(No Model.)

2 Sheets—Sheet 1.

P. ELEY.

CAP THREADING MACHINE.

No. 389,208. Patented Sept. 11, 1888.

Fig: 1.

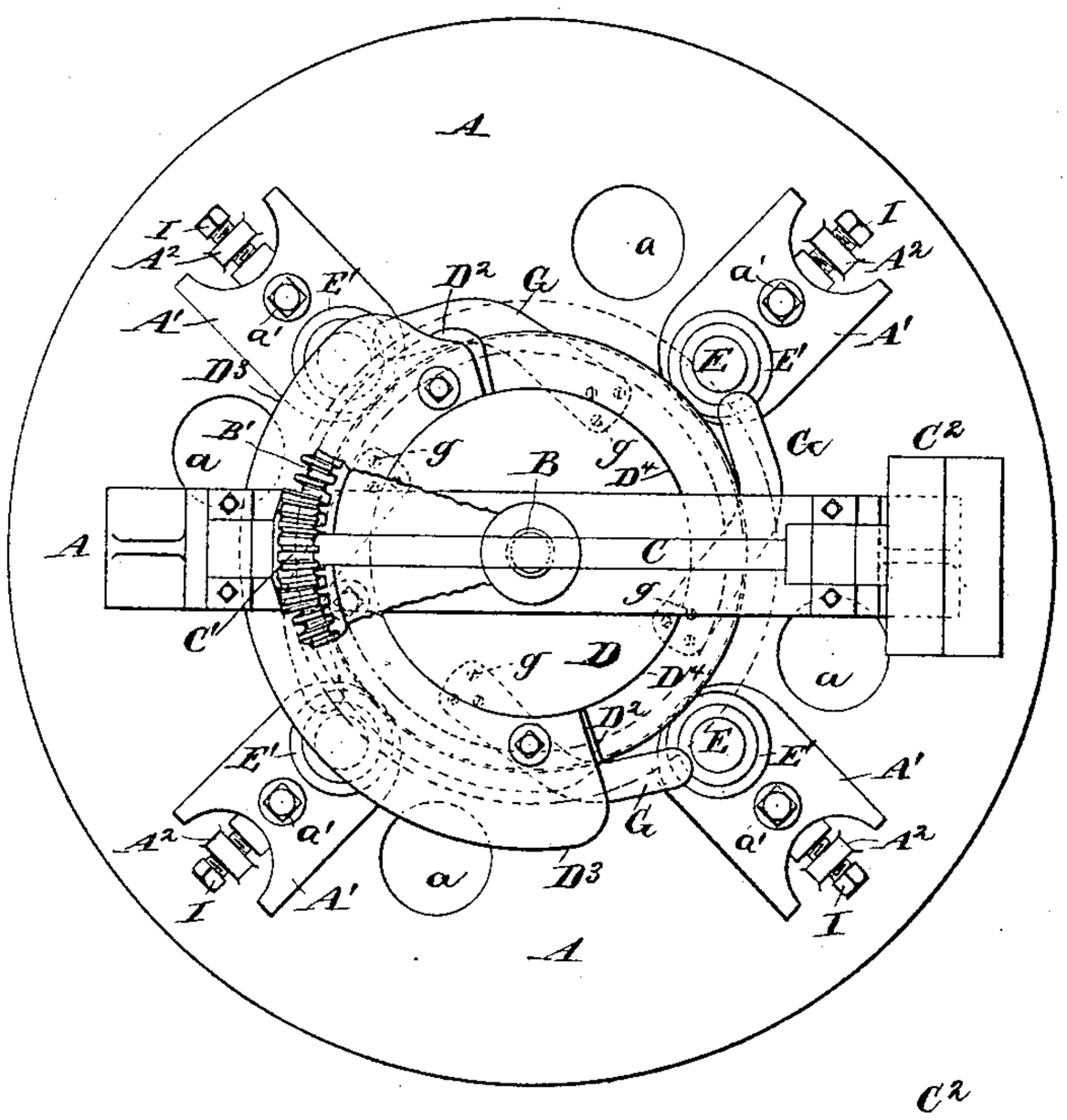
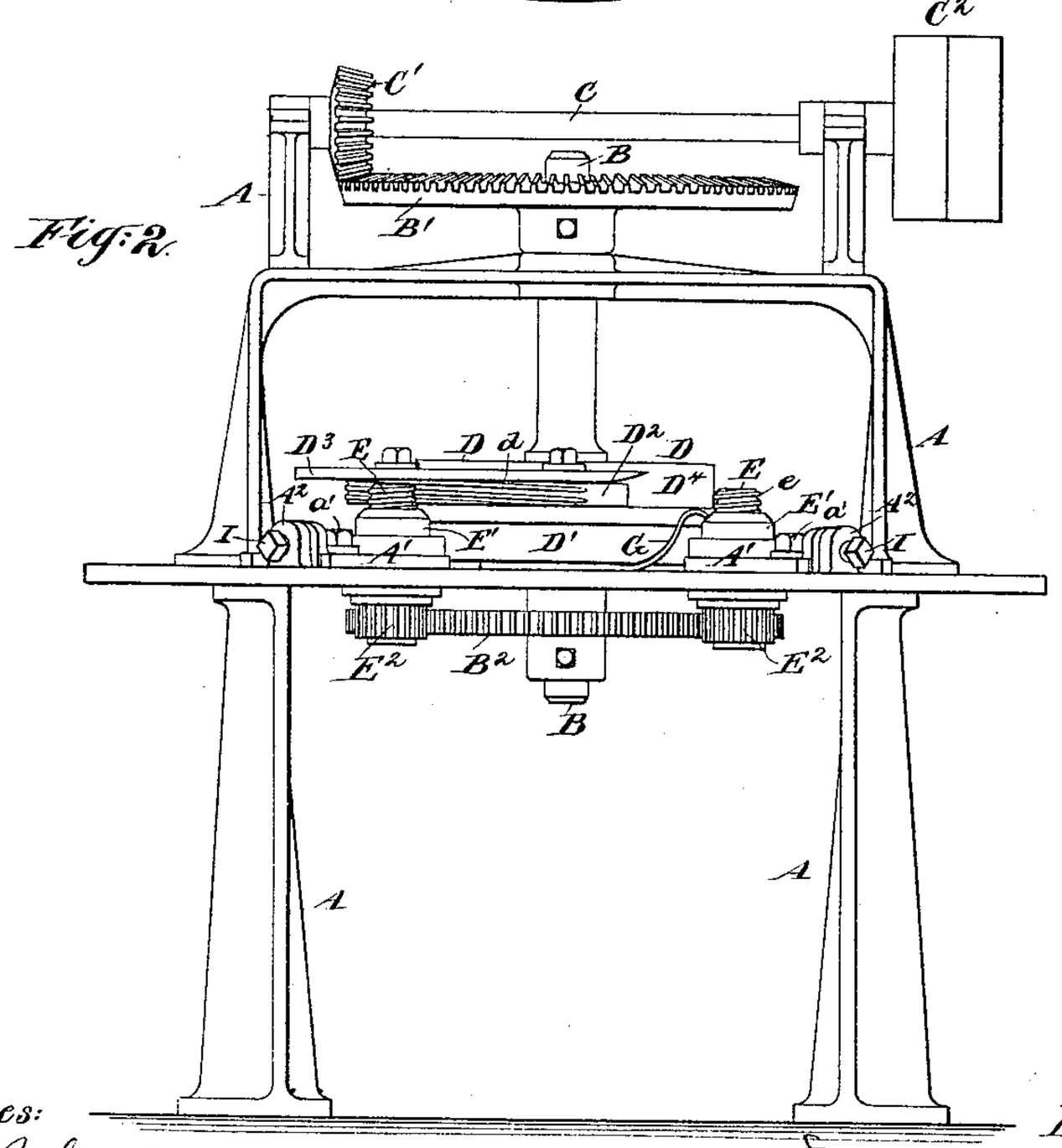


