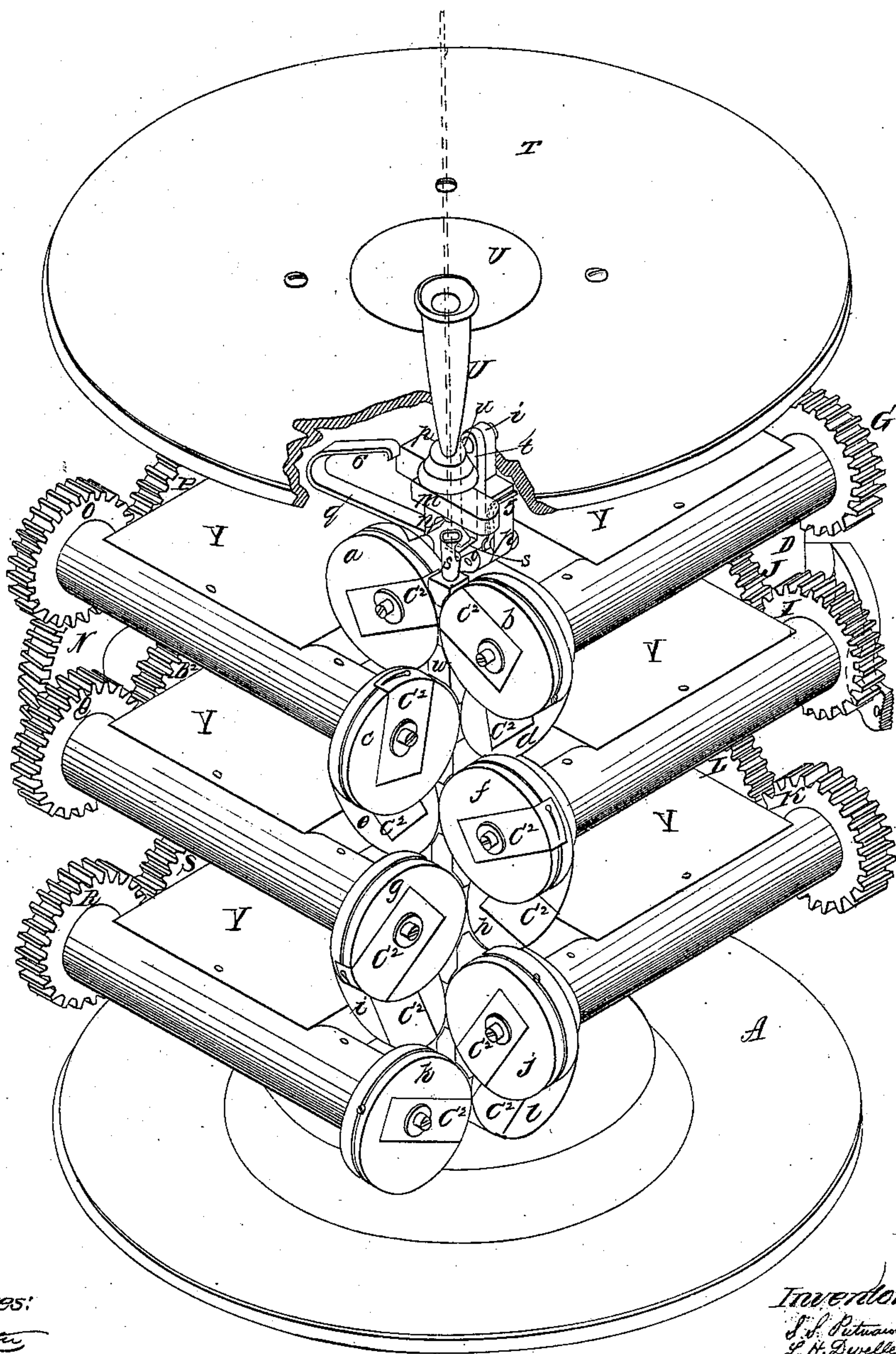


Putnam & Dwelley, Sheet 1-2 Sheets

N^o 62, 684

Fig 1. Patented Mar. 5, 1867.



