B. F. PAIST.

NUT TAPPING MACHINE.

APPLICATION FILED MAR. 15, 1909.

952,937.

Patented Mar. 22, 1910.

5 SHEETS—SHEET 1.

Fig. 1.

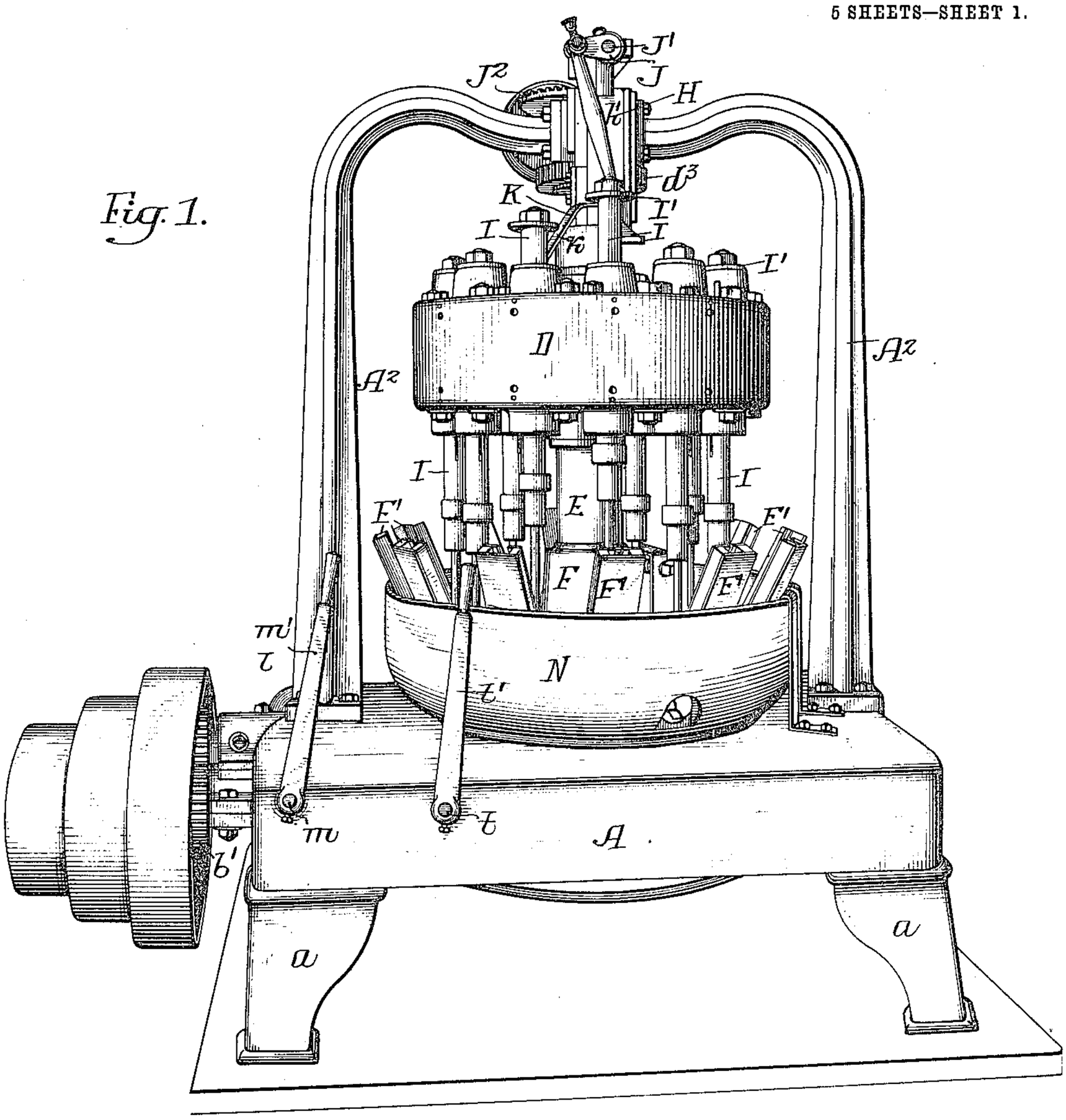
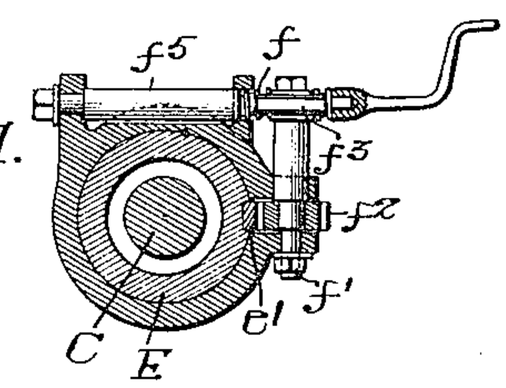


Fig. 11.



