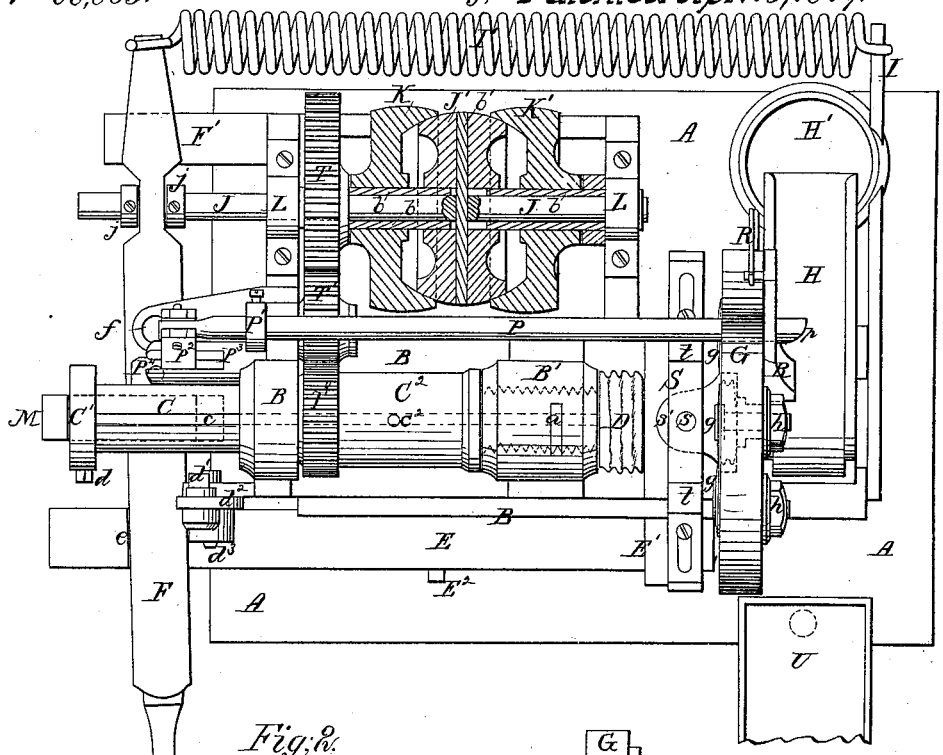
J. L. Mason.

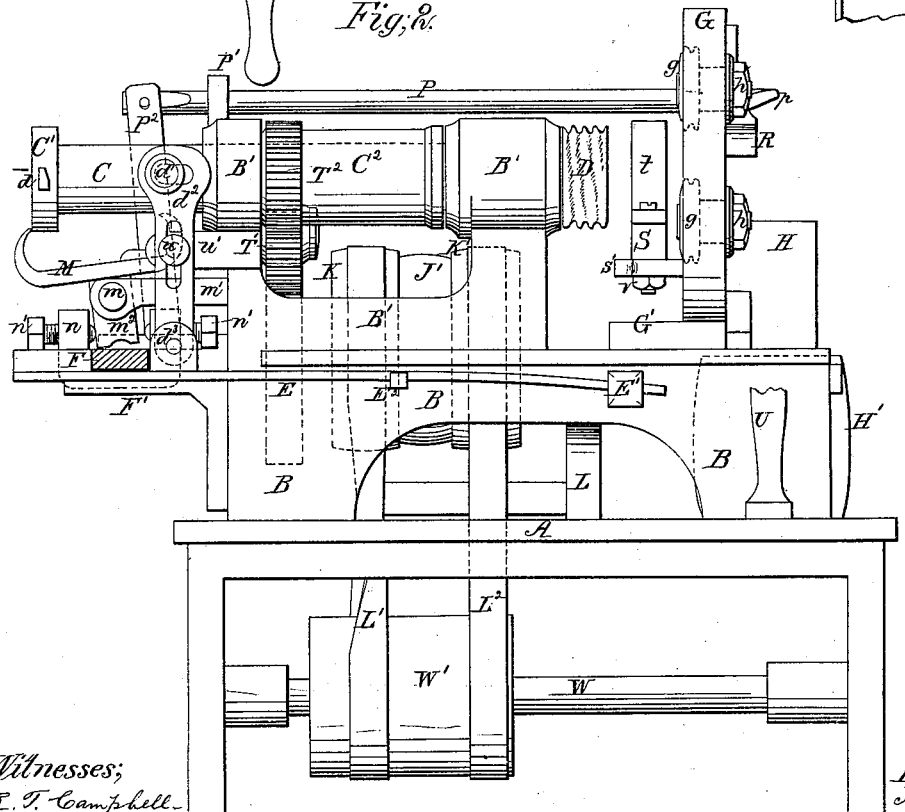
Sheet 1, 2 Sheets.

