

(No Model.)

2 Sheets—Sheet 1.

C. HOPE.

MACHINE FOR THREADING SHEET METAL SCREWS.

No. 270,314.

Patented Jan. 9, 1883.

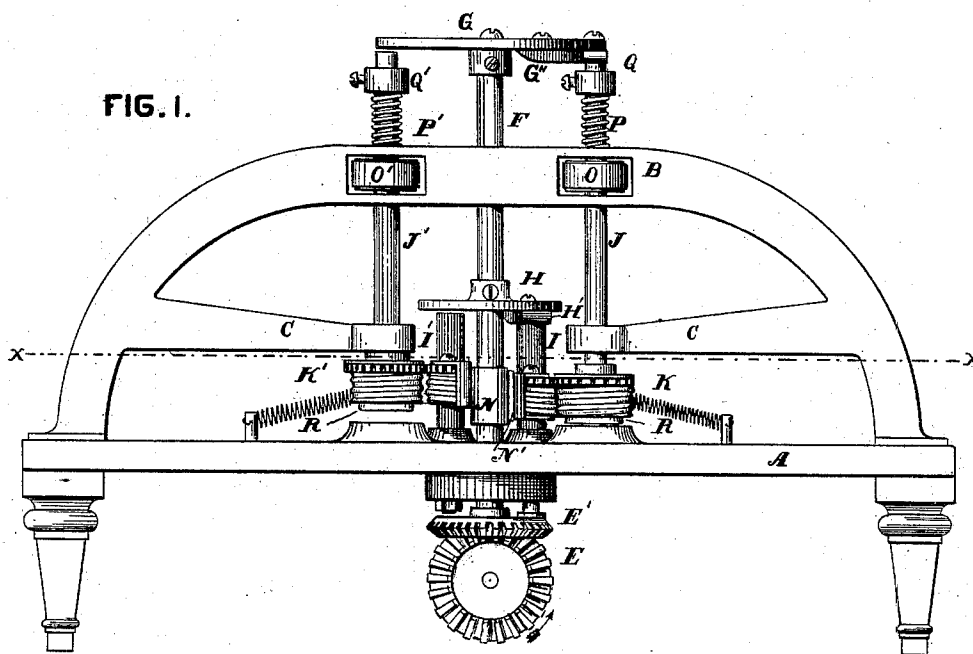
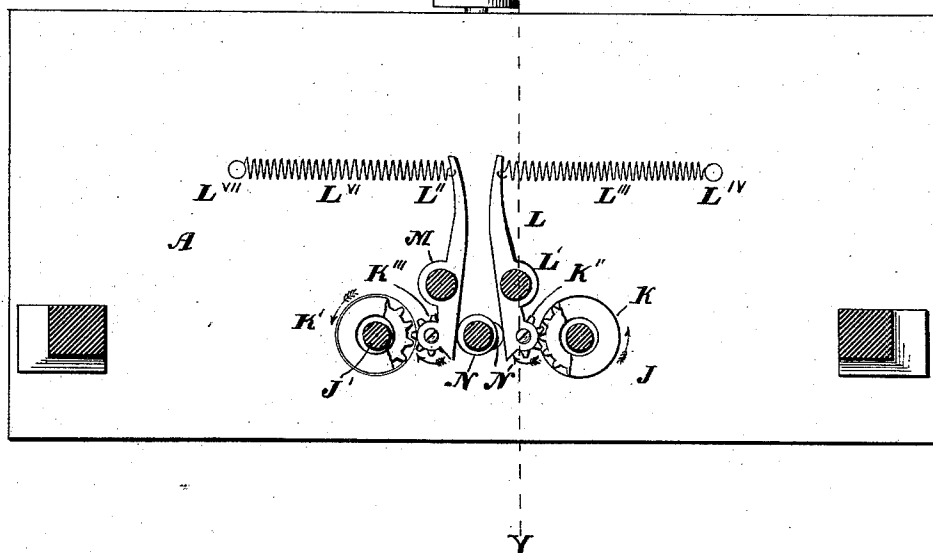


FIG. 2.