Fig: 2.



Witnesses:
Charles R. Searle,
H. A. Johnstone.

Inventor:
Philip Eley.
by his attorney
Thomas Drew Sleeper

(No Model.) 2 Sheets—Sheet 2.

P. ELEY.

CAP THREADING MACHINE.

No. 389,208. Patented Sept. 11, 1888.

Fig: 3.

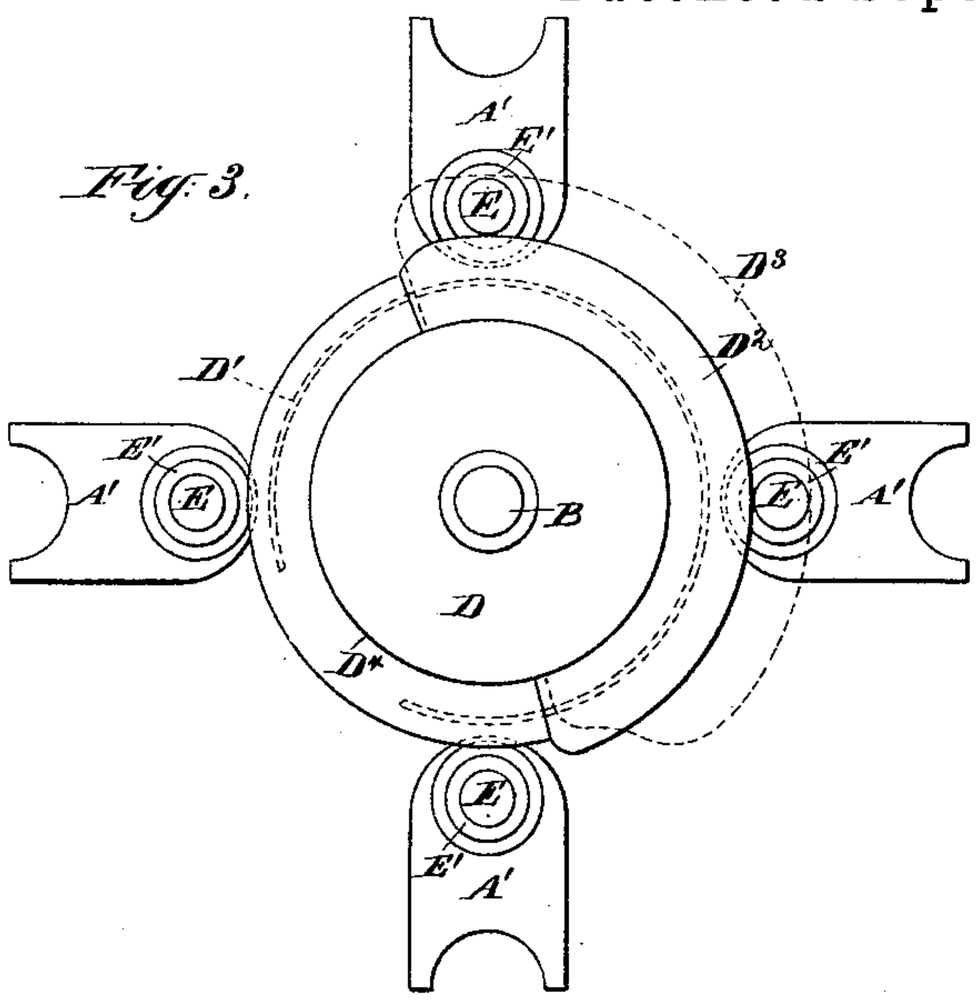


Fig: 4.

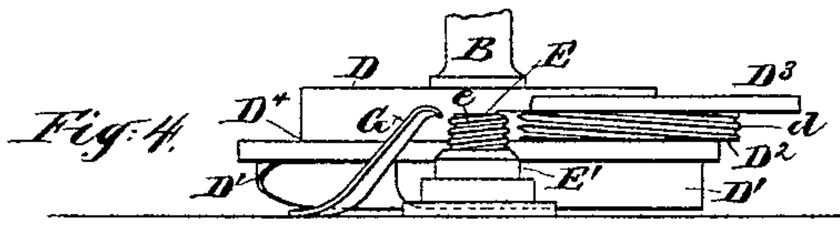


Fig: 5.

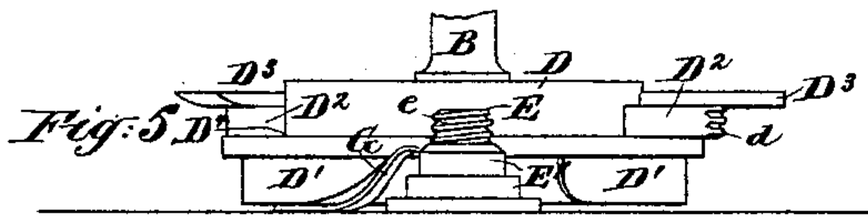


Fig: 6.