Witnesses:
J. M. Patten
A. Moore

Inventors:
J. S. Petrucci
L. H. Duvelley
By atty
A. B. Stoughton

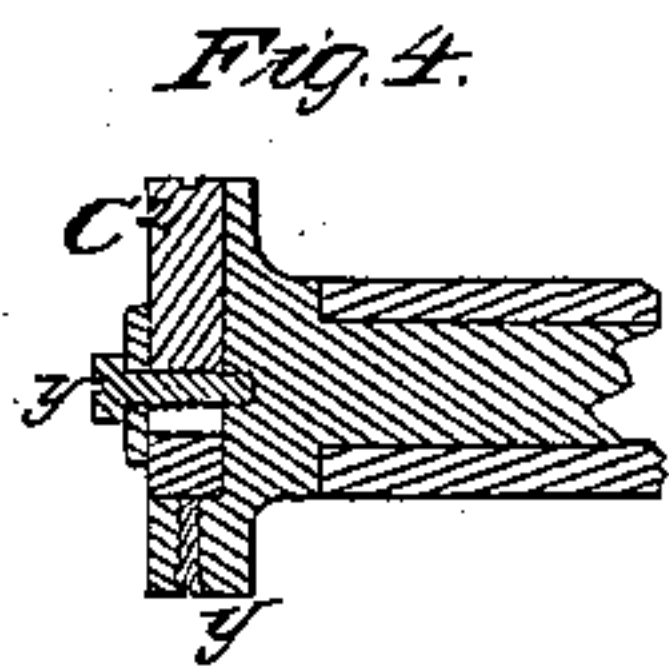