Witnesses:
Titus H. Ivors,
Wills A. Burrowes

Inventor:
Benjamin F. Paist.
by his Attorneys.-
Howson & Howson

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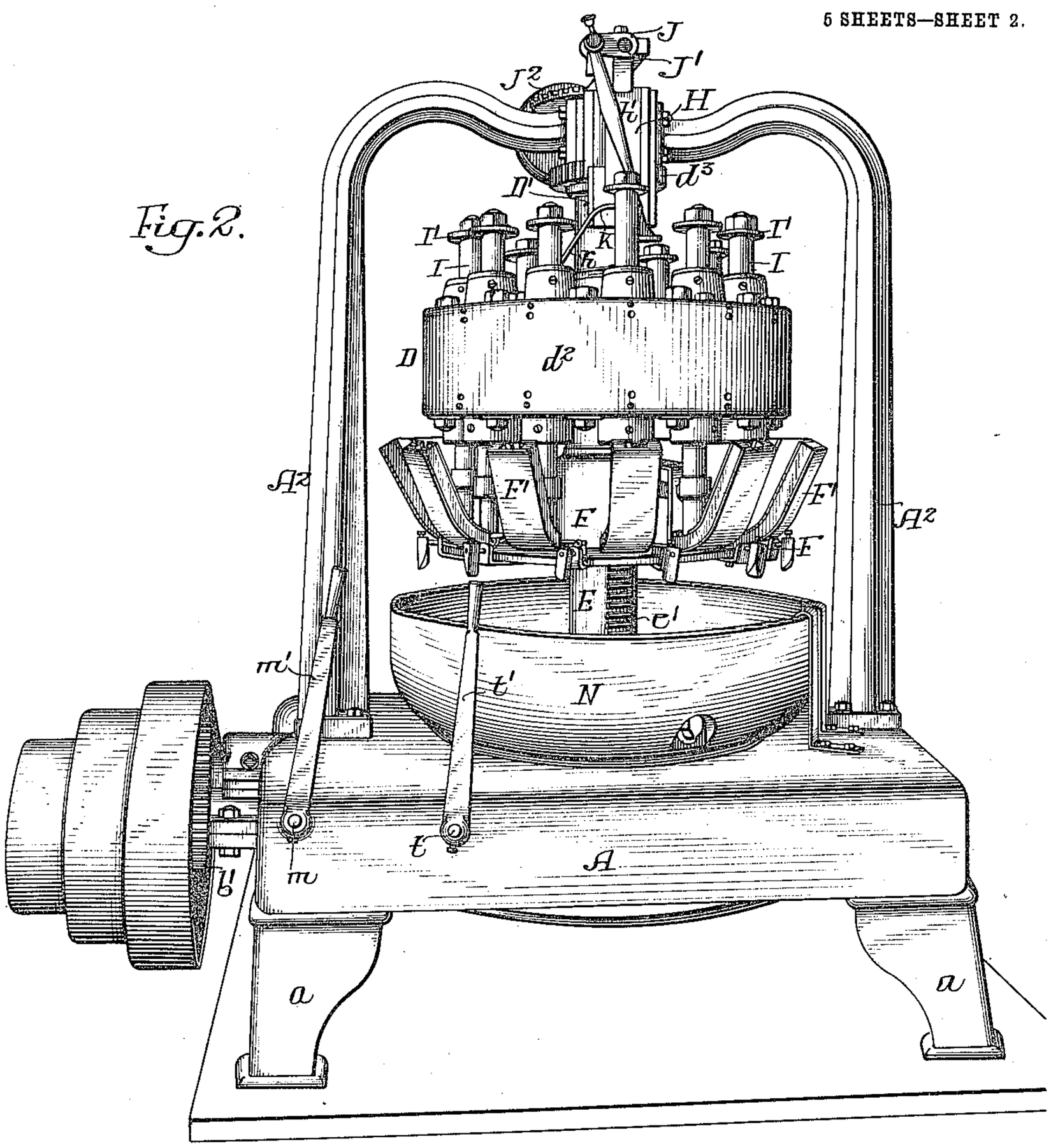
5 SHEETS—SHEET 2.