Screw Forming Mach.

No. 88,885. Fig; 1. Patented Apr. 13, 1869.



Fig; 2.



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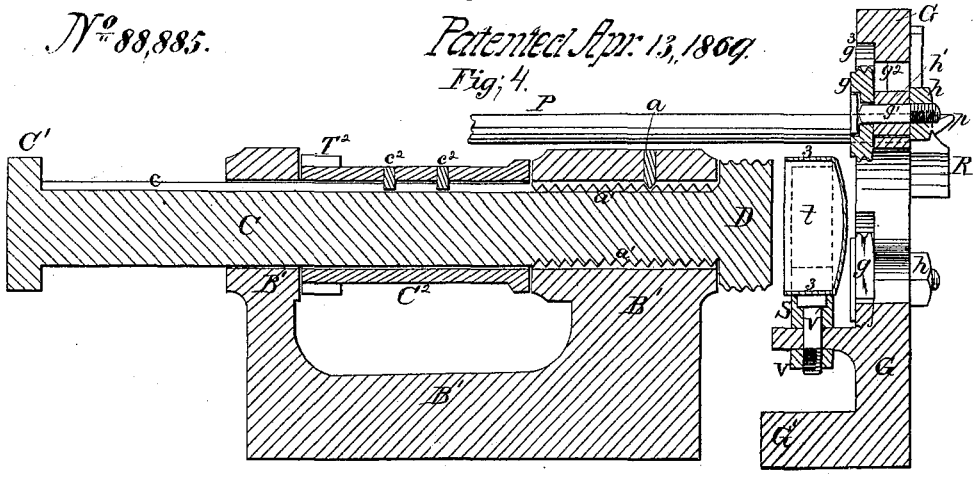
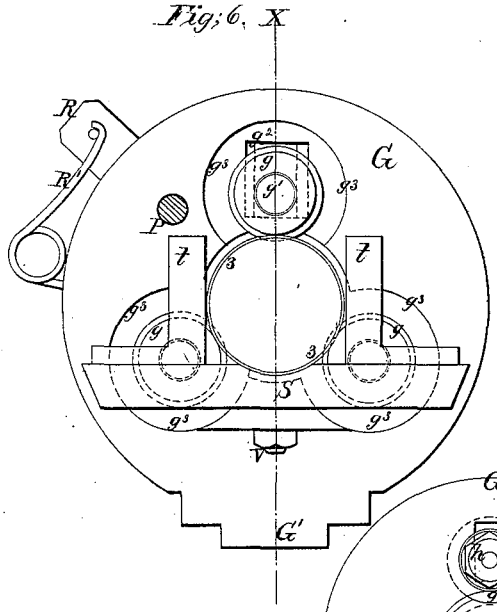
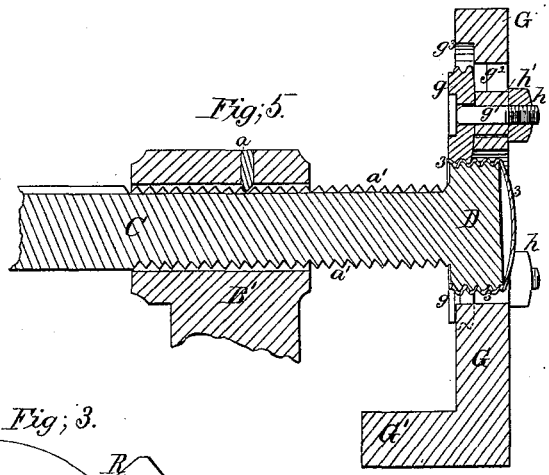
Fig; 4.



