

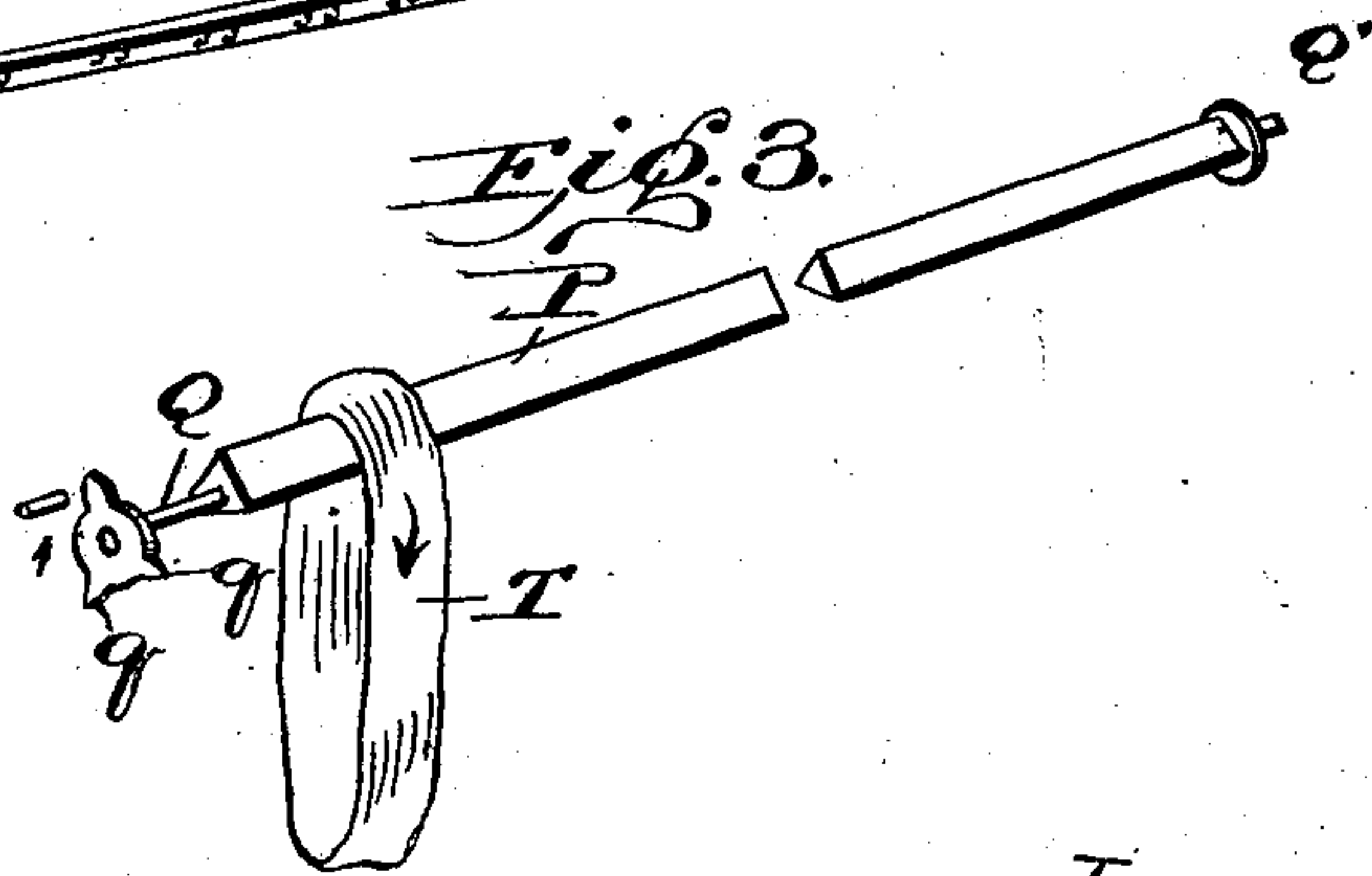
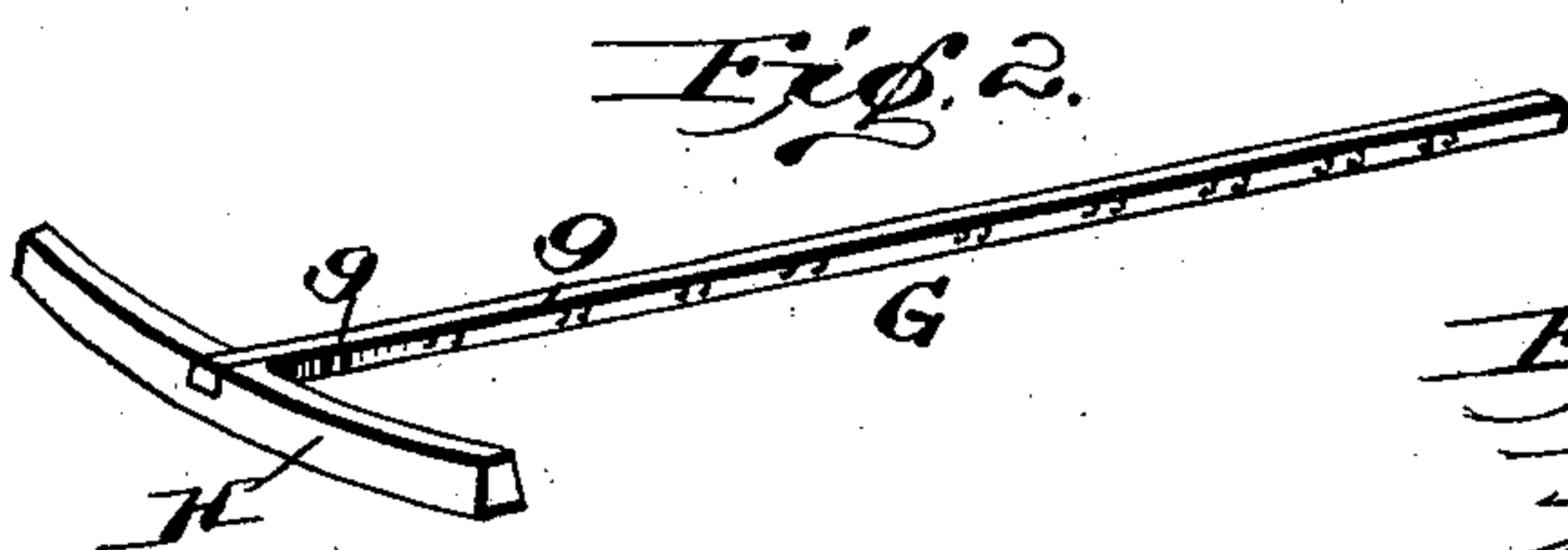