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2 Sheets—Sheet 2.

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FIG. 3.

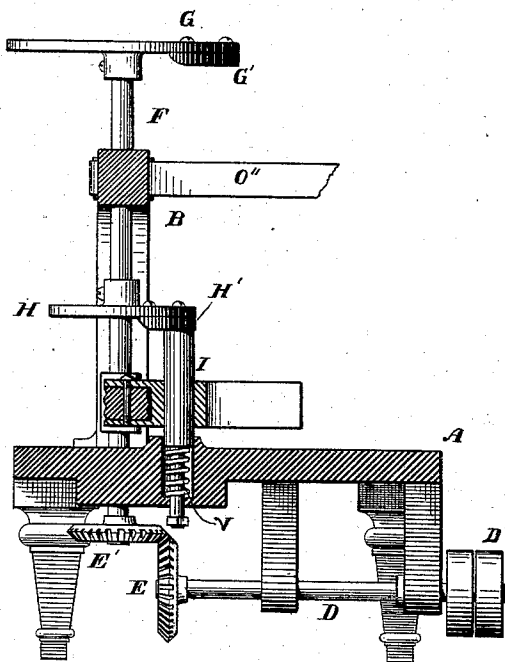


FIG. 4.

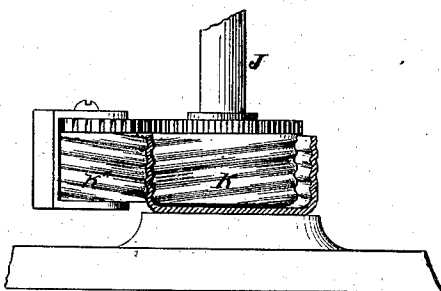


FIG. 5.

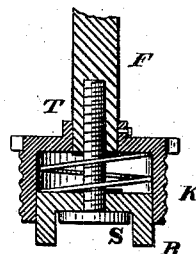


FIG. 6.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR THREADING SHEET-METAL SCREWS.

SPECIFICATION forming part of Letters Patent No. 270,314, dated January 9, 1883.

Application filed November 17, 1882. (No model.)

To all whom it may concern:

Be it known that I, CHARLES HOPE, of Camden, New Jersey, have invented a new and useful Improvement in Machines for Threading Sheet-Metal Screws; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the annexed drawings, making part hereof.

The nature of my invention will fully appear from the following specification and claims.

It has for its object the production of certain mechanism for sheet-metal-threading machines having a continuous action, whereby several sheet-metal caps are in the machine at the same time, and while one cap is being threaded upon one set of screw-threaded "formers" the other cap is in place upon another set of screw-threaded formers, ready to be operated upon the instant the first cap is finished, and while the latter cap is being threaded the first cap is released, another being substituted for it. This I accomplish, as above intimated, by two or more sets of formers upon the same machine, both operated by the same mechanism. The method of accomplishing these objects will be fully hereinafter set forth.

In the drawings, Figure 1 is a front elevation of my machine; Fig. 2, a horizontal cross-sectional view looking down upon the same upon the line X X of Fig. 1; Fig. 3, a vertical cross-sectional view of the whole machine upon the line Y Y of Fig. 2; Fig. 4, a detached elevation of one set of the screw-threaded formers, showing a cap in cross-section in process of being threaded; Fig. 5, a detached sectional view of one of the formers, showing the automatic spring-plunger for releasing the threaded cap from the former after the cap has been threaded and the former raised; Fig. 6, a perspective view of a completed threaded cap.

A is the frame of my machine; B, an arch supporting the two former spindles and the upright operating-shaft near their upper ends.

C C' are two inwardly-extending arms, preferably cast in one piece with the arch B.

D is the driving-shaft, operated by pulley D'.