Fig. 2.



Witnesses:-
Titus H. Irons.
Wills A. Burrows

Inventor:—
Benjamin F. Paist.
by his Attorneys.
Howson & Howson

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5 SHEETS—SHEET 3.

Fig. 10.

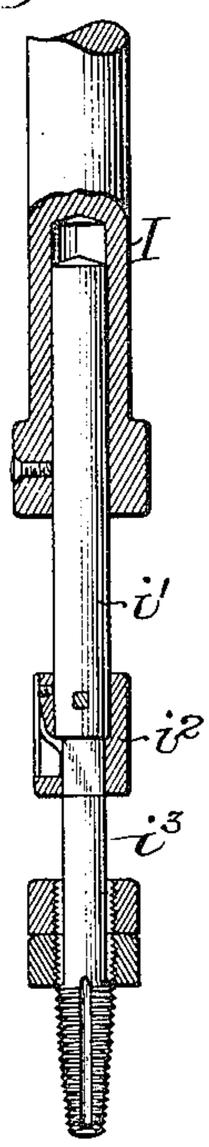
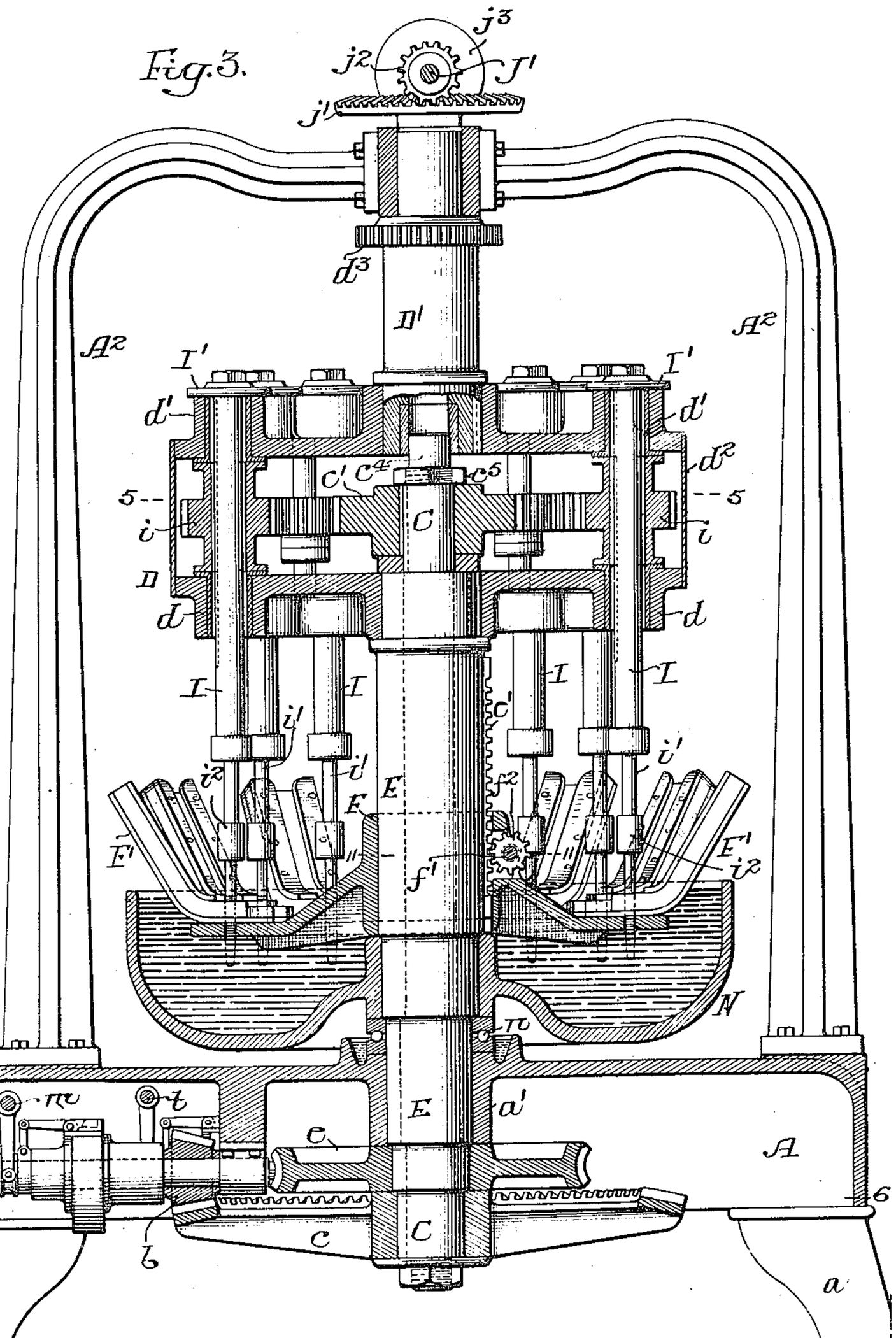