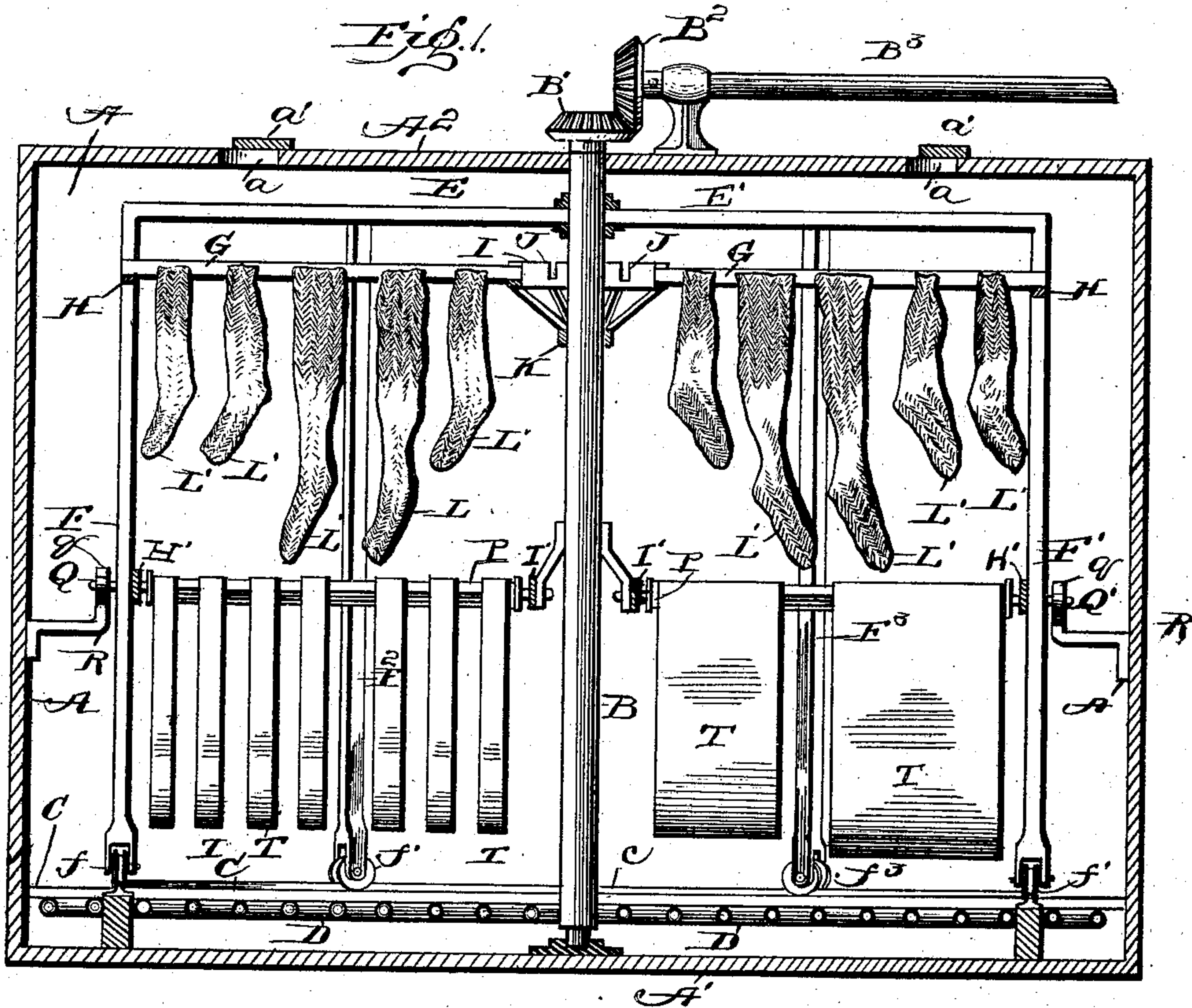
No. 708,874.