E is a beveled cog-wheel on the inner end of said shaft, which engages with the beveled cog-wheel E' upon the foot of upright operat-

ing-shaft F. (See Figs. 1 and 3.) The shaft F is furnished upon its upper end with a cam-plate, G, having around the edge of one side of its lower surface the cam G'. This cam is designed to throw the former-spindles down in its revolution whenever the cam strikes the head of a spindle. A similar cam-plate, H, is set lower down upon the shaft F, below the arch B. This cam-plate has a cam, H', in the same relative situation upon the under side of plate H as that occupied by cam G' upon the under side of plate G. (See Figs. 1 and 3.) This cam operates upon the plungers I I' similarly to the operation of the cam G upon the spindles J J'. It may be noted here that the formers upon the feet of the spindles are always right-hand threaded, while those formers which gear with them are always left-hand threaded. The right-hand-threaded former upon the lower end or foot of spindle J is denominated K, while K' is the right-hand-threaded former upon the foot of spindle J'. (See Fig. 1.)

L is a lever, pivoted at L', having upon one end the left-hand-threaded former K'', and upon the other end a spiral spring, L''', secured at the point L''. (See Fig. 2.) L'' is a similar opposite lever, pivoted at the point M, having upon that end next to the former K' a former, K''', and upon the other end a corresponding spiral spring, L''', which spring is secured at its opposite end at the point L''.

It will be noticed in the illustration Fig. 2 that the former K'', with the cog-wheel upon its top, by which latter it is revolved by the cog-wheel of former K, is much smaller than former K. These two formers and their cog-wheels are, however, in practice of exactly the same size, and the cog-wheels have the same number of teeth, the difference in the sizes being simply a convenience in drafting. The same remarks are applicable to the two formers K' K''' with their cog-wheels.

N is an enlargement upon the shaft F, having upon one side the cam or enlargement N', which cam serves to force the left-handed screw-threaded former, against which it impinges, toward the right-handed screw-threaded former adjoining it, in order to form the thread on the cap which is being revolved between

these two formers. As this cam ceases to operate upon either left-handed former the spiral spring attached to the other end of the lever upon which said left-handed former is set draws back that end of the lever, and so releases said left-handed threaded former from contact with the sheet-metal cap being threaded. (See Figs. 1 and 2.)

O O' are pulleys, located respectively upon spindles J J', (see Fig. 1,) and operated each by a belt, O''. (See Fig. 3.) These belts, receiving motion from a main shaft, (not shown in the drawings,) serve to turn the said pulleys, and consequently the spindles J J'.

P P' are spiral springs, each setting down upon the top of arch B, and abutting above, respectively, against the lower sides of the adjustable collars Q Q'. These collars are adjustable vertically upon the spindles J J' by means of set-screws, (see Fig. 1,) whereby the springs P P' may be tightened down to give greater power or be relieved when desired.

In Fig. 5, K is a right-hand-screw-threaded former. R is a cup-shaped plunger, set so as to work snugly up and down within said former, and is secured in place against dropping out of said former by means of the screw-bolt S, which is screwed into the lower end of spindle F. A spiral spring, T, surrounds the bolt inside of the former K and between the top of the movable plunger R and the inside face of the top of the plunger K. The former K' is furnished with a similar plunger, spring, and bolt.

The operation is as follows: Supposing the machine to be in the position shown in Fig. 1, the power which drives the belts O'' is applied and the pulleys O O' are thus started revolving. The shafts J J' are thus turned at the same time, the belt which turns pulley D' is started, and the shaft D revolves, thus, through the intermediary beveled cogs E E', turning the shaft F and the cam-plates G H. The beveled cog E turns in the direction of the arrow shown in Fig. 1, and the turning of the shafts J J' turns the formers K K' in the direction indicated by the arrows in Fig. 2. A metal cap which it is designed to thread is now inserted under the former K'. The revolution of the upright shaft F will finally bring the cam G' down upon the top of shaft J' and force down the shaft, so that the former K' will be forced down into the plain cap, to be threaded simultaneously therewith. The revolution of the cam-plate H will bring the cam H' around and upon the top of the plunger I'. This will force down the left-hand-screw-threaded former K''' to the same plane or level as that of the former K'. At the same time the enlargement N of the shaft F will bring by its revolution the cam N' against that end of lever L'' which sustains the former K'''. (See Figs. 1 and 2.) This action of the cam N' forces the former K''' against the outer shell of the cap to be threaded and indents the latter into that portion of the threads of former K' which is contiguous to the former K'''. The former K',