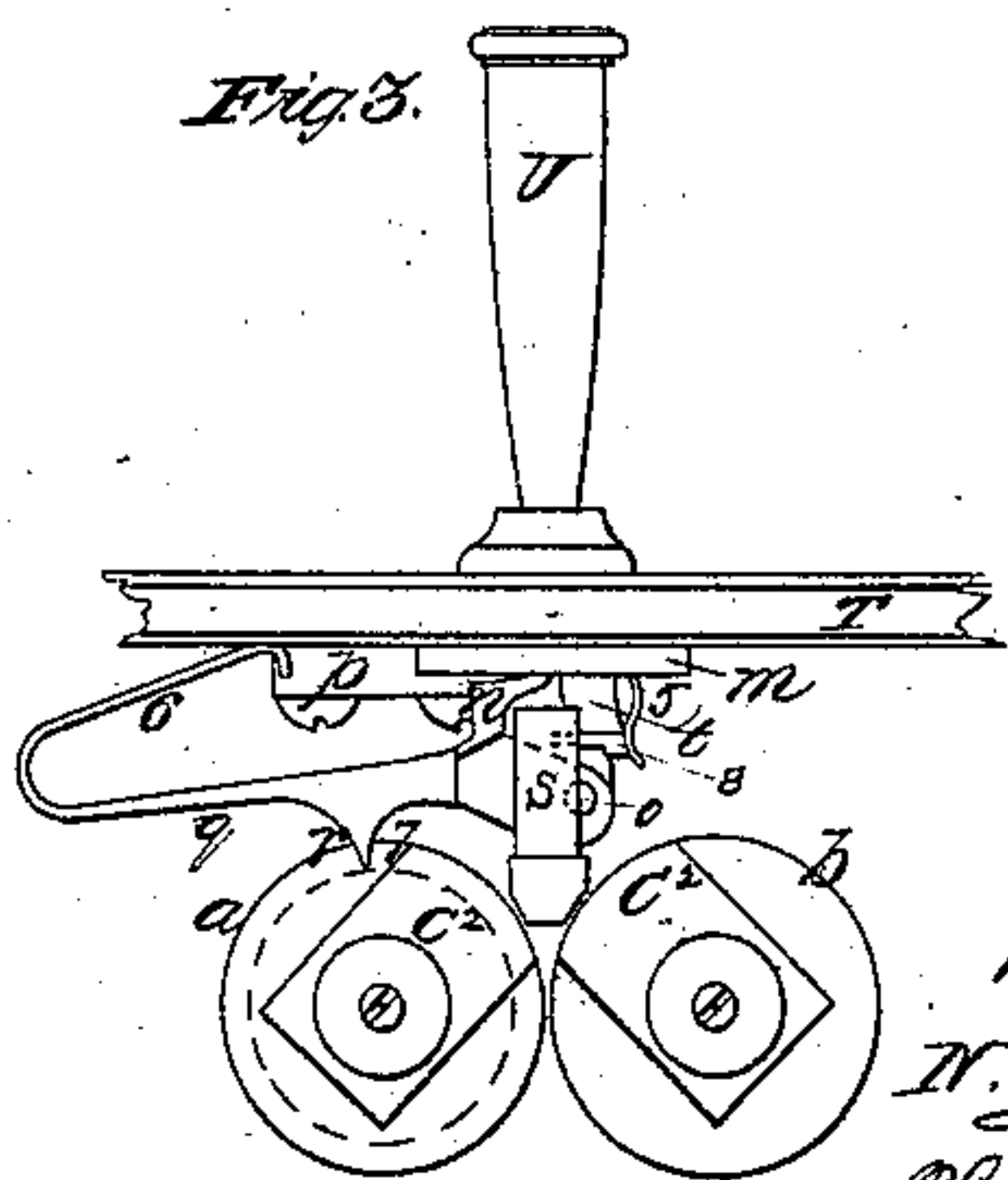
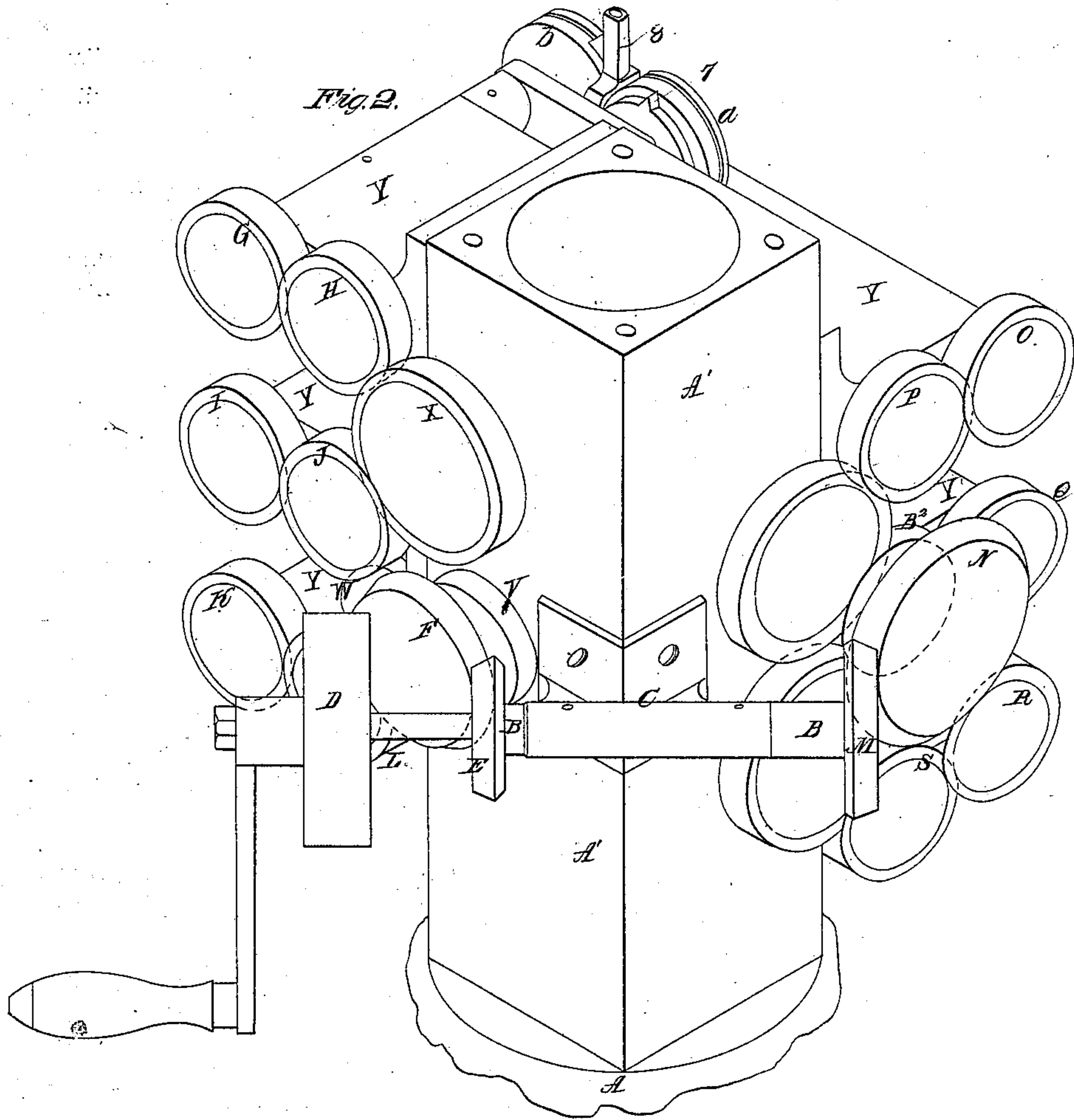
Sheet 2 of 2 Sheets.

