No. 646,511.

Patented Apr. 3, 1900.

J. R. THOMAS.

ABRADING CYLINDER

(Application filed Feb. 6, 1899.)

(No Model.)

2 Sheets—Sheet 1.

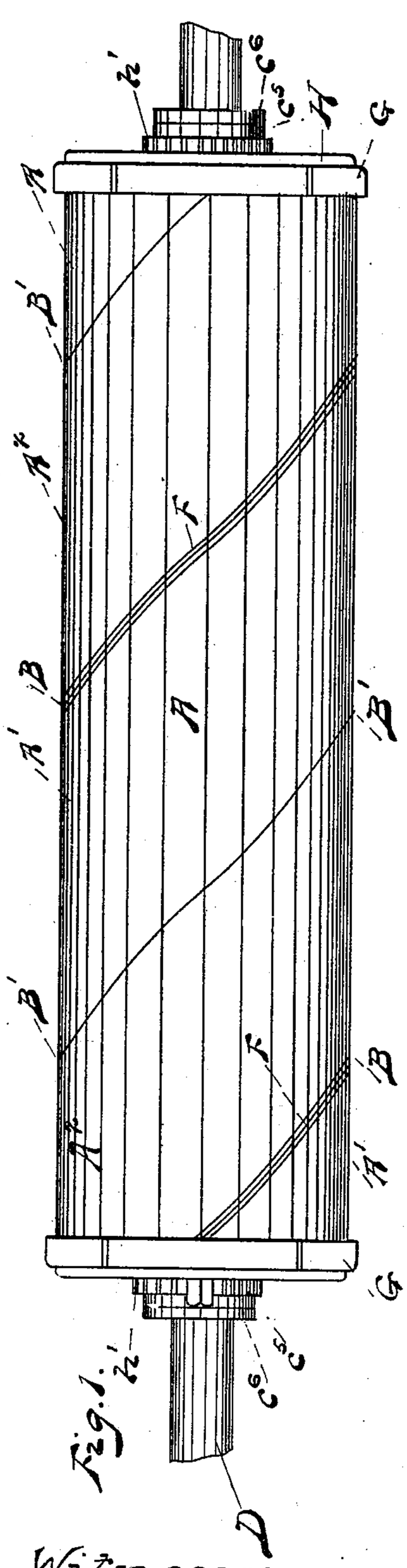

Fig. 1.