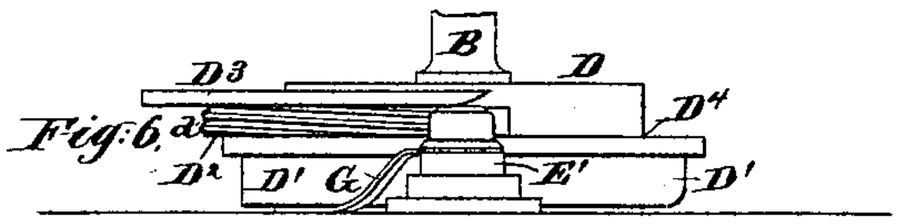


Fig: 7.

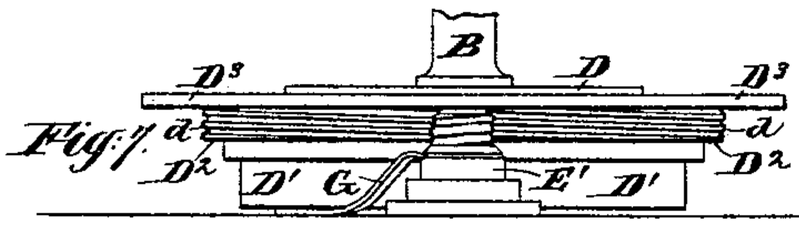
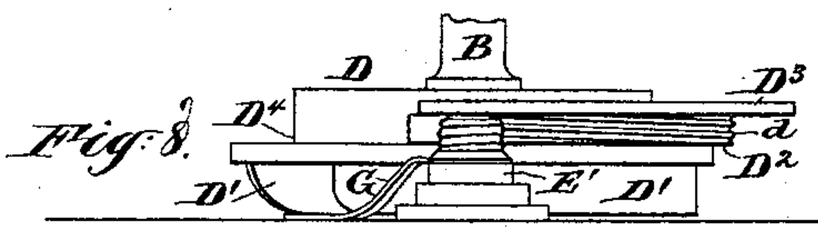


Fig: 8.



Witnesses:
Charles R. Searle.
H. S. Johnstone.

Inventor:
Philip Eley.
by his Attorney
Thomas Dyer Stetson.

UNITED STATES PATENT OFFICE.

PHILIP ELEY, OF BAYONNE, NEW JERSEY.

CAP-THREADING MACHINE.

SPECIFICATION forming part of Letters Patent No. 389,208, dated September 11, 1888.

Application filed May 3, 1888. Serial No. 272,645. (No model.)

To all whom it may concern:

Be it known that I, PHILIP ELEY, of Bayonne, in the county of Hudson and State of New Jersey, have invented a certain new and useful Improvement in Cap-Threading Machines, of which the following is a specification.

I have experimented more particularly with a view to producing nozzles and caps for the cans used in storing and transporting kerosene and analogous oils, the metal being ordinary annealed iron coated with tin, commonly designated "tin-plate." I will describe the invention as thus applied; but it will be understood that the invention may be used in producing the proper screw-threads on sheet-metal caps and nozzles of different sizes, using other metals, and adapted to apply to cans and analogous vessels for other uses.

My cap-threading machines are adapted, like some of the styles previously known, to form the screw-threads on the previously stamped-up nozzle and also on the cap therefor at one and the same operation. I employ small upright rollers—technically "chucks"—of hardened steel, each having on its projecting upper end proper screw-threads corresponding to those which it is desired to produce. I will show four of these small rollers arranged equidistant around the wheel. They are alike, and a description of one will suffice for the whole. On the upper end of the roller or chuck the blank nozzle and cap previously matched together are applied during a period while this roller is exposed so as to be properly accessible for the purpose. The blanks fit loosely over this screw-threaded chuck before the screw-threads are formed therein, and it is further important to the success of the ejecting operation that they shall also fit loosely after the screw-threads have been completely formed. A large horizontal wheel mounted alongside carries a segment which is properly ridged to match in the scores in this small roller and is provided with a partial flange above. The rotation of this wheel first presents the flange over the cap to hold it and the nozzle down in the proper position on the small roller. Afterward the ridges on the wheel commence to act on the metal of the cap and nozzle, biting the metal between its ridged surfaces and the correspondingly screw-threaded adjacent surface of the roller, causing the cap and nozzle which are pinched between them to turn around several times. The wheel and the roller are geared together by spur-gear of corresponding sizes, insuring their strong and uniform motion, gradually imprinting the threads both in the nozzle and cap. Finally, the continued revolution of the roller and wheel brings around a part of the wheel, which is so shaped as to relieve the cap from pressure; and a spring-dog, which has been properly placed below, by a previous operation of the machine, rises and throws off the completed cap and completed nozzle, both having been screw-threaded at once, and obviously so as to match together. The cap and nozzle may be allowed to remain engaged in this condition just as they come from the machine, and the flange of the nozzle being properly soldered or otherwise fixed to the can, (not represented,) the can is ready for delivery for use with the cap in place on the nozzle, but ready to be removed any time by turning it.

