, and having always a common and unvarying center, whereby a variable central aperture of corresponding sides may be had, substantially as described and shown.

2. The seat *e* formed in the dies by cutting therein the space *f*, whereby the length of the die is retained, yet it is not obstructed by the actuating-screws, substantially as described and shown.

3. A tap-wrench embodying the described mechanical movement, and provided with the handles *i i*, projecting from the encircling wall of the dies, substantially as described and shown.

HENRY K. PORTER.

Witnesses:

EBEN HUTCHINSON,

T. W. PORTER.