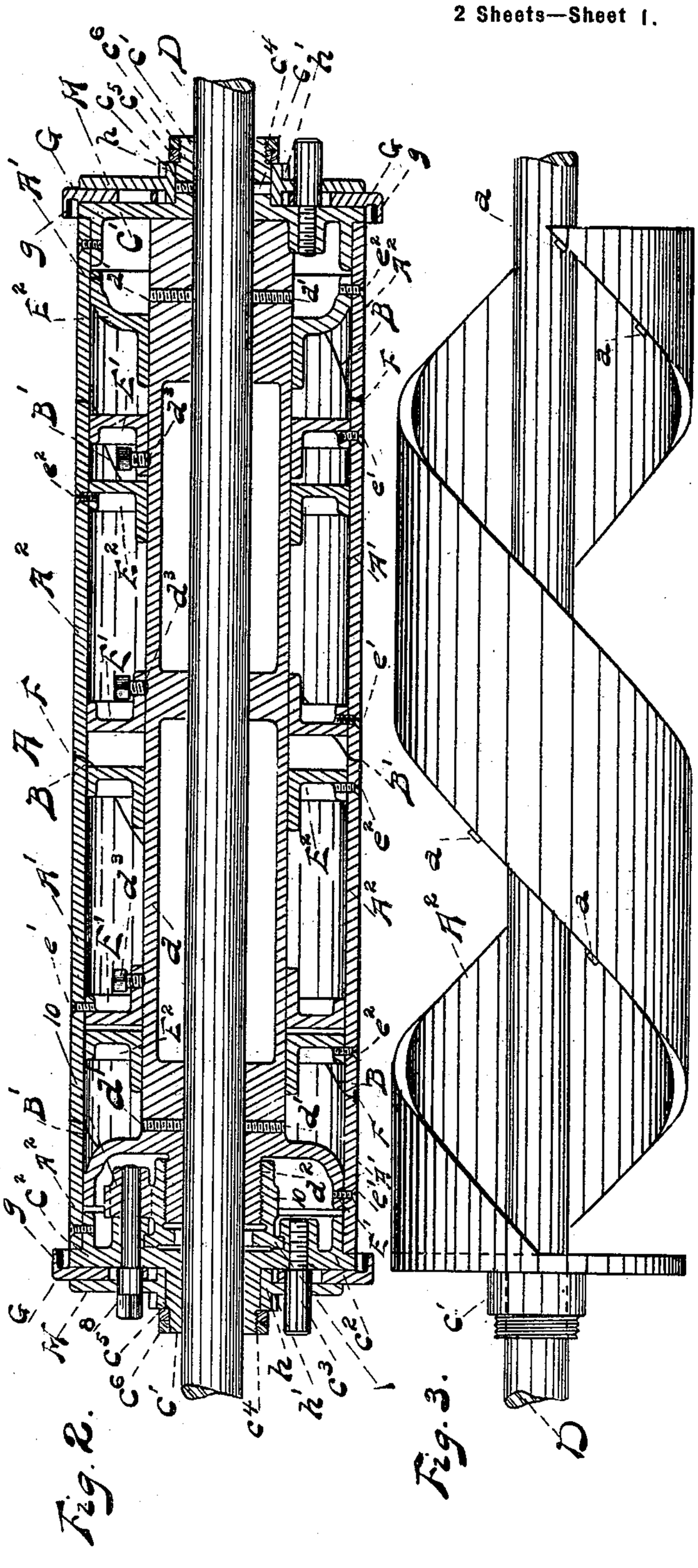

Fig. 2.

Fig. 3.

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2 Sheets—Sheet 2.

Fig. 4.