In the operation of my machine in treating the blanks, as soon as one completed nozzle and cap has been ejected by the spring, the further revolution of the wheel causes a cam projection on its under face to depress the spring-dog. Then the attendant applies the blanks for another nozzle and cap properly matched together upon the small roller, and the round of operations is completed.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawings form a part of this specification.

Figure 1 is a plan view of the apparatus, a portion being broken away. Fig. 2 is a side elevation. Fig. 3 is a plan view of certain portions. The remaining figures—Figs. 4 to 8, inclusive—are elevations showing successive stages in the revolution of the main wheel.

Similar letters of reference indicate corresponding parts in all the figures where they occur.

A is the fixed frame-work, of cast-iron or other suitable material, certain parts being

designated, when necessary, by additional marks, as A′. This framing may be in as many pieces as desired, rigidly bolted together.

B is an upright shaft supported in bearings in the framing A. It receives motion through a large bevel gear-wheel, B″, from a small bevel gear-wheel, C″, fixed on the driving-shaft C′, which receives motion through a pulley, C^2, actuated by a belt rotated continuously by a steam-engine or other suitable power. On the shaft B is fixed a large spur gear-wheel, B^2, and a peculiarly-formed wheel, D, to be described farther on.

E is a chuck or short upright roller, having a collar, E′, and screw-threads *e* on its exposed upper end. On its lower end is formed a small spur gear-wheel or pinion, E^2, which latter is engaged with the gear-wheel B^2, and receives a rapid rotary motion therefrom as the former is slowly revolved.

G is a clearer—a spring-dog held on the framing A by screws *g*. The wheel D is formed with a lip, D′, which holds the spring-dog G depressed, except during a small portion of each revolution. On the wheel D is bolted a segment, D^2, the exterior of which is formed with inclined ridges *d*, which match to the screw-threads *e* on the chuck E. This ridged segment may also be of hardened steel. As the parts revolve, the ridges *d* match successively in the grooves *e* in the chuck E, and give a corresponding shape to those portions of the cap and nozzle which are caught between them. Above the segment D^2 is a flange, D^3. This, too, extends only partially around the wheel; but its front edge projects somewhat in advance of the segment D^2.

In the operation of the machine the wheel D, during a portion of each revolution, first presents the flange D^3 over chuck E, so as to hold down firmly the nozzle and cap, which have been previously applied by the attendant upon the chuck, and next presents its ridged surface *d*, matching the ridged surface *e* of the roller, so as to produce corresponding screw-threaded ridges in the cap and nozzle. These ridges in the cap and nozzle are fully completed during the passage of the ridged portion *d*. Then the rotation of the wheel removes the partial flange D^3 and liberates the spring-dog G, which latter rises smartly by its elasticity and lifts and ejects the completed sheet-metal parts.

A hole, *a*, is conveniently placed to allow the completed nozzle and cap still remaining together to descend into any convenient receptacle placed below the table, or into a spout leading through the floor to an apartment below. The attendant next applies a fresh blank for a cap and nozzle on the chuck or roller E, and the rotation of the wheel, bringing the flange over it, holds it down, and it is in turn treated between the ridged surfaces *d e*, and the entire round of operations is repeated. The several chucks or screw-threads E are mounted in detachable portions A′ of the framing, which are held in placed by stout bolts *a*′. It is important to be able to adjust the chucks slightly toward and from the wheel D, to compensate for different thicknesses of the metal to be treated or imperfections in the construction or inequalities in the wear.

I are set-screws tapped through projections A in the framing and acting against the outer edge of each adjustable piece A′. By turning any one of these the corresponding chuck E may be adjusted toward or from the wheel D with any required degree of nicety.