Fig. 3.



Witnesses.—

Lewis H. Crone.

Nelle A. Burrows

Inventor.—

Benjamin F. Paist

by his Attorneys.

Howson & Howson

B. F. PAIST.

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5 SHEETS—SHEET 4.

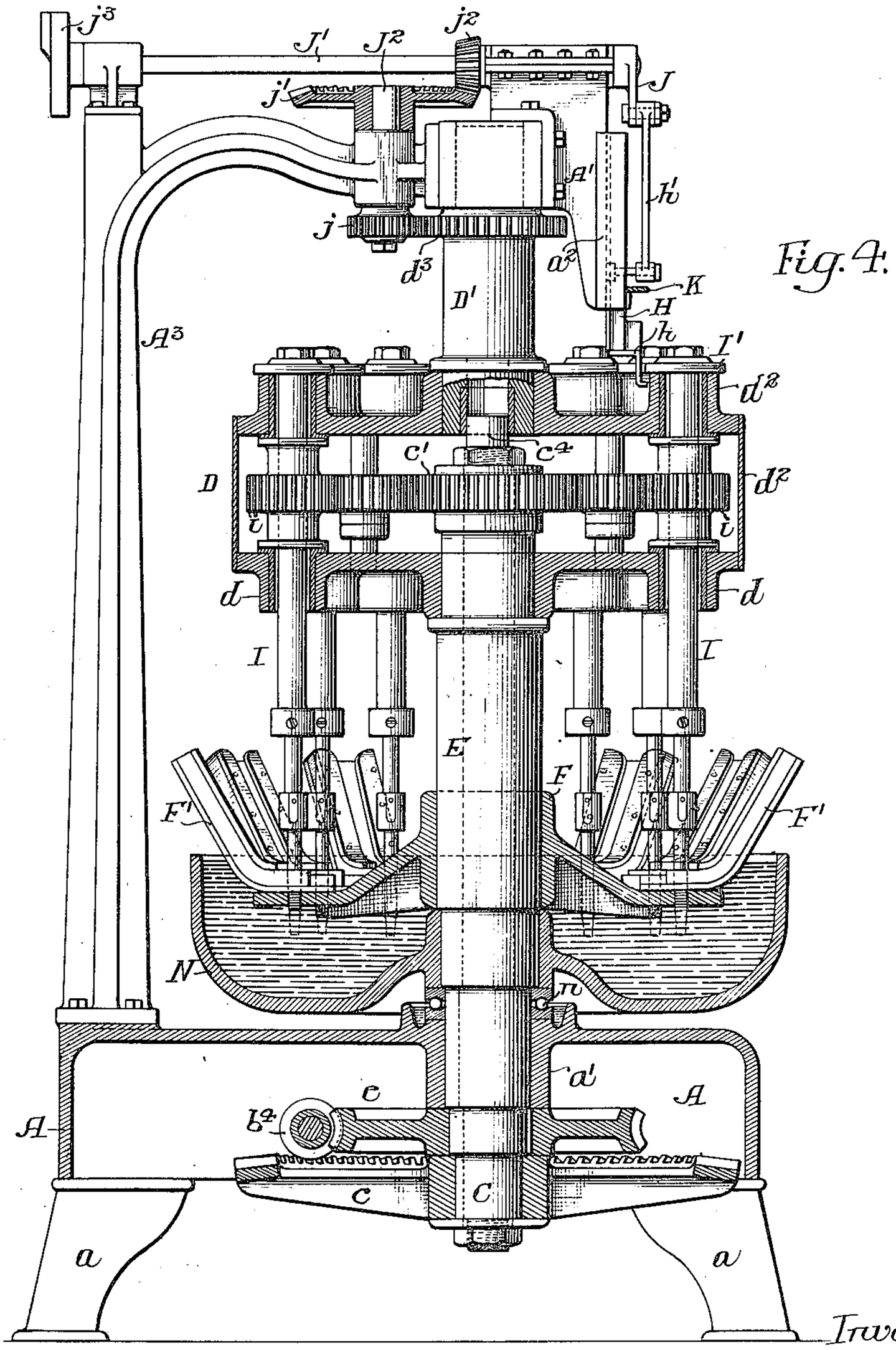

Fig. 4.