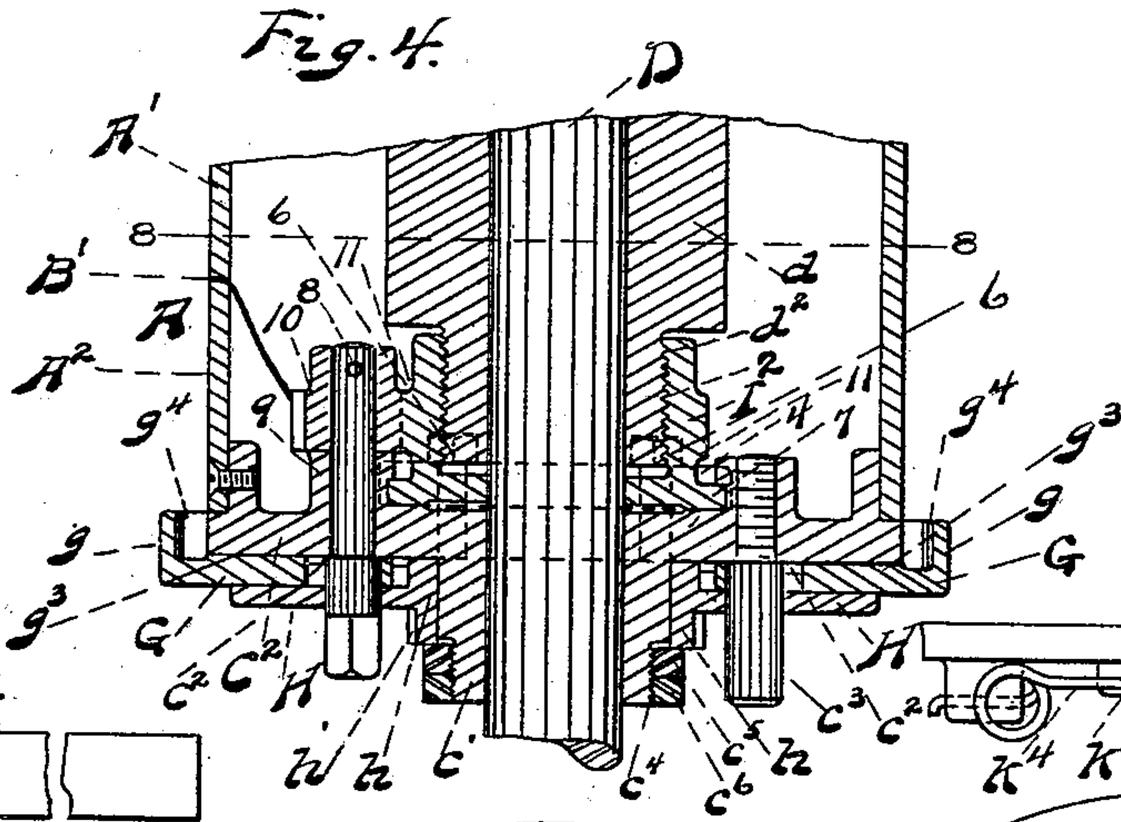


Fig. 6.

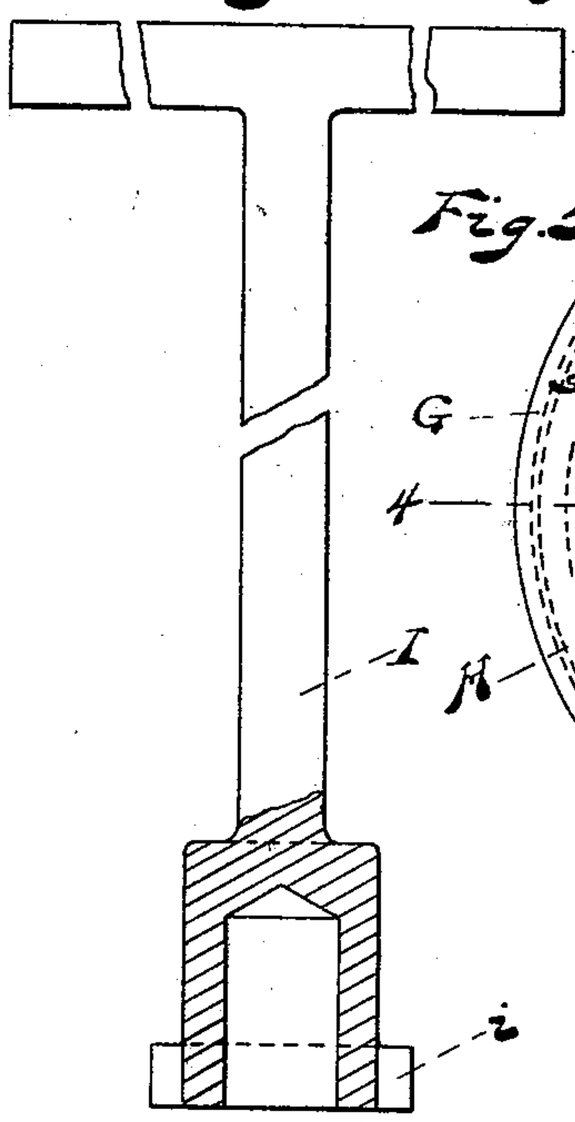


Fig. 5.