Patented Sept. 9, 1902.

A. N. DUBOIS.  
OXIDIZING APPARATUS.

(Application filed Aug. 14, 1901.)

(No Model.)



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# UNITED STATES PATENT OFFICE.

ALEXANDER N. DUBOIS, OF PHILADELPHIA, PENNSYLVANIA.

## OXIDIZING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 708,874, dated September 9, 1902.

Application filed August 14, 1901. Serial No. 72,057. (No model.)

*To all whom it may concern:*

Be it known that I, ALEXANDER N. DUBOIS, a citizen of the United States of America, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Oxidizing Apparatus for Hanks of Yarn, Piece Fabric, Stockings, and Garments, of which the following is a specification.

My invention relates particularly to the method or process of anilin-black dyeing commonly known as the "dry" process—that is to say, the oxidation which forms an essential step in the process is effected by exposure to the air instead of by immersion in an oxidizing bath.

Heretofore in using the dry process the article to be dyed has been saturated with the dye liquor, and after the removal of the surplus by the use of a whizzer or by wringing it has been customary to hang them up in a closed room whose temperature was maintained at the proper point until the appearance of a peculiar green color indicated that the oxidation had reached the proper stage, after which the goods were subjected to the final treatment. In the practical conduct of the process in this manner great difficulty is experienced in obtaining a uniform oxidation of the goods, owing to the fact that no matter how carefully the room may be constructed the wind-pressure from the outside always produces an irregular diffusion of the air and moisture within and occasions unequal pressures and temperatures in different parts of the room. When the wind is blowing strongly from one quarter—as, for instance, north—it is common experience to find the goods on the north side of the room completely oxidized before those upon the south side are anywhere near completion. If these oxidized or ripened goods are allowed to remain until the others are ready for removal, they become tender, frequently to such an extent as to be unsalable. On the other hand, if the goods whose oxidation is not complete are removed when the first are ready they fail to attain the proper color when they are subjected to the final treatment or finishing process. It is not practicable to remove the goods piecemeal

without a great increase of expense and, in fact, without very considerable risk to the operatives, owing to the fact that the stay in a room filled with oxidizing goods for a period long enough to select those which are ready for removal exposes the workmen to the action of gases which are exceedingly prejudicial to health. My invention is directed toward the remedy of this difficulty, and it consists in a method of oxidizing the goods uniformly and expeditiously by causing their rotation throughout the different points of the compass in a suitable chamber or room, the object and effect being that each piece of goods, taking the oxidizing process as a whole, is exposed to substantially similar atmospheric conditions with the rest.

I will now proceed to describe a convenient apparatus for my improved method.

In the accompanying drawings, Figure 1 represents in vertical central section a room and apparatus adapted for the conduct thereof. Fig. 2 is a detail view showing one form of support upon which the goods are held. Fig. 3 is a detail view of another form of support and having a somewhat different action.

I construct a room or chamber A, preferably circular in form, having a floor A' and a ceiling A<sup>2</sup>. The ceiling may be provided with ventilating-apertures *a*, closed by sliding doors *a'*. A steam-heating coil D is arranged above the floor A', and above this in turn is a slatted floor C, which permits the ascent of the heated air. In the center of the room is a vertical shaft B, supported in suitable journals, and having at one end a bevel-gear B', which is actuated by a similar gear B<sup>2</sup> upon the shaft B<sup>3</sup> in such a manner as to effect a very slow rotary movement of the shaft B. Radial arms E E', &c., extend outward from the shaft B near the ceiling of the room, and at their outer ends are connected with vertical supports F F', &c. Said supports have at their lower ends rollers *f f'*, &c., respectively, which run upon a circular track *c*, mounted upon the floor. The several upright supports F F', &c., are connected by an annular band or brace H, which is provided at intervals with rectangular notches upon its upper side. Near the shaft B a similar



annular band or brace I is mounted upon supports K and provided with rectangular notches J upon its upper side registering in number and circumferential position with the notches upon the band H. If desired, the several supports F F' may be connected by means of cross stays or braces to insure steadiness. Rectangular poles G (shown in detail in Fig. 2) fit in the notches of the bands H and I, so as to be properly supported for rotation, but freely removable. When it is intended to use the apparatus for the oxidizing of dyed stockings or garments, these poles are provided with wheels having spurs *g g* thereon, upon which hang the stocking or garment frames. These poles do not revolve axially or vertically, but simply move horizontally at all points of the compass.

