(No Model.)

3 Sheets—Sheet 1.

M. D. LUEHRS, Dec'd.

C. H. H. LUEHRS, Executrix.

NUT TAPPING MACHINE.

No. 583,061. Patented May 25, 1897.

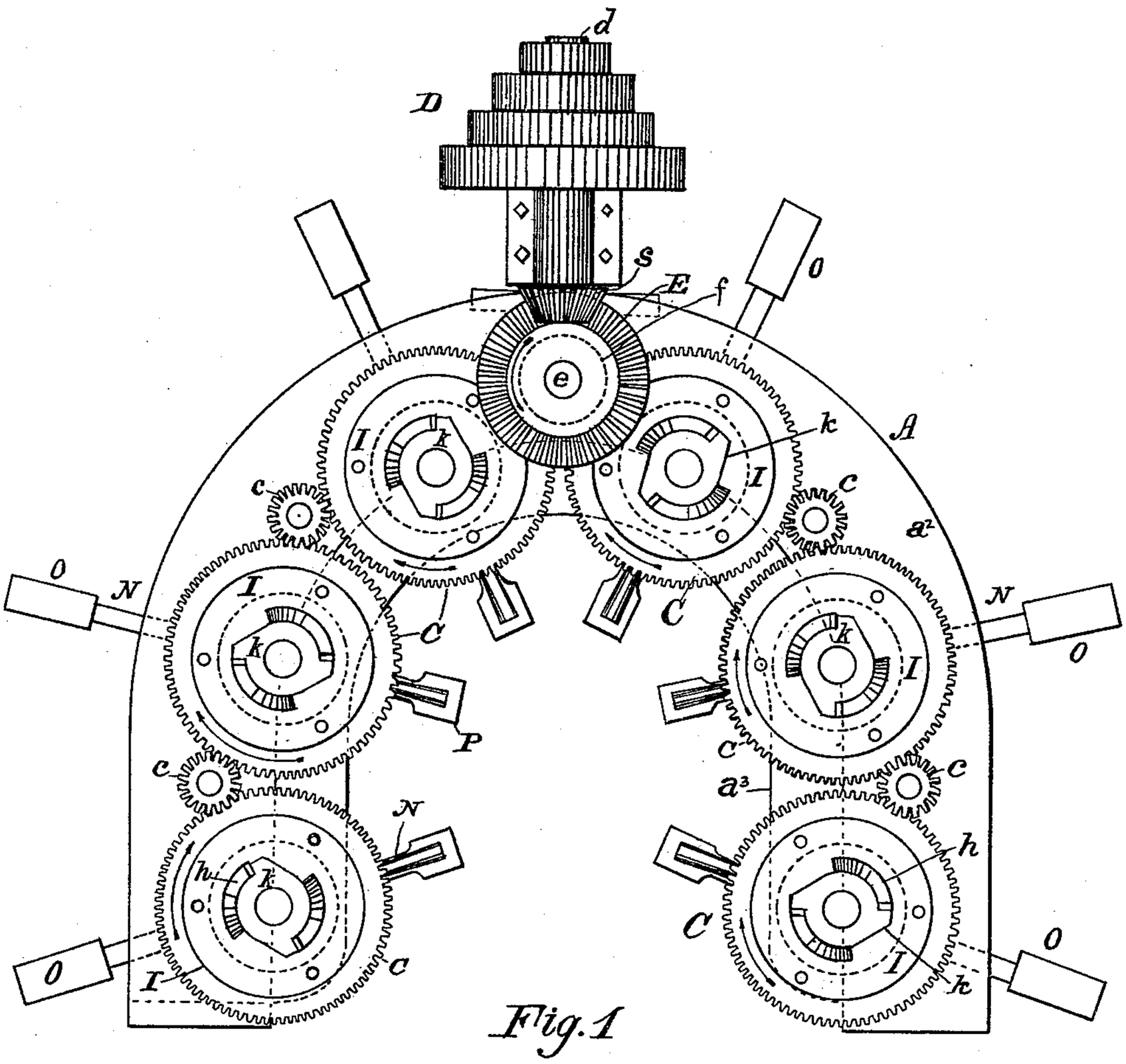

Fig. 1

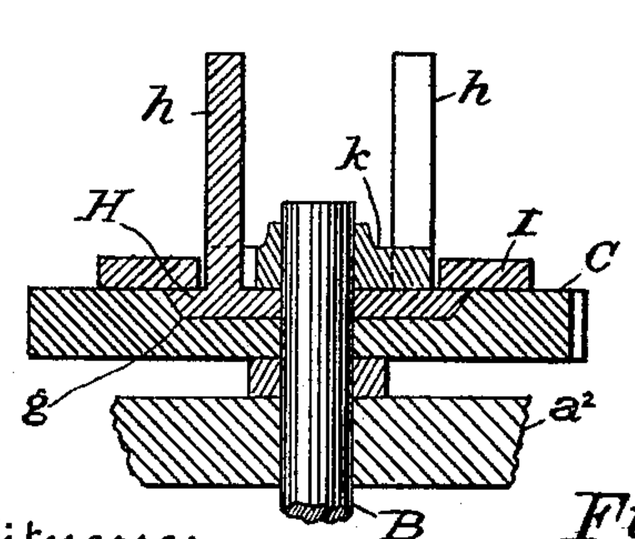

Fig. 5