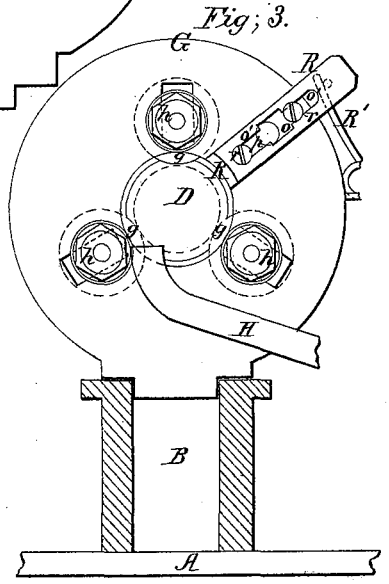
Fig; 6.



Fig; 5.



Fig; 3.



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UNITED STATES PATENT OFFICE.

JOHN L. MASON, OF NEW YORK, N. Y.

IMPROVEMENT IN MACHINES FOR MAKING SHEET-METAL SCREW-CAPS.

Specification forming part of Letters Patent No. **88,885**, dated April 13, 1869.

To all whom it may concern:

Be it known that I, JOHN L. MASON, of the city, county, and State of New York, have invented certain new and useful Improvements on Mechanism for Producing Threads upon Sheet-Metal Caps or Cylinders; and I do hereby declare that the following is a full, clear, and exact description of said improvements and of a machine to which they are attached, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1, Sheet 1, is a plan view of my improved threading devices, with mechanism which is adapted for operating them. Fig. 2, Sheet 1, is a front elevation of the machine. Fig. 3, Sheet 1, is a view of the one side of the face-plate, showing the clamping device or stripper for holding the finished caps while the screw-chuck recedes to allow them to drop into a trough and be conducted out of the way. Fig. 4, Sheet 2, is a vertical central section taken longitudinally through the mandrel and screw-chuck, the face-plate, and gage, showing a blank cap adjusted in the latter in position to receive the said chuck. Fig. 5, Sheet 2, is a vertical sectional view of the threading devices in the act of producing a thread upon a cap. Fig. 6, Sheet 2, is a view of one side of the face-plate, showing a blank cap adjusted in the gage ready to receive the screw-chuck.

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

This invention relates to certain novel improvements on machinery designed for swaging screw-threads in sheet-metal caps or cylinders, by drawing the sheet metal over screw-threads upon a chuck or male counter-die, and pressing it by means of dies into the helical grooves between said threads.

In the year 1857, Letters Patent of the United States, numbered 17,437, were granted to me for a method of manufacturing sheet-metal screw caps or cylinders, which consisted in applying the blanks upon a screw-threaded chuck confined in a lathe so as to rotate freely, and producing the threads in such blank by means of a blunt-pointed tool or chaser held in the hand and pressed laterally against the said blank, so as to sink or swage the thin metal of the cap into the groove between the turns of the thread upon the chuck.

In the year 1858 Letters Patent were granted to me bearing date on the 30th day of March, and numbered 19,786, wherein an improved chuck was described adapted for receiving sheet-metal caps, and allowing threads to be formed in them by means of a chaser or swaging-tool held and guided by the hand of the operator.

In the year 1868 Letters Patent were granted to me, numbered 76,220, wherein I represented, described, and claimed a method of producing screw-threads upon sheet-metal caps or cylinders by the employment of one or more dies, or rolling chasers, applied to a suitable support, in combination with a rotating and endwise-reciprocating chuck having a spiral groove formed in it, into which groove the thin metal of the cap-blank was pressed by the said dies or chasers. Under this arrangement I dispensed with the necessity existing in my former contrivances of manipulating the chaser by hand, and was enabled to produce the screw-caps more rapidly and perfectly than could be done under the aforesaid contrivances.