Putnam & Drelley.

Horseshoe-Nail Machine,

No 62,684,

Patented Mar. 5, 1867.



Witnesses:
W. W. Stearns
B. T. Schenck

Inventors:
Julius S. Putnam
Lucius H. Drelley

UNITED STATES PATENT OFFICE.

SILAS S. PUTNAM AND LUCIUS H. DWELLEY, OF DORCHESTER, MASS.
ASSIGNORS TO S. S. PUTNAM & CO.

IMPROVEMENT IN MACHINES FOR MAKING HORSESHOE-NAILS.

Specification forming part of Letters Patent No. 62,684, dated March 5, 1867.

To all whom it may concern:

Be it known that we, SILAS S. PUTNAM and LUCIUS H. DWELLEY, of Dorchester, in the county of Norfolk and State of Massachusetts, have invented an Improved Machine for Making Wrought Nails, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a perspective view of our improved machine, a portion of the top plate being broken away to show the "cut-off" and gage. Fig. 2 is a rear view, showing the driving-shaft and gearing, the top plate being removed; Fig. 3, detail showing the cut-off and gage in elevation. Fig. 4 is a central longitudinal section through one of the die-holders.

Our invention consists in an improved machine for making wrought nails directly from the rod by a continuous operation, the blank or piece of metal from which the nail is to be made being first cut off from the rod, and then passed successively through a series of revolving dies operating in pairs, by which it is gradually drawn down and converted into a finished nail.

To enable others skilled in the art to understand and use our invention, we will proceed to describe the manner in which we have carried it out.

In the said drawings, A is the bed-plate, from which rises a heavy standard, A', which supports the working parts of the machine. B is the driving-shaft, which is supported in the bearing C, and has attached to it the driving-pulley D. E is a bevel-gear attached to the driving-shaft, which drives the bevel-gear F, to the shaft of which is secured a cog-wheel, V, from which motion is communicated, through suitable intermediate gears W X, to the gears G H I J K L. M is a beveled gear attached to the opposite end of the shaft B, which drives the bevel-gear N, from the shaft of which motion is communicated, through the gear B², to the gears O P Q R S. The shafts of these gears G H I J K L O P B² Q

R S run in suitable bearings, Y, projecting from the standard A', and carry at their opposite ends the revolving die-holders or rolls *a b c d e f g h i j k l*, which are arranged in pairs beneath each other, and each pair at right angles to that immediately above it, as seen in Fig. 1. Each of these die-holders has a recess cut nearly across its face, for the reception of a steel block or die, C², which is so fitted to it that it may be moved in its recess and adjusted by means of the screws *y* and *z*, Fig. 4, the outer end of each of the dies being curved to correspond to the circular form of the die-holders.

The recesses in the first pair of dies are of a half-round form, enlarged at the head and tapering to a point, by which the blank is slightly reduced and drawn out. This form is retained in the second and third pair of dies, by which the blank is further reduced and elongated, the round form being maintained for the reason that, in reducing a blank in a square or flat form during the entire process, the alternate action of the dies on opposite sides is liable to twist the blank and make its point diamond-shaped in its cross-section instead of square, as is required. The three succeeding pairs of dies have their recesses formed rectangular to further reduce the nail and finish it of the required form.

We do not confine ourselves to the exact number of pairs of dies of each of these forms, as above described, but consider the drawing down of the blank nearly or quite to a point in the round form, in the first part of the operation, and the gradual reduction of the blank, as essential to the production of a perfect nail. The dies in the upper part of the series, instead of having their recesses of a perfectly round form, may have them slightly oval.

The device for gaging the length of the blank and cutting it off from the rod will now be described. T is the top plate, from which rises the tube U, of any suitable length, through which the nail-rod is fed into the machine. *m* is a steel block secured to the under side of the plate T, and has a hole through it of a