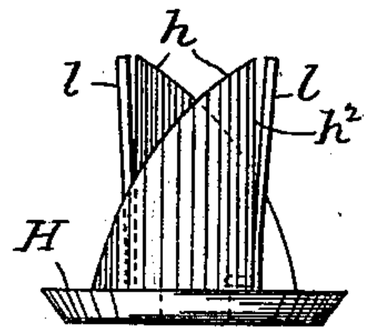

Fig. 6

Witnesses
Myron B. Voce.
John R. Ryder.

Inventor
Michel D. Luehrs
By his Attorney
C. M. Voce

(No Model.) 3 Sheets—Sheet 2.

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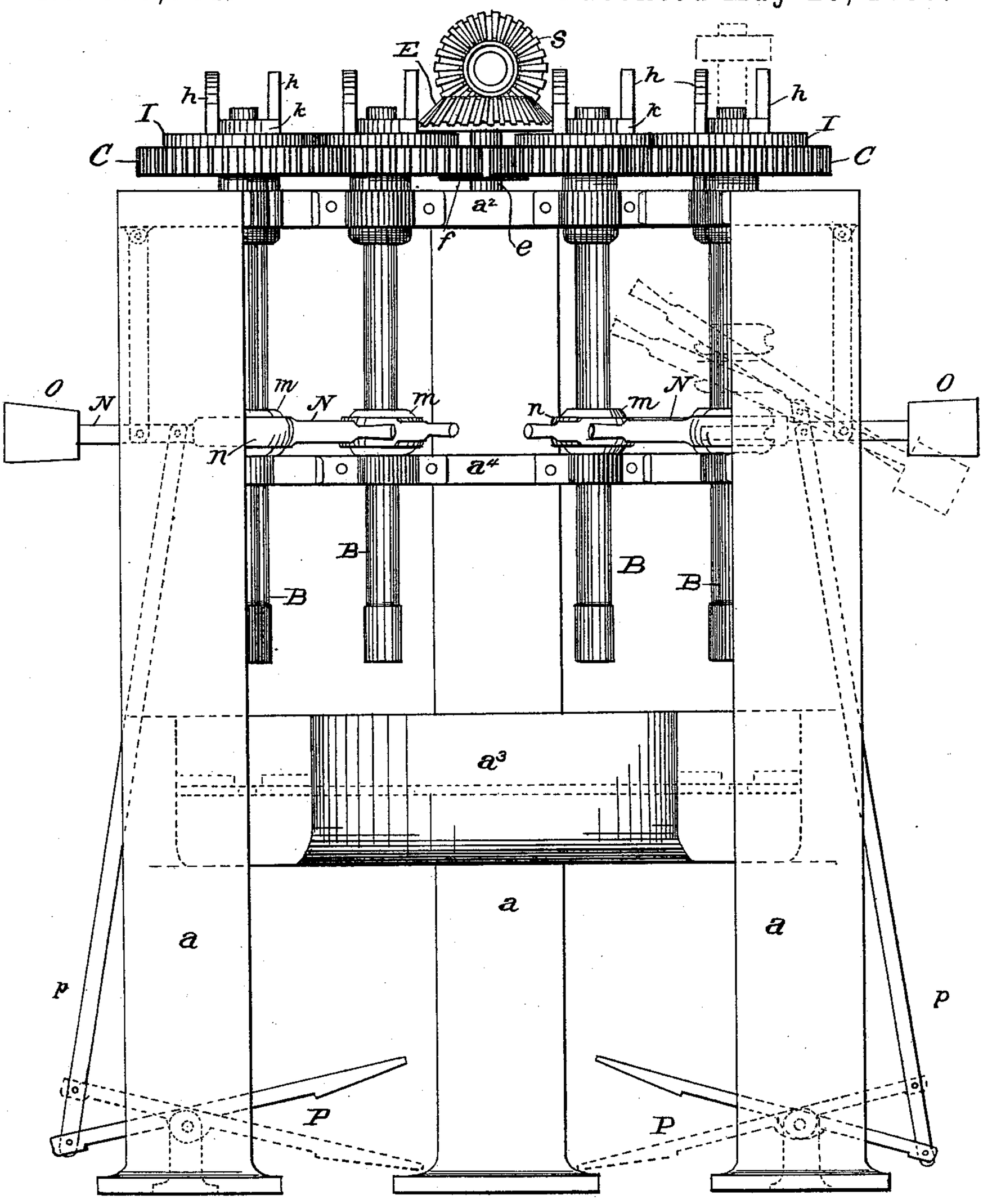

