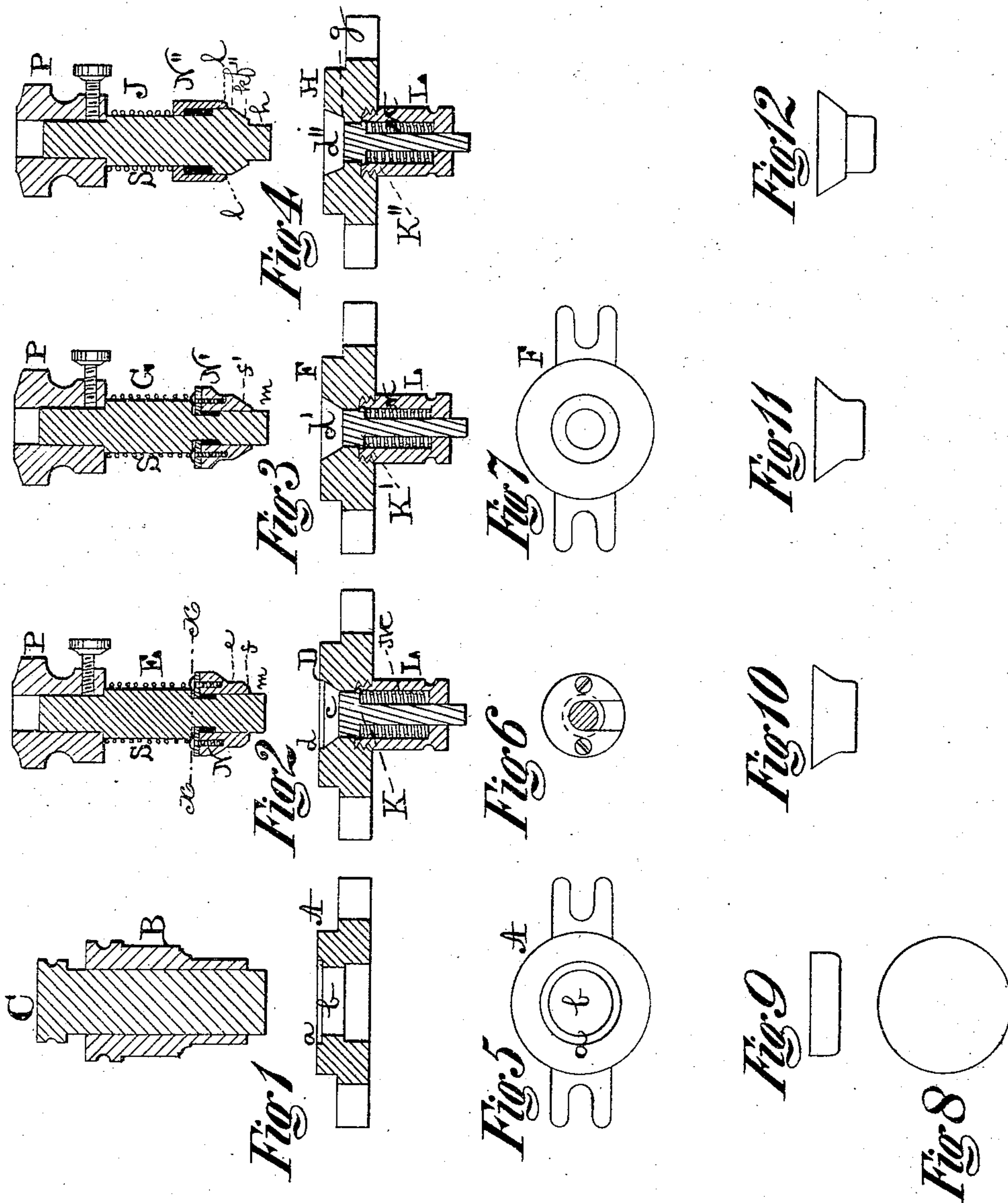


J. L. MASON & F. W. PERRY.
Dies for Making Sheet-Metal Caps.

No. 153,358.

Patented July 21, 1874.



Witnesses:

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UNITED STATES PATENT OFFICE.

JOHN L. MASON, OF NEW BRUNSWICK, AND FRANK W. PERRY, OF CAMDEN,
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IMPROVEMENT IN DIES FOR MAKING SHEET-METAL CAPS.

Specification forming part of Letters Patent No. **153,358**, dated July 21, 1874; application filed
December 3, 1873.

To all whom it may concern:

Be it known that we, JOHN L. MASON, of New Brunswick, in the county of Middlesex, and FRANK W. PERRY, of the city and county of Camden, both of the State of New Jersey, have invented a new and useful Improvement in the Manufacture of Sheet-Metal Caps; and we do hereby declare the following to be a clear and exact description of the nature thereof, sufficient to enable others skilled in the art to which our invention appertains to fully understand, make, and use the same, reference being had to the accompanying drawings making part of this specification, in which—

Figures 1 to 4, inclusive, are vertical sections of the series of dies, in pairs, employed by us. Fig. 5 is a top view of the lower die, Fig. 1. Fig. 6 is a horizontal section in line *xx*, Fig. 2. Fig. 7 is a top view of the lower die, Fig. 3. Fig. 8 is a face view of the blank. Figs. 9, 10, 11, and 12 are side elevations, showing successive operations on the metal.