Witnesses:-
Titus H. Irons.
Wills A. Burrowes

Inventor:-
Benjamin F. Paist
by his Attorneys
Howson & Howson

B. F. PAIST.

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5 SHEETS—SHEET 5.

Fig. 5.

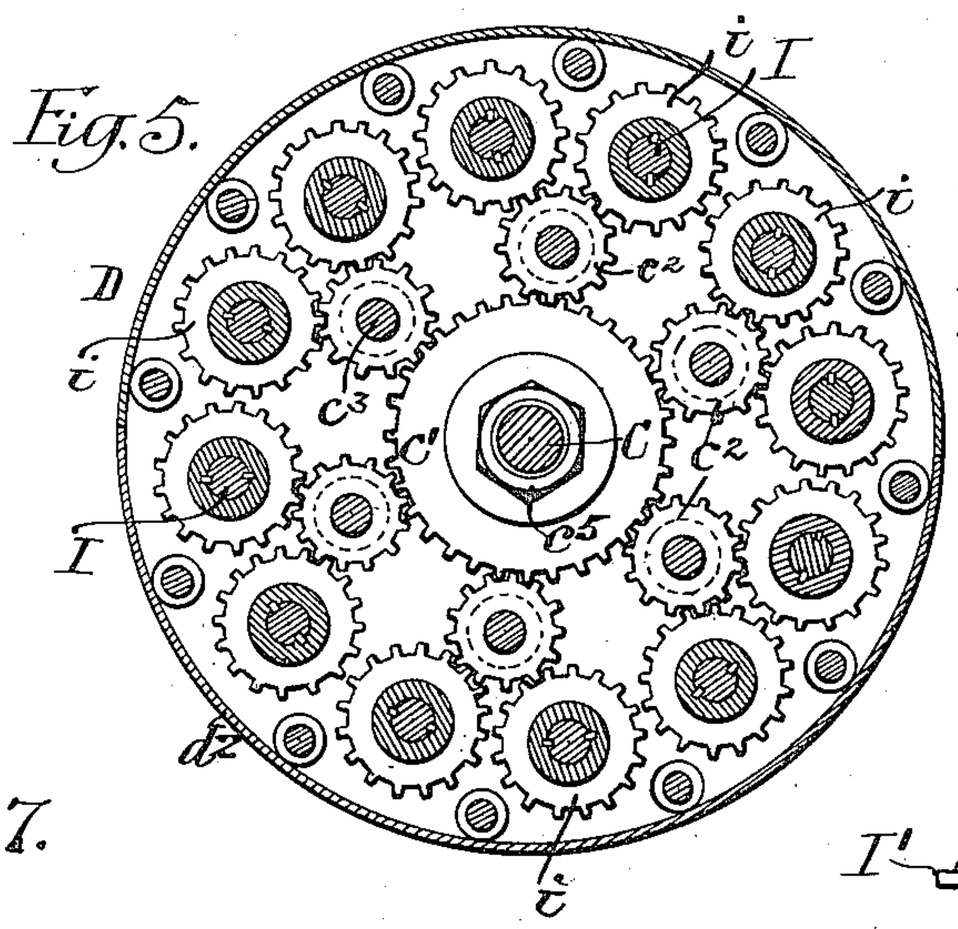


Fig. 9.

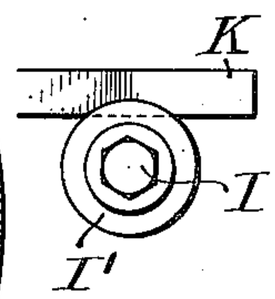


Fig. 8.

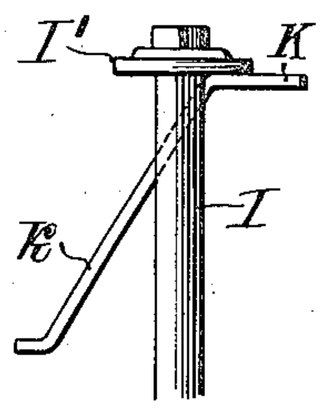


Fig. 7.