Fig. 2

Witnesses
Myron B. Vorce
John R. Ryder

Inventor
Michel D. Luehrs
By his Attorney
C. M. Vorce

(No Model.) 3 Sheets—Sheet 3.

M. D. LUEHRS, Dec'd.

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NUT TAPPING MACHINE.

No. 583,061. Patented May 25, 1897.

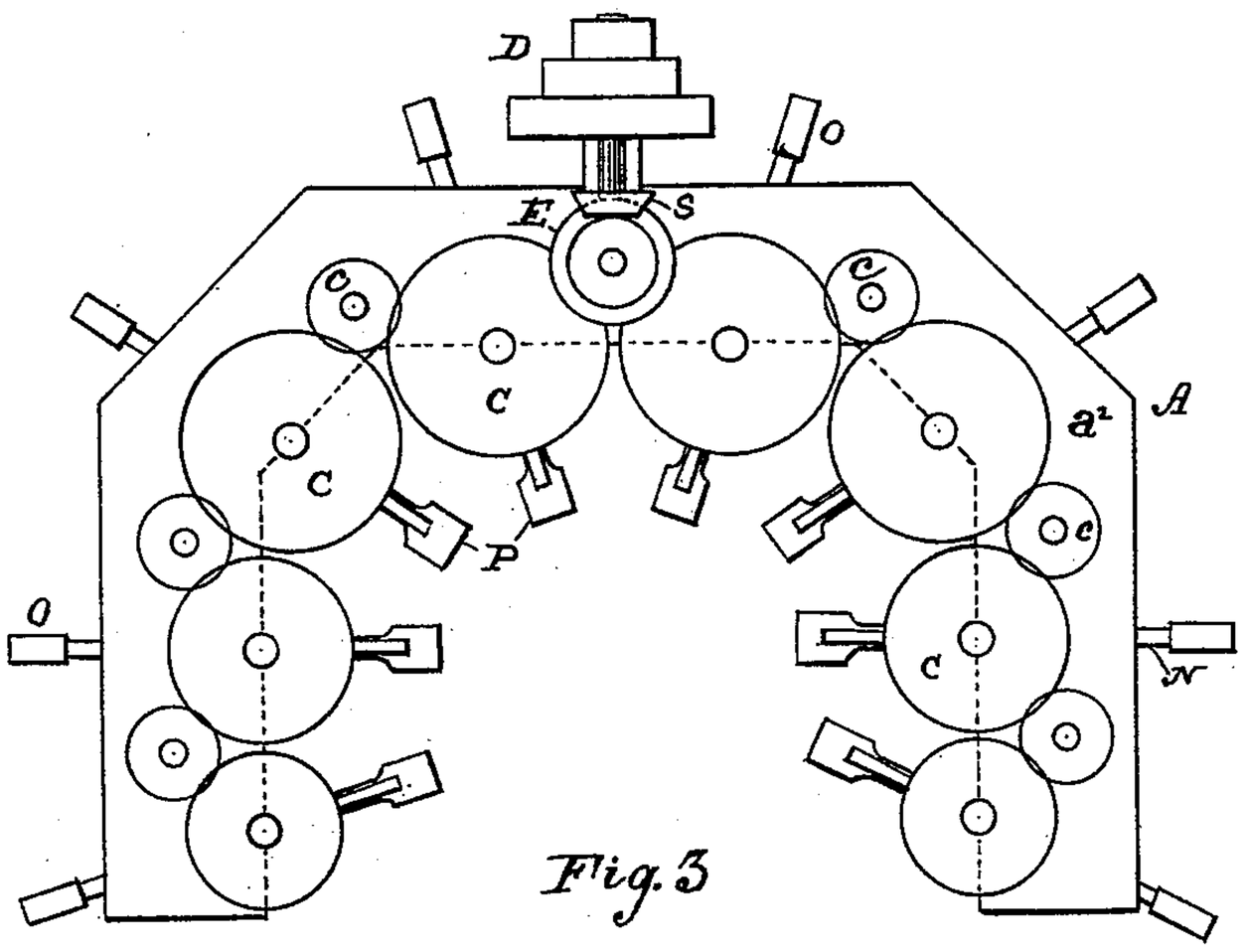

Fig. 3

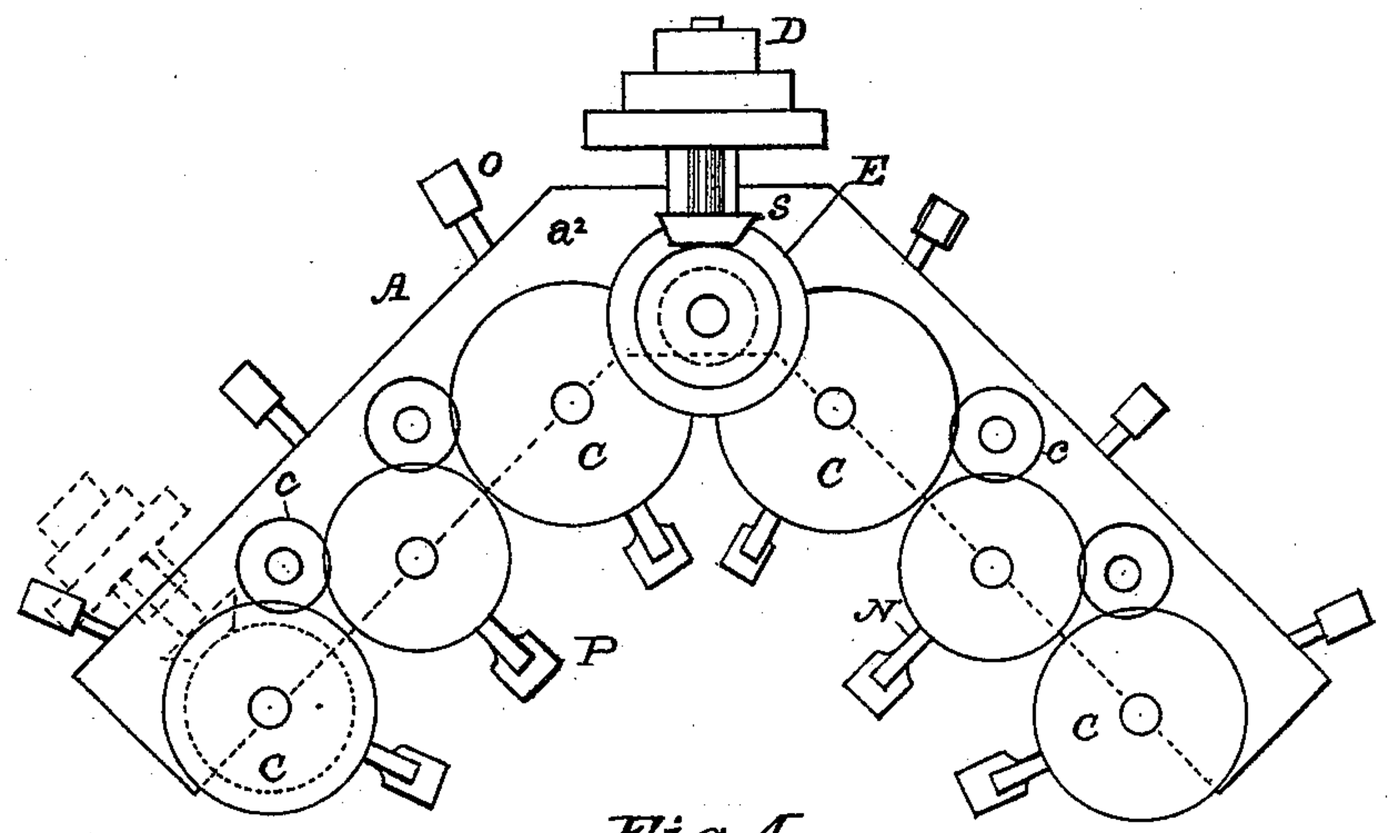

Fig. 4

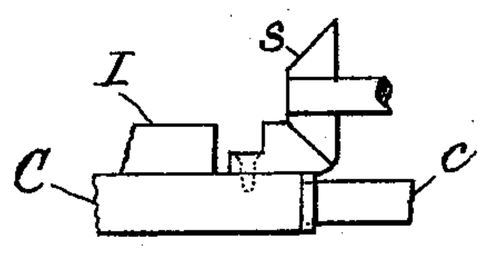

Fig. 7

Witnesses
Myron B. Vorce.
John A. Ryder.

Inventor
Michel D. Luehrs,
By his Attorney
C. M. Vorce

UNITED STATES PATENT OFFICE.

MICHEL D. LUEHRS, OF CLEVELAND, OHIO; CATHARINE H. H. LUEHRS EXECUTRIX OF SAID MICHEL D. LUEHRS, DECEASED.

NUT-TAPPING MACHINE.

SPECIFICATION forming part of Letters Patent No. 583,061, dated May 25, 1897.

Application filed February 10, 1896. Serial No. 578,699. (No model.)

To all whom it may concern:

Be it known that I, MICHEL D. LUEHRS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Nut-Tapping Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in nut-tapping machinery, the objects of the invention being to increase the efficiency of the apparatus, render it easier to operate, and diminish the cost of operating it. These objects I attain by means of the novel features of construction, combination, and arrangement hereinafter fully described, and specifically pointed out in the claims.