One object of the invention hereinafter set forth is to provide, in a machine for swaging screw-threads upon sheet-metal caps or cylinders, for feeding the caps through a face-plate containing the swaging-dies from one side of the plate and delivering them upon the opposite side thereof, out of the way of the threading devices, thereby greatly facilitating the work and relieving the attendant of the labor of removing the finished caps from the machine by hand, as will be hereinafter explained.

Another object is to provide for clamping or holding the finished caps while the mandrel with its screw-chuck recedes and leaves the cap thus held to be discharged from the machine, said clamp or stripping device being controlled in its operation by mechanism which will cause it to operate automatically and in harmony with the longitudinal movements of the mandrel which carries the screw-chuck, as will be hereinafter explained.

Another object is to provide for conducting the finished caps from the point where they are released by the stripping device into a tub or other suitable receptacle arranged in any convenient place out of the way of the machine; also, to provide a hopper or gage for receiving the blank caps, holding and center-

ing them in front of the screw-chuck, so that when this chuck advances to its work it will enter the cap, as will be hereinafter explained; and, finally, another object of my invention is to so combine the dies or chasers with a face-plate which has an opening through it, and is recessed around said opening to admit the dies, and with the screw-chuck of the mandrel that the dies have a firm support, and at the same time the length of traverse for the screw-chuck of the mandrel in order to discharge the finished cap is much shorter than would be the case if the dies were arranged on pins projecting directly from face-plates not recessed—in a word, whereby the first portion of the screw of the caps is formed within a countersunk chamber around the central passage through the face-plate.

To enable others skilled in the art to understand my invention, I will describe the same and the machine to which they are attached.

In the accompanying drawings, A represents the elevated top of a table which is adapted for supporting the mechanism for producing threads upon circular or cylindrical caps, and B represents an elevated bed or way which is mounted upon and secured rigidly to the top of said table in a horizontal plane, and adapted for receiving and supporting a head-block, B′, having two standards which form journal-bearings for a mandrel, C. This mandrel C is constructed with a cylindrical enlargement, C′, upon its rear end, having a tappet, *d*; also, with a keyway, *c*, extending its entire length, which receives a tooth, c^2, on a sleeve, C^2; also, with a screw-thread, *a*′, upon its forward portion, which receives a tooth, *a*, on the forward standard-bearing, B′, and finally with a cylindrical screw-chuck, D, upon its forward end, which is adapted to serve, in conjunction with dies *g*, or their equivalents, for producing threads upon sheet-metal cylinders or caps, as will be hereinafter explained.

The mandrel thus constructed is represented in section in Fig. 4, Sheet 2, arranged so that its axis coincides with the horizontal axis or center of a circular hole made through the face-plate G. The thread *a*′ upon the body of the mandrel C has the same pitch and number of turns in a given length as the thread which is formed upon the circumference of the enlarged chuck D.

The collar C^2, which is placed upon that portion of the mandrel included between the standard-bearings of the screw-chuck, and which is connected to the mandrel by the tooth c^2, fitting loosely into the keyway *c*, has spur-teeth T^2 formed on one end, which engage with an intermediate pinion, T′, that receives rotary motion from a spur-wheel, T, keyed upon a hollow shaft, *b*, as shown in Fig. 1.

By means of a shifting clutch, J′, which is keyed to a shaft, J, passing through the tubular shaft *b*, with the aid of two flanged pulleys, K K′, that receive motion in opposite directions from a drum, W′, on a driving-shaft, W, through belts L′ L^2, the mandrel C can be made to receive a rotary motion and at the same time advance toward or recede from the face-plate G, as will be hereinafter explained.

The screw-check D may be constructed substantially as shown and described in my Letters Patent numbered 76,220, and it may be made of any required diameter and length according to the diameter and length required for the finished caps or cylinders.