Similar letters of reference indicate corresponding parts in the several figures.

This invention consists in the construction of dies for the manufacture of sheet-metal caps by successive operations.

Referring to the drawings, A represents the lower die of the first pair or series, which has on its upper face a shoulder, *a*, and centrally a vertical opening, *b*, the shoulder and opening being of circular form. B represents a cylindrical sleeve, which receives a plunger or upper die, C, and is adapted to fit on the shoulder *a* of the die A. The plunger C is constructed of length in excess of that of the sleeve B, so as to have a movement greater than that of the latter. D F H represent the lower dies of three series, respectively, and E G J the upper dies or plungers thereof, respectively. Each plunger has a head, P, at its upper end, a sleeve at its lower end, and a spring, S, for pressure on the sleeve. The die D has a conical opening, *c*, a shoulder, *d*, at the upper portion thereof, and a cylindrical opening below the conical opening. In this cylinder is fitted a sliding head, K, and its stem is guided in an opening in a sleeve,

L, secured to the under side of the die, and containing a spring, M, which presses against the head K, and forces it upwardly, the motion being limited by a shoulder on the head. The die or plunger E, which is the adjunct of the die D, is of cylindrical form at its lower or working end *m*, and its sleeve N is cylindrical at *e*, and chamfered at *f*, and the diameter of its working end is slightly smaller than the opening *cd* of the die D. The plunger E is attached to the sleeve N by a plate, which encircles a neck formed on the plunger, which, while it keeps the two parts in position, does not interfere with the necessary sliding movements of the plunger. The die F is constructed similarly to the die D, excepting that the opening *d'* in the former is smaller than that of the latter, and the spring-pressed head K' is smaller than the head K. The lower end *m* of the plunger G is smaller than that of the plunger E, and the chamfer *f'* of the sleeve N' is greater than the chamfer *f* of the sleeve N. The die H has a conical opening, *d''*, which terminates in a shouldered portion, *g*, and a cylindrical opening is below the shoulder. The spring-pressed head K'' is about equal in diameter to the head K' of the die F. The plunger J for the die H has a cylindrical working end, *h*, and above the latter a wider portion, *f''*, whose lower edge is chamfered at *k*. The sleeve N'' for the plunger J is cylindrical, and has its lower edge chamfered at *l*. The conical openings in the dies D, F, and H have their widest parts uppermost.

The operation is as follows: The lower dies are suitably attached to a bed-plate or place of support. The plunger C and sleeve B are attached to mechanism which is designed to depress said parts independently of each other. The plungers E G J are also attached to mechanism which serves to depress them, and in their movements carry with them the sleeves respectively connected to them. A piece of metal is laid on the lower die A, and the sleeve B, descending, cuts therefrom the disk, shown in Fig. 8, which disk rests on the shoulder, with the sleeve B bearing against it, and holding it at its periphery. The plunger C quickly

follows, and draws the metal into the opening *b* of the die A, thus shaping or cupping the same, as shown in Fig. 9. The cup is then removed, and laid top downward on the die D. The plunger E now descends, and when the sleeve N reaches the cup, the plunger, continuing its downward movement, causes an increased pressure of the spring S on the sleeve, so that the latter bears firmly on the cup, and holds it as the plunger acts further on the cup, and draws the latter into the die D, thus causing the metal to arrange itself in the form of a shell, as seen in Fig. 10. After the full stroke of the plunger it is returned to its first position, and the head K in the die presses the cup upwardly from the die. The ascent of the plunger causes the sleeve to assume its first position, and in doing so the working end of the plunger is uncovered and stripped of the shell, and the latter is entirely cleared of the plunger. The shell is then applied to the die F and die H successively, and the respective actions therewith of the sleeve N' and plunger G, and the sleeve N'' and plunger J, produce results as shown in Figs. 11 and 12.

It will be seen that the cup in die D and shells in dies F and H are held while the metal is being drawn or stamped by the plungers

respectively, the advantages of which are that while the metal is being arranged in the new form there will be no "buckling," breaking, or cracking of the metal, and irregularity in the thickness thereof. The surface of the product will be found to be smooth at all points, possibly excepting the edge of the cap, which will readily be remedied by trimming.

The cap shown in Fig. 12 is in condition for threading, top-cutting, or other desired manipulation.

We do not claim a series of dies for making sheet-metal articles by successive operations similar to those stated by us, as we are aware this process is not new.

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

The die E, with stock-head P, spring S, and sleeve N, in combination with die D, presser-head K, spring M, and sleeve L, constructed and operating substantially as and for the purpose set forth.

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Witnesses:

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