In the drawings hereto annexed, Figure 1 represents in plan view, and Fig. 2 in elevation, a nut-tapping machine constructed and arranged according to my invention. Fig. 3 is a diagram representing in plan view a modified arrangement of the machinery, and Fig. 4 a diagram illustrating further and different modifications of structure embraced in my invention. Fig. 5 is a central vertical section through one of the gears C and its spindle, and Fig. 6 is a detail of the standard *h*. Fig. 7 is a detail showing an alternative method of actuating the gearing.

A represents the frame or body of the machine, comprising standards *a*, joined at the top by a strong cross-plate a^2 and having secured to or integral with the frame A a trough or pan a^3, in which are fixed the nut-holders, and which trough holds the lubricant usually employed in nut-tapping. Above the trough or pan is a bar or plate a^4, which, besides strengthening the frame, serves as a guide for the spindles B B, which carry and actuate the taps. These spindles pass through bearings on a^2 and a^4, and above the latter they pass through the gears C C, by which they are actuated, as hereinafter described.

The gears C C, &c., which I prefer to make of the same size, although they may, if preferred, be of different sizes, are so spaced as to be out of contact with each other and may be driven from a single set of pulleys D, either directly or, preferably, in the following manner: A bevel-gear E, actuated by a bevel-pinion *s* on the pulley-shaft *d*, carries on its shaft *e* a pinion *f*, which meshes with the two adjacent gears C C and therefore rotates them in the same direction, as shown by the arrows, which show the direction of rotation of the respective gears. A small gear *c* is placed between each pair of the gears C C, meshing with each, and thus transmitting the same direction of rotation to each of the gears C and spindles B. For driving the spindles I attach to each of the gears C one or more standards *h*, having a vertical face h^2, and I affix rigidly to the spindle near its top an arm *k*, projecting sufficiently to be engaged by and rotate with the standards. The standards *h* are made high enough to remain in engagement with the arms *k* through nearly the whole distance to which the spindle can be lifted, but so that when the treadle is depressed to its extreme limit the arms *k* will be lifted above the standards *h*, and the spindle will instantly stop. This provision affords a valuable protection in case of accidents, &c. To avoid the jar and noise caused by the standards *h* striking the arms *k* and to reduce the wear caused thereby, I prefer to attach to the face h^2 or arm *k* a spring *l*, which cushions the blow, but when forced back against the face h^2 becomes rigid therewith.