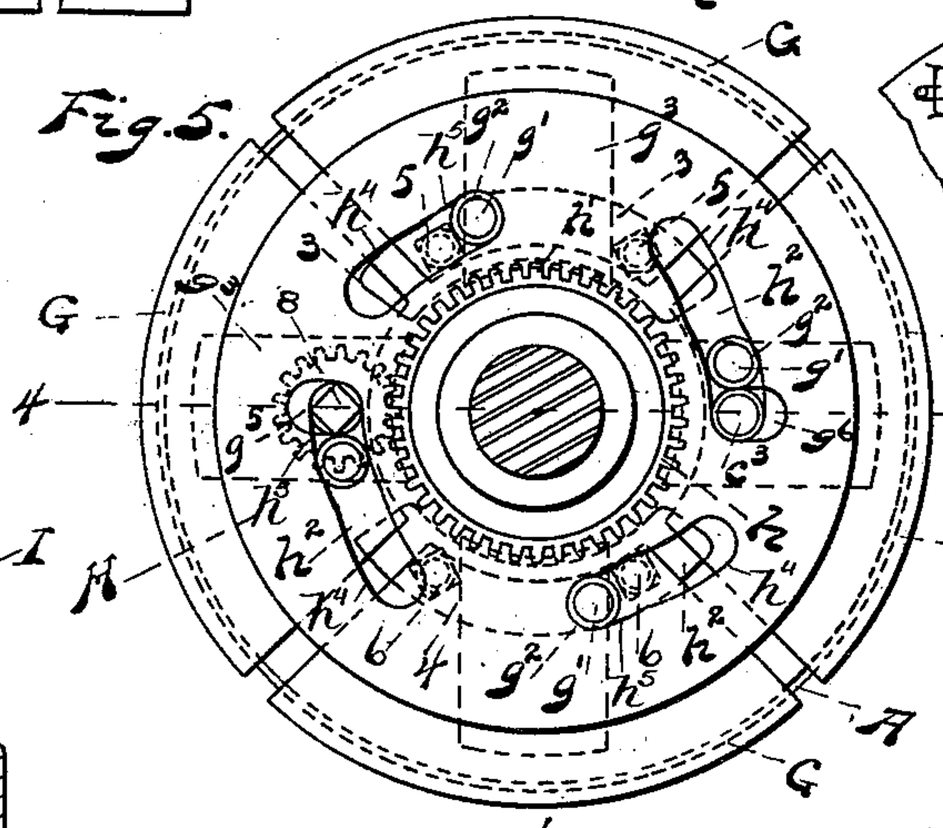


Fig. 7.

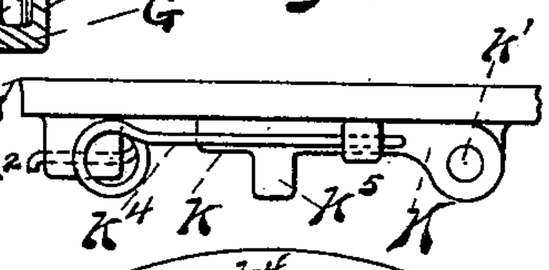


Fig. 7a.

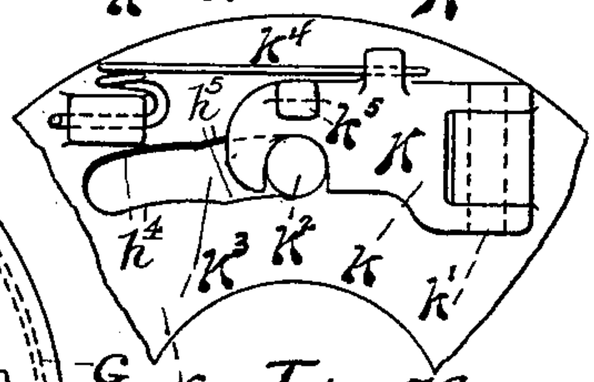


Fig. 9.