sufficient size to allow the passage of the nail-rod, and forms a stationary cutter. n is a reciprocating cutter, pivoted at o to an elbow, p , secured to the plate T , and has an arm, q , which is bent over, forming a spring, 6 , which rests against the under side of the plate T . r is a projection on the arm q , which is struck by a tooth, 7 , on the back of the die-holder a , Figs. 2 and 3, as it revolves, by which means the cutter n is vibrated in contact with the lower face of the block m , to sever a blank from the rod at each complete revolution of the dies. s is a tube or conductor leading to the first pair of dies through an elongated aperture, in which projects the bent arm or finger 8 of a gage, t , against which the end of the nail-rod rests. This gage is pivoted at u to an ear, v , rising from the top plate, and its length is adjusted by a slot in the ear v , and a screw, in a well-known manner. As the cutter n is vibrated to cut off a piece of the rod, it strikes the gage t , and vibrates it to one side against the resistance of a spring, 5 , thus withdrawing the finger 8 from the tube s , and permitting the piece of metal or blank to pass through the tube s into the first pair of dies, which are so arranged and timed, with respect to the cut-off, as to be in the exact position to receive the blank as it passes through the conductor. A tube or conductor is placed between each pair of rolls or die-holders, to receive the blank and guide it to the next pair below.

Operation: The dies having been set in motion through the connections already explained, the nail-rod, properly heated, is placed in the tube U , as shown in Fig. 1, and passes down between the cutters until it is arrested by the gage in the tube s . As the dies revolve, the tooth 7 strikes against the projection r on the arm q of the cutter n , by which it is vibrated, and a piece of metal or blank of a proper length to form a nail is cut off from the rod, the gage t being struck at the same time by the cutter n and moved out of the tube s , to allow the blank to pass through to the dies. At the instant the blank is cut off, the tooth 7 passes off the projection r on the arm q , and the cutter n is drawn back by the action of the spring 6 , which permits the gage t to be returned to its place by the spring 5 in time to arrest the end of the nail-rod as it falls through the tube U . The blank passes through the conductor s into the first pair of dies, which are in the proper position to receive it, and as they revolve it is slightly elongated, and discharged into the tube or conductor w , through which it passes to the next pair of dies beneath, where the operation is repeated; and when the first pair of dies has made a complete revolution a fresh blank is cut off and passed in, as before. The blanks are thus passed successively from one pair of dies to that immediately beneath, the revolution of each pair of dies being timed so that

they will arrive in the proper position to receive the blank as it comes from the pair next above, by which means the blank is gradually drawn down to the required form and converted into a finished nail. If preferred, the gage t may be dispensed with, and the nail-rod may be fed into the machine at the required intervals by means of rolls or other suitable device.

It will be seen that by the above-described machine we are enabled to form a wrought nail directly from the rod without its being partially formed in another machine, thus reducing the expense and facilitating the process of manufacturing. By first reducing the blank to a point, in a round or oval form, as above described, we are enabled to produce a more perfect nail than when the blank is drawn down in a square or flat form during the entire process of forming the nail, as the point is then liable to assume a diamond form instead of a square form required.

Instead of the die-holders being each furnished with one die only, they may be provided with two or more, the cut-off and gage being so timed as to feed in a blank as each pair of dies arrives in a proper position to receive it, and the whole series being properly timed, one pair with the other.

We do not confine ourselves to the exact position and arrangement of the die-holders or rolls, as shown, for these may be varied without departing from the spirit of our invention. For instance, instead of each pair of die-holders being at right angles to the succeeding pair, two pairs may be arranged in the same vertical plane, and the two succeeding pairs at right angles thereto. We prefer the method first described, however, as it is the most compact and simple. Instead of the blank being cut from the rod, as above described, it may be cut from a plate of the required width and thickness, a suitable cut-off and conductor being used.

We are aware that a single pair of dies for making nails has been used, and that two pairs of dies working at right angles to each other, but acting simultaneously upon the blank, with the intention of making a nail at a single operation, have also been used; and we are further aware that a series of traveling and revolving dies operating on three sides of a stationary blank, in combination with a stationary former, has been used; and that a series of vibrating-lever dies, arranged at right angles to each other and operating alternately on opposite sides of the blank, has been used; but in this latter case the operation is more one of squeezing than of working, welding, and drawing out. These, therefore, we do not claim.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The combination of the several pairs of revolving dies, connected by gearing, and

otherwise arranged to operate successively and alternately on opposite sides of a nail-blank, substantially as described.

2. In combination with the foregoing, a device for cutting off the blank, substantially as described.

3. In nail-making machines having a series of pairs of revolving dies, operating substantially as described, constructing the several pairs of dies in the form herein described, for drawing down the blank in a rounded form

during the first part of the operation, and afterward to the form proper for the nail, as specified.

SILAS S. PUTNAM.

LUCIUS H. DWELLEY.

Witnesses to signature of S. S. Putnam:

R. K. BELLAMY,

J. E. PUTNAM.

Witnesses to signature of L. H. Dwelley:

P. E. TESCHEMACHER,

N. W. STEARNS.