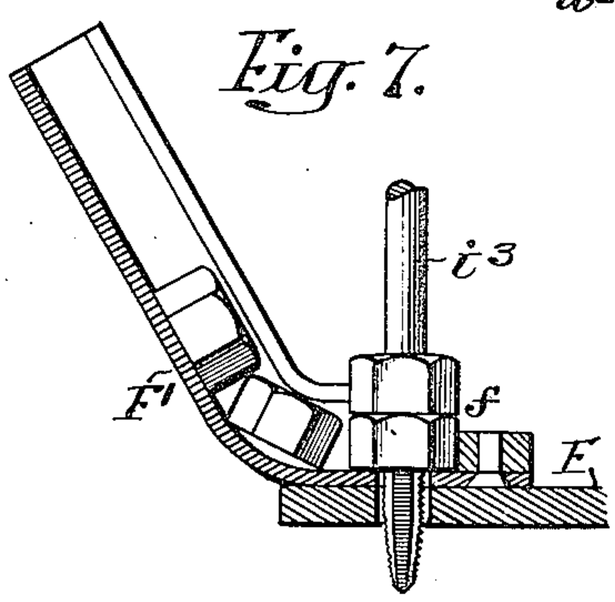
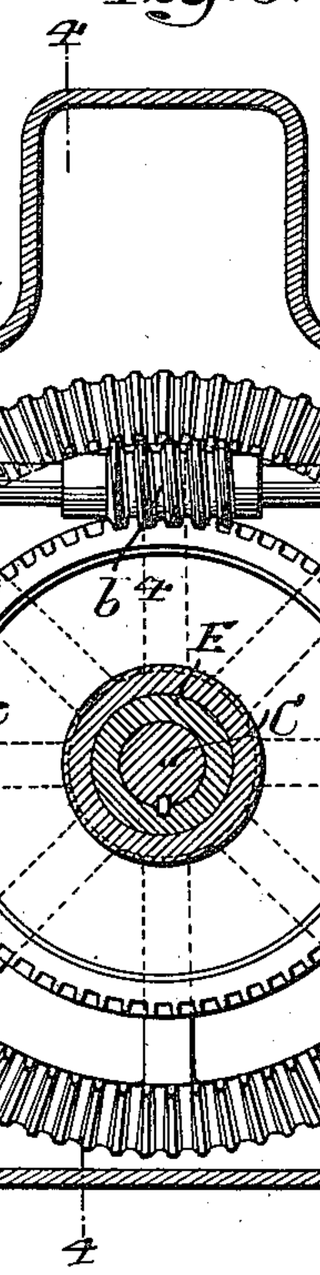


Fig. 6.



Witnesses.

Titus H. Jones,

Wills A. Burrows

Inventor.

Benjamin F. Paist.

by his Attorneys:

Howson & Howson

UNITED STATES PATENT OFFICE.

BENJAMIN F. PAIST, OF PHILADELPHIA, PENNSYLVANIA.

NUT-TAPPING MACHINE.

952,937. Specification of Letters Patent. Patented Mar. 22, 1910.

Application filed March 15, 1909. Serial No. 483,579.

To all whom it may concern:

Be it known that I, BENJAMIN F. PAIST, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Nut-Tapping Machines, of which the following is a specification.

The main object of my invention is to construct an automatic nut tapping machine which will accurately and quickly tap the nuts while submerged in a lubricating liquid.

A further object of the invention is to so design the machine that access can be had to the bowl in which the taps are submerged.

My invention relates further to the details of the mechanism fully described hereafter, reference being had to the accompanying drawings, in which:—

Figure 1, is a perspective view of my improved nut tapping machine, the device being in position within the bowl; Fig. 2, is a view similar to Fig. 1, showing the tapping mechanism raised so that access may be had to the bowl; Fig. 3, is a vertical sectional view on the line 3—3, Fig. 6; Fig. 4, is a vertical sectional view on the line 4—4, Fig. 6; Fig. 5, is a sectional plan view illustrating the gearing, the section being taken on the line 5—5, Fig. 3; Fig. 6, is a sectional plan view on the line 6—6, Fig. 3; Fig. 7, is a detached sectional view of the tap and chute; Figs. 8 and 9, are views illustrating the means for raising and holding the tap in its raised position; Fig. 10, is a view of the tap and spindle, and Fig. 11, is a sectional view on the line 11—11, Fig. 3.