then being revolved by its shaft J', revolves the former K''' by means of the cog-wheels set upon the tops of these two formers, respectively. The thread is thus formed in the sheet-metal cap. Now, when the cams N', H', and G' were operated as above described, the former end of lever L was released from the pressure of the cam N' and the contraction of the spring L''' threw the former K'' away from contiguity of the former K. At the same time the removal of the pressure of the cam G' from the top of shaft J allowed the shaft J, operated by its spiral spring P, to rise up and lift the former K to the height shown in the drawings, Fig. 1, as there occupied by the former K'. At the same time the removal of the pressure of cam H' from the top of the plunger I permitted the said plunger to rise to the height shown by the plunger I' in Fig. 1. This rising was effected by means of the spring V. (See Fig. 3.) Both the plungers I and I' are furnished with spiral springs V, set in a socket in the plate or platform A. These springs V operate to raise the plungers I I' in the same manner that the springs P P' operate respectively to raise the shafts J J' when the latter are released from the pressure of the cam G. The formers K K'' having thus been raised and separated from each other while the sheet-metal cap was being screw-threaded by the formers K' and K''', a plain sheet-metal cap is now placed under the former K in the same manner as the other cap was described to have been placed under the former K'. By the revolution of the shaft F the cam G presses down the shaft J, and the cam H' presses down the plunger I, and the cam N' presses the former K'' against the outer shell of the cap to be threaded, and the revolution of the two formers threads the last-mentioned cap, as will be seen in Fig. 4. The cap to be threaded is always larger in its inner diameter than the largest diameter of the former which sets into it, and the thread is formed at the points of contact inside and outside of the shell of the cap by the two formers. This larger size of the cap than its former is for the purpose of allowing the cap to drop freely from the former when the left-hand-threaded former is removed from contact with it, and the right-hand-threaded former is raised up; but to further insure the release of the cap from the former when the latter is raised, I use the cup-shaped plunger R, which, when the former is raised, actuated by the spiral spring T, shoots down out of the former and frees the cap from the latter. Now, while the former K is threading its sheet-metal cap, the parts J J', I I', and the former K''' being released from the pressure of their respective cams G' H' N', the formers K' and K''' will rise, the former K''' will separate from contact with the recently-threaded cap, which will be thrown by the plunger down and away from the former K', and another plain cap will be immediately inserted beneath the former K', to be threaded in its turn, and thus the operation is contin-

ued, so that while one cap is being threaded upon one set of formers, a recently-threaded cap is removed and another one set in place for threading upon the other set of formers in one continuous operation. When a right-hand-threaded former descends into the cap to be threaded the cup-shaped plunger R of course is pushed up into the interior of its former, only to be released when the former rises and the spring T pushes it downward.

What I claim as new is—

In combination with vertically movable and revolving shafts J J', sustained in a frame, B, and acting alternately, as described, pulleys O O' to drive said shafts, springs P P' to raise them, screw-threaded formers K K', cam G' upon its revolving cam-plate G, mounted upon

the revolving central shaft, F, acting alternately to push down the shafts J J' to drive the formers K K' into the caps to be threaded, plungers I I', and the cam H' upon its supporting cam-plate H to alternately push these plungers down, springs V to throw them up again, pivoted spring-levers L L'', substantially as shown, female-screw-threaded formers K'' K''', and the cam N', whereby these female-screw-threaded formers are alternately thrown against the sheet-metal cap being threaded, all arranged and operating substantially as described.

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Witnesses:

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