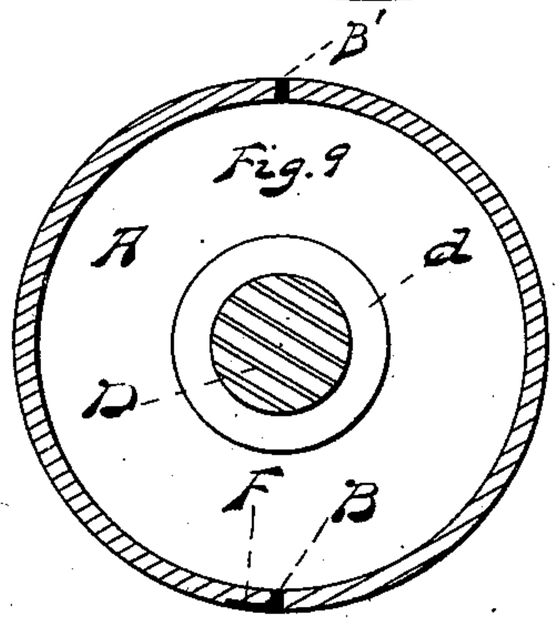
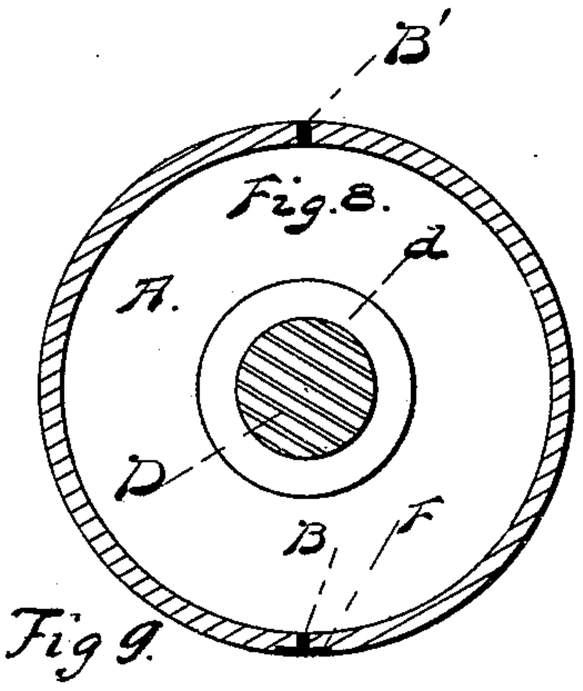


Fig. 8.



Witnesses:
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Fig 8

Fig 9.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN RICKARD THOMAS, OF CINCINNATI, OHIO, ASSIGNOR TO THE J. A. FAY & EGAN COMPANY, OF SAME PLACE.

ABRADING-CYLINDER.

SPECIFICATION forming part of Letters Patent No. 646,511, dated April 3, 1900.

Application filed February 6, 1899. Serial No. 704,678. (No model.)

To all whom it may concern:

Be it known that I, JOHN RICKARD THOMAS, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Abrading-Cylinders, of which the following is a specification.

My invention relates to abrading-cylinders adapted to receive a covering of abrading or polishing material and used in the abrading or polishing of various substances, especially wood.

It is the object of my invention to provide an abrading-cylinder on which the sandpaper or other abrading material may be readily, quickly, firmly, and uniformly secured.

My invention consists in providing an abrading-cylinder which enables the abrading material to be evenly and firmly stretched in all its parts, so as to hug the cylinder closely and uniformly and in such manner that in the stretching thereof the cylinder itself or a part thereof may be a moving agent under the abrading material, relieving the frictional resistance that would have to be overcome if it were attempted to stretch the abrading material throughout the length of the cylinder by merely exerting strain at one or both ends of the paper or abrading material; further, in providing an abrading-cylinder in which the abrading material may be strained from its ends in connection with the moving part or parts of the cylinder to counteract the centrifugal force exerted on the paper or abrading material by the rapid revolution of the drum or cylinder, tending to raise the abrading material from the cylinder; further, in providing an abrading-cylinder divided spirally along its length, and, further, in the various parts and in the construction, arrangement, and combination of parts hereinafter more fully described and claimed.