A is the base of the machine mounted on feet a in the present instance, and in this base are the bearings for the main shaft B which has a bevel pinion b meshing with the bevel wheel c secured to the vertical shaft C which extends up through the machine, and attached to the upper end of the shaft is a gear wheel c' for turning the spindles.

Geared to the shaft B is a shaft B′ through the medium of the train of gears b', b^2, b^3, and on this shaft is a worm b^4 which meshes with a worm wheel e on a vertical tubular shaft E which is mounted in bearings a' in the frame A and carries the spindle casing D and also supports the chute carrier F. The casing D has a lower plate d and an upper plate d', spaced apart by suitably arranged studs. In each of the plates are bearings for the spindles I and on the spindles are the pinions i which are splined to the spindles, so that while the spindles must turn with the pinions they are free to be raised or lowered. The pinions i mesh with intermediate wheels c^2 mounted on vertical studs c^3 carried by the plates d, d'. These wheels c^2 mesh in turn with the gear wheel c' on the spindle C. It will be noticed that all the pinions of the spindles intermesh and each wheel c^2 meshes with two of the pinions, as clearly illustrated in Fig. 5. The pinions i are mounted between the two plates d, d' and are prevented from moving vertically. The casing d^2 incloses the space between the plates d, d'.

Secured to the spindles I are adjustable extensions i' having chucks i^2 for the taps i^3, Fig. 10, so that the taps can be readily detached from the chucks when desired and taps of different diameters substituted therefor.

On the upper ends of the spindles I are heads I′ clearly shown in Figs. 8 and 9. These heads are so proportioned that they will project beyond the bearings of the spindles and into the path of a vertical reciprocating lifter H having a finger h which extends under the heads, as illustrated in Fig. 4. This lifter is actuated by a crank J on a shaft J′ through the medium of a connecting rod h'; and is adapted to ways a^2 on the head A′ secured to the frame. The frame consists in the present instance of three uprights A^2, A^2, A^3.

K is a platform onto which the heads travel as they leave the lifter H when in its elevated position, so that each tap is held in the raised position a sufficient length of time to give the operator a chance to properly locate the nut in line with the tap. As the spindle casing turns the head travels down the inclined surface of the table and by its own weight the tap enters the opening in the nut and forms a screw thread therein.

The shaft J′ is driven from the spindle casing D through the medium of a hollow shaft D′ which has its bearings in the upper frame and extends into and is firmly secured to the upper plate d' of the spindle casing D, forming in fact a continuation of the hollow shaft E. On this shaft D′ is a gear wheel d^3 which meshes with a pinion j on a vertical shaft J^2 adapted to bearings in the upper frame, and secured to the upper end

of this shaft is a bevel wheel j' meshing with a bevel pinion j^2 on the shaft J'. On the end of the shaft J' is a counterweight j^3 for counterbalancing the crank J.

N is a basin secured to the shaft E so that it will turn with the shaft. I preferably provide a ball bearing n between the basin and the frame A, although it is not essential. Mounted normally within the basin is the chute carrier F to which I attach the chutes F'; these chutes are formed as illustrated in the drawings having a way for the passage of the nuts, as illustrated in Fig. 7; the nuts coming to a stop f when directly under a tap i^3 so that when the tap is lowered it is in a direct line with the opening in the nut and cuts a thread in the walls of the opening. As one nut after another is fed into position the threaded nuts simply work up onto the shank portion of the taps and when the taps are filled with nuts they are quickly detached from the chuck by the attendant and the nuts removed, when the taps are again placed in position to tap another series of nuts.

The lower ends of these chutes, as before remarked, are submerged in lubricating liquid within the basin N and the chips from the cutting of the threads are collected in the bottom of the basin. When it is desired to clean the basin the carrier F with the chutes F' can be raised bodily by suitable gearing mounted on the carrier F. In the drawings I have shown a rack e' on the shaft E, and meshing with this rack is a pinion f^2 on a shaft f', having a worm wheel f^3 with which meshes a worm f^4 on a shaft f^5 to which a handle can be applied, as illustrated in Fig. 11. When the carrier F is elevated it assumes the position shown in Fig. 2, so that access can be readily had to the basin.