In nut-tapping machines of the vertical-spindle class the spindle slides through its actuating-gear, and to secure its rotation by the gear it is usual to provide splines or ribs on the spindle working in grooves on the gear, or vice versa, and in such constructions the rotation of the spindle by the gear is positive, so that in case of extra or unusual load on the tap—as, for instance, where the nut is punched with too small a hole or where a tap becomes dull or damaged—the breakage of some part of the machinery becomes inevitable. Besides this disadvantage it is impossible with such construction to stop any of the spindles independently of the others, as is sometimes important, as in the case of accidents, &c.

To provide for such contingencies, I have devised the construction shown. In the upper side of each of the gears C is formed a depression *g*, in which is seated an annular disk H, on which are the standards *h*. A ring I, secured to the gear C and overlapping on the disk II, binds the same upon the gear C with sufficient force to cause it to rotate therewith against the usual or ordinary strain, but allows it to turn in its seat if the strain becomes dangerously great, and thus prevents breakage. Obviously the disk II may be placed upon the gear instead of being let into the same, but I prefer the latter construction, and prefer to bevel the periphery of the disk II, as shown. By setting up the bolts or screws which secure the ring I to the gear more or less tightly the friction of the disk in its seat may be readily regulated, so as to resist or yield to any degree of strain. Each of the spindles B is provided with a rigid grooved collar *m*, in which groove is seated a pin or lug on the ring *n* of the handle-bar N, the other end of which bar carries a counterweight O. A treadle P, connected by rod *p* to the ring *n* or bar N, serves to lift the spindle B as required, or when the hands of the operator are busy.

By making the gears C of different sizes and properly proportioning the gears *c* the spindles may obviously be driven at different speeds, as is sometimes desirable for different-sized nuts, and this arrangement is within my invention, as also is the omitting of gear E and driving the gears C direct from pinion *s*, as shown in Fig. 7 and in dotted lines in Fig. 4.

By constructing the machine of the horseshoe form shown in Fig. 1, or some approximately similar form, such as the half-octagon shown in Fig. 3 or the angular form shown in Fig. 4, I accomplish several important ends. In the first place, I bring all the handles and treadles within the reach of a single operator without the necessity of his moving about to reach them, whereas in all non-rotating nut-tapping machines of which I have any knowledge that employ a number of spindles the operator is required to travel several feet to reach all the spindles, and it is sometimes necessary to employ two operators for machines having as many as five or six spindles. By thus grouping the spindles around the operator I dispense, in the case of large machines, with all necessity for employing more than one man's labor, and I enable the single operator to accomplish one-third or one-half more work in the same time by saving the time usually required in moving from one spindle to another. These savings effect a large reduction of the cost of the work, the work done by each of the spindles in a given time being very much increased. In the second place, I am enabled to use a lighter and better braced frame, which stands steadier and with less jar than a straight frame would, unless unusually heavy, thereby securing a marked economy of construction.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A nut-tapping machine having a plurality of spindles arranged in an angular or curved line on a stationary frame and partially surrounding the point which the operator is to occupy, substantially as described.

2. In a nut-tapping machine the combination of a number of spindles arranged in a curved or angular line on a stationary frame and partially surrounding the point to be occupied by the operator, gears actuating said spindles, auxiliary gears between the spindle-actuating gears and meshing therewith, and a driven gear meshing with one or more of the spindle-actuating gears, substantially as described.

3. In a nut-tapping machine the combination of a number of spindles arranged in a curved or angular line on a stationary frame and partially surrounding the point to be occupied by the operator, gears actuating said spindles, auxiliary gears located between each pair of spindle-actuating gears and meshing with both, and a driven gear interposed between one pair of spindle-actuating gears and meshing with both, substantially as described.