The face-plate G is constructed with a foot-piece, G′, which affords a firm stand for the plate upon the bed or ways B, and admits of the plate being confined rigidly to said bed or ways at any required distance from the screw-chuck D. Plate G rises perpendicularly from the horizontal bed B, and may be made of a circular form. (Shown in Figs. 3 and 6.) It has an opening centrally through it of such diameter as will allow the screw-chuck, with a cap or cylinder upon it, to pass freely through it, whereby the caps, when finished, can be discharged upon an inclined trough, H, and thence conducted into a receiver, H′. At regular intervals apart, and arranged concentrically around the center of the hole through the face-plate, are three circular wheels, *g g g*, which may be made alike in every respect, and which perform the office of dies for swaging or pressing the sheet metal of the blank caps 3 into the groove between the thread which is formed around the chuck D, as illustrated in Fig. 5. Each one of these roller-dies *g* is constructed with two rounded beads or annular ribs upon its circumference, and with a cylindrical shoulder upon its end, as fully described in my Letters Patent numbered 76,228. The annular ribs on each die *g* are adapted for pressing the metal of a cap-blank, 3, into the groove formed in the threaded chuck D, and the cylindrical shoulder on the end of each die prevents the sheet metal from buckling up in rear of the ridges. A screw-stud, *g*′, forms a bearing for each die *g*, and allows it to turn freely, and an adjustable chamfered block, *h*′, which is fitted into a radial slot, g^2, through the face-plate G, together with a nut, *h*, on the screw-stud *g*, confines the said die in its proper place for acting upon the blank caps.

It will be seen by reference to Figs. 2, 4, 5, and 6 that each one of the rolling-dies *g* is let into a recess, g^3, made in one side of the face-plate. These rolling-dies *g* can be adjusted nearer to or farther from the center of the hole through the face-plate, according to the diameter of the cap which it is desired to operate upon. I prefer to employ rolling-dies, as above described; but, if desired, fixed tools or chasers may be used in their stead, but not with as good results as are afforded by the use of roller-dies.

My improvements may be applied to a machine in which the dies are attached to the mandrel and the counter die or screw-thread formed in a hollow chuck, or in the face-plate,

in which case the thread will be formed from the inside of a blank cap instead of upon the outside, as above described.

Between the face-plate G and the head-block B′, and supported upon a lug, *s′*, extending from said face-plate, is a horizontal transverse bar, S, which is connected to said lug by a bolt, V′, and nut V. By interposing washers between the said bar and its lug the former can be adjusted to any desired height with reference to the longitudinal axis of the mandrel C and screw-chuck D. Upon this bar S two standards or jaws, *t t*, are applied perpendicularly to it, which are adjustable, so that they can be moved and fixed nearer to or farther from each other. The jaws *t t* and bar S constitute a gage or hopper for receiving, supporting, and centering blank caps in front of the screw-chuck D, as indicated in Figs. 4 and 6, so that when the chuck advances it will receive upon it a screw-cap, thereby relieving the attendant from the labor and attention required to apply the cap-blanks upon the chuck. On the right-hand side of the face-plate G a slide, R, is applied by screws *r r* passing through slots *o′ o′*. On the inner end of this slide a jaw is formed with a concave surface. Through a slot, *o*, made through the slide R, the beveled or wedge-shaped end *p* of a rod, P, passes, which rod is operated by a lever, P^2, so that at proper times the rod will be moved forward and its beveled end *p* pressed against a shoulder in slide R, thus moving the slide inward and griping a finished screw-cap, so that when the mandrel C recedes such cap will be left in a position for dropping into the trough H, which will take place when rod P recedes and allows spring R′ to retract the slide R. The lever P^2, to which rod P is pivoted, is connected by its lower or shortest arm to a piece, P^4, that is secured rigidly to a vibrating lever, F, which lever has its fulcrum at *f* upon a bracket extending from the bed of the machine, as shown in Fig. 1. One end of lever F is connected to a bar, I, by a horizontal spring, I′, placed at the back of the machine, and the other end of this lever extends across a flat spring catching-plate, E, and has a handle formed on it, as shown in Fig. 1. Through the shortest arm of lever F passes freely the shaft J, and is connected by collars *j j* to this shaft, so that when said lever is vibrated shaft J will receive an endwise movement, and the beveled clutch-drum J′ will be moved with it. This clutch-drum is keyed to shaft J by the pin *b′*, which passes through it and through oblong slots made longitudinally through tubular shaft *b′*, as shown in Fig. 1. When the longest arm of lever F is moved to the right hand and held by catch *e* on spring-plate E the clutch-drum J′ will be brought in contact with the flange of cross-belt pulley K, and the mandrel C will be rotated in a direction which will cause it at the same time to move up to the work; and when spring-plate E is depressed, as will be hereinafter explained, spring I will move the shortest arm of lever F to the right hand and engage the clutch J′ with the straight-belt pulley K′, thereby reversing the motion of the mandrel and causing it to recede from the work. When the said clutch-drum J′ is at an intermediate point between the two pulleys K K′ it will not operate upon them, and consequently the mandrel C will remain at rest.