It is important to the successful working of the ejector that the blanks shall be of such size and the work so conducted that when the blanks have been completely threaded the finished nozzle and cap shall be so much larger than the chuck E that they may be ejected by a direct upward movement. In other words, the screw-threads of the nozzle and cap must not engage with the threads *e* on the chuck, so as to hold thereon and prevent the proper ejection by a direct upward movement.

Modifications may be made without departing from the principle or sacrificing the advantages of the invention. The grooved portion *d* can be shortened or lengthened. Instead of making the part thereof which is first presented to the cap to merely indent a little and the succeeding portions to deepen the grooves and ridges thus produced, so as to complete the screw-threads by a number of revolutions of the nozzle and cap, the grooved portion *d* may be shorter, and the entire threads in the sheet metal may be produced complete at a single treatment between the wheel D and the chuck E. Thus arranged it will be only necessary to have the grooved part *d* of a little more length than one circumference of the chuck E.

I have shown the partial flange D^3 and the segment D^2 as both secured to the wheel D by the same bolts. I prefer this mode of mounting; but other means may suffice. I have shown the segment D^2 as held in a rabbet in the upper surface of the wheel D, so that the offset or shoulder D^4 of this rabbet receives the inner edge of the segment and supports it against the strong pressure in the radial direction experienced when the machine is at work on the two thicknesses of thick and hard sheet-iron. This construction affords an important advantage; but the machine may succeed with the segment simply held by the bolts or by other convenient means.

I have shown four chucks E, requiring four attendants, and prefer such number; but a less or greater number may be used. The machine will succeed with only one roller E, and the power consumed in its working will be proportionately reduced and the amount of work which it is capable of doing will be proportionately decreased.

I have shown the gear-wheel B^2 as eight times larger than the pinion E^2, with which it engages. This may be varied; but it is essen-

tial that it shall be in some exact proportion, as six times or seven times, so that the ridges *d* shall always match to the screw-threads *e* in all positions of the parts.

It will be understood that, if it is for any reason preferable, I can treat the cap without the nozzle and the nozzle without the cap. I prefer treating both together, as shown.

The wheel D may rotate intermittently instead of continuously, or it may partially rotate alternately in opposite directions. I prefer a slow and moderate continuous revolution. The capacity for doing so constitutes one of the merits of my invention.

The wheel may be made smaller, and only two chucks E or only one may serve; or I can employ a greater number than shown. In the latter case, the wheel D being larger, there may be two of the segments D^2 placed opposite to each other. The lateral pressure exerted by each balances the other.

With either construction that portion or those portions of the wheel D which are not provided with the segment D^2 serve as a recess, leaving a free space when that part of the wheel is presented to allow the blank to be applied and the completed nozzles removed.

The nozzles and caps may be other metal than tinned sheet-iron. Zinc is frequently used. I can thread the two separately in any case, if preferred.

Parts of the invention can be used without the whole. I can dispense with the partial flange D^3 and hold each blank down upon its respective chuck by other means, as by a plunger descending from above.

I claim as my invention—

1. In a cap-threading machine, the rotating wheel D, having a segment, D^2, and portion *d*, obliquely grooved, and another portion of the circumference relatively recessed, in combination with a screw-threaded chuck, E, and suitable driving-gear therefor, arranged for joint operation, substantially as herein specified.

2. In a cap-threading machine, the partial flange D^3, carried on the continuously-revolving wheel D *d*, and with the chuck E *e*, arranged for joint operation, as herein specified.

3. In a cap-threading machine, the clearer G, in combination with the revolving wheel D and the partial lip D′ thereon, and chuck E, the parts being provided with screw-threads *e*, and inclined ridges *d*, matching therewith, arranged for joint operation, substantially as herein specified.

4. In a cap-threading machine having a continuously-revolving wheel, D, with a grooved segment, D^2, engaging with a screw-threaded roller, E, the construction of the wheel D with an offset, D^4, adapted to brace the segment D^2 against the strong inward pressure, substantially as herein specified.

In testimony whereof I have hereunto set my hand, at New York city, this 28th day of April, 1888, in the presence of two subscribing witnesses.

PHILIP ELEY.

Witnesses:
H. A. JOHNSTONE,
M. F. BOYLE.