4. In a nut-tapping machine the combination of a number of spindles arranged in a curved or angular line on a stationary frame and partially surrounding the point to be occupied by the operator, gear-wheels having sliding engagement with said spindles, standards borne by said gears and engaging arms on said spindles, auxiliary gears located between each pair of spindle-actuating gears and meshing with both, and a driven gear interposed between one pair of spindle-actuating gears and meshing with both, substantially as described.

5. In a nut-tapping machine the combination of a number of vertically-sliding spindles arranged in a curved or angular line on a frame of corresponding shape and partially surrounding the point to be occupied by the operator, gear-wheels supported on said frame and having sliding engagement with said spindles, standards borne by said gears and engaging arms on said spindles, auxiliary gears located between each pair of spindle-actuating gears and meshing with both, and a driven gear interposed between one pair of spindle-actuating gears and meshing with both, substantially as described.

6. In a nut-tapping machine the combination of a number of vertically-sliding spindles arranged in a curved or angular line on a stationary frame and partially surrounding the point to be occupied by the operator, gear-wheels supported on said frame and having sliding engagement with said spindles, standards borne by said gears and engaging arms on said spindles, a handle spanning each spindle and engaging a groove thereon, aux-

iliary gears located between each pair of spindle-actuating gears and meshing with both, and a driven gear interposed between one pair of spindle-actuating gears and meshing with both, substantially as described.

7. In a nut-tapping machine the combination of a number of vertically-sliding spindles arranged in a curved or angular line on a stationary frame and partially surrounding the point to be occupied by the operator, gear-wheels supported on said frame and having sliding engagement with said spindles, standards borne by said gears and engaging arms on said spindles, a handle spanning each spindle and engaging a groove thereon, said handles converging toward the point to be occupied by the operator, auxiliary gears located between each pair of spindle-actuating gears and meshing with both, and a driven gear interposed between one pair of spindle-actuating gears and meshing with both, substantially as described.

8. In a nut-tapping machine the combination of a number of vertically-sliding spindles arranged in a curved or angular line on a stationary frame, gear-wheels supported on said frame and having sliding engagement with said spindles, standards borne by said gears and engaging arms on said spindles, a handle spanning each spindle and engaging a groove thereon, a treadle connected to each handle-bar, auxiliary gears located between each pair of spindle-actuating gears and meshing with both, and a driven gear interposed between one pair of spindle-actuating gears and meshing with both, substantially as described.

9. In a nut-tapping machine the combination of a number of vertically-sliding spindles arranged in a curved or angular line upon a stationary frame and partially surrounding the point to be occupied by the operator, gear-wheels supported on said frame and having sliding engagement with said spindles, standards borne by said gears and engaging arms on said spindles, a handle spanning each spindle and engaging a groove thereon, a treadle connected to each handle-bar, said handles and treadles converging toward the point to be occupied by the operator, auxiliary gears located between each pair of spindle-actuating gears and meshing with both, and a driven gear interposed between one pair of spindle-actuating gears and meshing with both, substantially as described.

10. The combination with the spindle-actuating gear and the spindle sliding therethrough, of standards secured to said gear and having a cushioning-spring, and an arm affixed to the spindle and adapted to be engaged by said standards, substantially as described.

11. The combination with the spindle-actuating gear and the spindle sliding therethrough of a disk rotatably secured to the gear, standards carried by said disk, an arm affixed to the spindle and adapted to be engaged by said standards, and means for clamping said disk upon said gear, substantially as described.

12. The combination with the spindle-actuating gear and the spindle sliding therethrough of a disk rotatably seated in said gear, standards carried by said disk, an arm affixed to the spindle and adapted to be engaged by said standards, a ring secured to said gear and overlapping on said disk, substantially as described.

13. The combination with the spindle-actuating gear and the spindle sliding therethrough of a disk rotatably secured to the gear, standards carried by said disk, an arm affixed to the spindle and adapted to be engaged by said standards, a cushioning-spring on the contact-face of the standard, and means for clamping said disk upon said gear, substantially as described.

In witness whereof I hereunto set my name in the presence of two witnesses.

MICHEL D. LUEHRS.

In presence of—

DANIEL M. LUEHRS,

WM. G. TAYLOR.