On the spring-plate E, near its catch *e*, an eye-lug, d^3, is fixed, to which a standard, d^2, is pivoted. This standard rises vertically to a proper height, and is connected by a stud, *u*, passing through a vertical slot in the standard, to a fixed bracket-arm, *u′*. To the upper end of the standard d^2 a stud, *d′*, is adjustably attached in such a position with relation to the termination of the forward stroke of the mandrel C that when the screw-chuck D completes its work upon a cap the tappet *d* on the collar C′ of said mandrel will act upon the stud *d′*, press down standard d^2 and spring-plate E, and allow the spring I′ to move lever F, and thus reverse the movements of the mandrel. The mandrel then recedes from its work, and in doing so, when nearly at the termination of its back stroke, its collar C′ presses upon the rear hooked portion of a rocking lever, M, and moves lever F toward the catch *e* far enough to release the clutch J′ from the pulley K′, but not far enough to engage it with pulley K. The motions of the mandrel C will then be stopped and the attendant can place a cap-blank in the gage in front of the screw-chuck D. When he has done this he starts the mandrel again by drawing the long arm of lever F to the right until catch *e* on spring-plate E receives and holds it. The hooked lever M acts upon the lever F through the medium of a vibrating arm, m^2, and a yoke, *n*, which latter is fastened to lever F and provided with set-screws *n′ n′*, against the ends of which arm m^2 is caused to press against these screws as it is vibrated.

It will be seen that when the several parts are in position for moving the mandrel forward or up to its work the rod P will be thrown back and at the instant the work of forming a thread upon a cap-blank is completed, and just before this mandrel is caused to recede from its work, the said rod P will be forced forward by spring I′, acting through the medium of levers F and P^2, and the slide or stripper R will gripe and hold the finished cap. As the mandrel recedes it liberates itself from the cap, leaving the latter held by the said slide until the lever F is again moved in a position to commence operation again.

I do not desire to be understood as making claim of invention to the friction-clutch for giving right and left movements to the shaft which communicates motion to the mandrel C, nor to any part or combination of parts shown for moving said mandrel; nor do I claim, broadly, under this petition a screw-clutch, D, in combination with rolling or sta-

tionary dies, as these parts have been described and shown by me in the schedule annexed to my Letters Patent numbered 76,220; and, finally, I entirely disclaim, so far as concerns this present application, all the devices and combinations hereinbefore described, except such as I shall now proceed to specify.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The face-plate G, with an opening entirely through it, in combination with the devices which hold the finished caps, form the thread thereon, release the caps from the threading devices, and then discharge them, free from the machine, on the side of the face-plate opposite to that which they had entered, substantially as and for the purpose described.

2. The arrangement on one side of the perforated face-plate G of a clamp or stripper, R′, operated by a wedged rod, P, and spring R′, substantially as and for the purposes described.

3. The trough H, in combination with the machine herein described.

4. In combination with the sheet-metal cap-threading devices, the use of the gage *s t t*, for receiving, holding, and centering the cap-blanks preparatory to being threaded, substantially as described.

5. The dies or chasers *g*, or their equivalents, applied within recesses formed in the face-plate G, and made radially adjustable therein, as described, in combination with the mandrel-chuck D, as and for the purposes described.

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