The method of operation in using this apparatus for treatment of stockings or garments is as follows: The stockings or garments are first steeped in the dye liquor, then put through the whizzer or wrung, stretched upon frames, and suspended upon the poles G until the room is properly filled. The entire frame is then caused to rotate slowly and continuously, so that the stockings or garments are in succession carried around the room to all parts of the compass and receive a uniform exposure, no matter what may be the direction of the wind and irregularities of the temperature and atmospheric conditions within the room itself.

When it is intended to apply the method to the oxidation of dyeing hanks of yarn or lengths of cloth, I prefer to substitute for the removable poles G the devices shown in Fig. 3. The support for the hanks of yarn or pieces of material T consists of a flat-sided bar P, preferably of triangular cross-section, as shown, having suitable journals Q Q' at its respective ends, which fit into sockets in the annular bands H' and I', respectively, so that each bar can turn upon its longitudinal axis. Upon the outer end of the bar are mounted spur-wheels *q*, and within the range of movement of the teeth on the spur-wheels as the frame rotates are fixed studs or pins R, placed at intervals around the wall of the room, so that as the whole frame carrying the series of bars P rotates the teeth of the spur-wheels *q* will successively strike against the fixed studs R and in passing by will cause the bars to rotate upon their longitudinal axis for a short distance. In the instance shown the distance would of course be one-third of a circle. This movement of the bars will cause the hanks of yarn or pieces of other material suspended thereon to be shifted in the direction of their length, so as to prevent the under surface from remaining in contact too long at any one point with the surface of the bars. Experience has shown that it is necessary to shift the hanks of yarn or pieces of goods in this manner in order to prevent

what is known as the "beaming" or unequal oxidation of surface due to its protection by contact with the surface of the bar.

I am aware that the use of rotating frames for clothes-driers, &c., is not new, and I do not claim the same, nor do I claim a rotating process for other purposes than the oxidation of dyed goods nor even for that purpose, except when the rotation is carried on with substantial reference to the points of the compass.

Having thus fully set forth my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. An oxidizing apparatus comprising a suitable chamber provided with a ceiling, adjustable ventilating means in the ceiling, heating means located above the floor of the chamber, a rotatable rack contained within the chamber, a circular track on which the rack is supported and upon which it rotates and independently-removable poles carried by the rack, the poles having articles to be dried attached thereto.

2. An oxidizing apparatus comprising a suitable inclosed chamber, heating means stationarily located therein, horizontally-rotating means contained within the chamber, a plurality of series of supports carried by the rotary means one of the series of supports provided with means to intermittently actuate them in a direction at right angles to the plane of movement of the horizontally-rotating means.

3. A drying apparatus comprising a suitably-inclosed chamber, heating means in the chamber, a rotating rack contained within the chamber, the rack provided with a plurality of independently-rotatable radial arms journaled therein, spurs secured to and rotating with the radial arms, stationary pins placed at intervals within the chamber, the spurs adapted to contact with the pins to intermittently rotate the radial arms.

4. A drying apparatus comprising an inclosed chamber, a rotary rack therein, a plurality of radial arms carried by the rack and rotating therewith, certain of the radial arms independently rotatable in a direction at right angles to the direction of rotation of the rack, the independently-rotatable arms being flat-sided in form, spurs carried by the last-mentioned arms and rotating therewith, studs mounted in the path of the spurs, the spurs adapted to intermittently contact with the studs to effect a partial rotation of the independently-rotatable arms during the rotation of the rack.

5. An oxidizing apparatus comprising an inclosed chamber, a rotatable rack therein, rotating means therefor, the rack provided with a series of vertical supports, rollers on the supports, a track upon which the rollers bear, annular notched bands connecting the vertical supports of the rack, annular notched braces surrounding and secured to the rotat-



ing means, independently-removable poles  
supported in the notches in the bands and  
braces and means for intermittently actuat-  
ing certain of the poles in a rotatory direc-  
5 tion at right angles to that in which the rack  
moves.

In testimony whereof I have signed my

name to this specification in the presence of  
two subscribing witnesses.

ALEXANDER N. DUBOIS.

Witnesses:

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