The shaft C has an extension c^4 which is adapted to a bearing in the lower end of the shaft D' and the gear wheel c' is held to the shaft not only by the key but by the nut c^5.

I provide a clutch B^2 on the shaft B and a clutch B^3 on the shaft B'. The clutch B^2 is actuated through the medium of a shifter rod m having a hand lever m' and by actuating this clutch the spindles can be thrown into and out of gear.

The clutch B^3 on the shaft B' is actuated by a clutch rod t having an operating arm or handle t' and controls the movement of the basin, chute carrier and spindle casing. It will be noticed that the arm t' projects above the basin and is arranged close to it, so that in the event of the hands of the operator being caught by the tap or one of the chutes and carried around by the rotating mechanism, he will strike the lever t' and will throw the lever so as to disengage the clutch and stop the rotation of the mechanism. Both levers are within easy reach of the operator so that he can stop either or both shafts as desired.

As the operator has his hands submerged in the lubricating fluid while adjusting the nuts to the taps, it is desirable to have some means for automatically stopping the driving mechanism should an accident happen.

The operation of the machine is as follows:—The basin N is filled with a lubricating liquid and the operator stands in front of the machine within easy reach of the clutch operating levers t' and m', and he feeds nut blanks into the chutes F' and one after another will come in line with the taps, as indicated in Fig. 7, and as the spindle casing D and the spindles rotate, the spindles are first lifted up and travel on the platform K, while the operator is adjusting the nut under that particular spindle, and as the spindle is lowered it enters the opening in the nut blank and commences to cut the thread in the nut; the nut being submerged in the lubricating liquid is properly lubricated at all times. After the tap has threaded the nut, the nut remains on its shank, and when the nuts have accumulated the tap is removed from its chuck and the nuts discharged, after which the tap is again placed in position. By making the spindles in two sections the taps can be adjusted when worn away or broken at the ends. When it is desired to clean the basin all that is necessary is to apply a handle to the squared end of the shaft f^5, Fig. 11, and on turning the handle the chute carrier F can be raised to the position shown in Fig. 2, when access can be had to the bottom of the basin, the worm and worm gearing holding the carrier in its raised position. By this construction it is not necessary to detach any of the parts to gain access to the basin.

I claim:—

1. The combination in a nut tapping machine, of a vertical shaft, a rotating spindle carrier mounted thereon, a series of tap spindles having their bearings in said carrier, means for rotating said spindles, means for elevating them, a chute carrier mounted on the vertical shaft, a series of nut chutes thereon, said chute carrier rotating with the spindle carrier, a basin containing lubricating liquid in which the taps and chutes are submerged, and means for raising the chute carrier so that access may be had to the basin.

2. The combination in a nut tapping machine of a frame, two vertical shafts mounted one within the other, means for driving said shafts, a basin, a chute carrier, and a spindle casing carried by one shaft, a series of spindles mounted on the spindle casing, a gear wheel carried by the other shaft, pinions for driving the spindles and driven by said gear wheel, the chutes being ar-

ranged to feed nuts to a position under the several taps within the basin, means for raising the spindles and holding them for a given time so as to allow the nuts to be adjusted by the operator in line with the taps, and means for raising and lowering the chute carrier.

3. The combination of a frame, a vertical hollow shaft, means for driving said shaft, a basin, a chute carrier, and a spindle casing carried by said hollow shaft, an independently driven shaft extending through the hollow shaft and having a gear wheel at its upper end, a series of spindles mounted to slide vertically in the spindle casing, pinions splined to the said spindles and geared to said gear wheel, with a shaft driven by the spindle casing, a reciprocating lifter geared to said last mentioned shaft, a platform adjacent to the lifter, and a head on each spindle so that the head of the spindle will travel over the lifter, and the spindle will be raised bodily by the lifter and will travel from the lifter onto the platform thus giving time for the operator to adjust a nut under the taps.

4. The combination in a nut tapping machine of two shafts geared together, clutches on each shaft, means for independently operating each of said clutches, and two vertical shafts one within the other, one driven by one driving shaft and the other by the other shaft, a spindle, a chute carrier, and a basin mounted on one shaft so as to turn in unison, a driving gear mounted on the other shaft, a series of spindles mounted on the spindle casing and having pinions driven by the said gear wheel on the central shaft, means for raising said spindles, and levers for actuating the clutch mechanism.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

BENJAMIN F. PAIST.

Witnesses:
WM. E. SHUPE,
WM. A. BARR.