In the drawings, Figure 1 is a side view of my improved device. Fig. 2 is a longitudinal section of the same. Fig. 3 is a side view of one of the divided parts of the cylinder. Fig. 4 is an enlarged longitudinal section of one end of the cylinder on the line 4 4, Fig. 5. Fig. 5 is an end elevation of the same. Fig. 6 is a side elevation and bottom view of the gear-crank. Fig. 7 is a plan view, and Fig. 7^a is a side elevation of the lock for the clamping-jaws. Fig. 8 is a cross-section of the cylinder on the line 8 8, Fig. 4; and Fig. 9, a similar view showing a modification of the groove.

A represents the cylinder, divided on spiral lines B B′ into two parts A′ and A^2, each part being integral with or rigidly attached to one of the heads C′ C^2 of the cylinder and free to move with relation to the other of said heads.

D is a shaft, preferably strengthened by a reinforce *d*, cast integral therewith or secured thereto in any suitable manner, as by bolts *d′ d′*. The shaft is adapted to be provided with suitable journals and pulleys. Collars or webs E′ E^2 take over the shaft and reinforce, being interposed between the latter and the cylinder A. The heads C′ C^2 take about the shaft. In the construction shown one of the heads—for instance, C′—is rigidly secured to the shaft, as by means of bolts *c*, while the other head C^2 slides on the shaft. The part A′ of the cylinder A is preferably integral with or attached to the head C′ and the part A^2 to the head C^2. The heads are preferably provided with hubs *c′*. One end of the reinforce may be provided with threads d^2, about which I prefer to have a nut 1, having threads 2, take the nut encircling the shaft D. Its face impinges against the head C^2. Flanges 3 and 4 are secured to the head by means of bolts 5 5 6 6 and take over a flange 7 on the nut 1, retaining it in fixed longitudinal relation thereto. A shaft 8 takes through a bearing 9 in the head. A pinion 10 is secured to the end of the shaft. The nut 1 is provided with a gear-face 11, with which the pinion 10 meshes. The outer end of the shaft 8 has a proper head to receive a wrench. When the shaft is turned, it causes the nut to revolve and climb on the reinforce *d*, thus increasing the length of the cylinder by carrying the movable part of the same with it in its movement and stretching the abrading material which has previously been secured to the respective ends of the cylinder in the manner hereinafter more fully explained.

The webs E′ are secured to the part A′ of the cylinder A by means of bolts *e′*, while the webs E^2 are secured to the part A^2 of the cylinder A by means of bolts e^2. The webs E′ are also secured to the reinforce by means of bolts d^3, whereas the webs E^2 are allowed to

slide on the reinforce when the part A^2 of the cylinder is moved.

The cylinder A is provided with a groove F, coincident with one of the joints B B'. In the drawings this groove corresponds with the joint B. A strip of sandpaper or other suitable abrading material is cut tapering at its ends to such form that the taper at one end may encircle one end of the cylinder and the material be then wound spirally, so that its edges may be coincident with the groove F, the taper at the other end of the abrading material encircling the other end of the cylinder. The taper at either end of the abrading material when wrapped about the cylinder preferably registers with the respective ends of the cylinder. Clamping-jaws G, having flanges *g*, take about the ends of the cylinder and clamp the abrading material to the latter in the manner which will now be described.

H is a plate provided with a hub *h* and a gear *h'*. The plate has parallel contact-faces h^4 h^5, shown as the side walls of slots h^2. The contact-faces are partly eccentric to the axis of the plate and partly concentric with that axis, as more clearly shown in the drawings. The eccentric part of the contact-faces I have designated h^4 and the concentric part thereof h^5. Pins *g'*, having antifriction-rolls g^2, are secured to the jaws and take between the contact-faces. The jaws G are provided with gibs g^3, which slide in ways c^2 in the heads C' C^2. A stud-pin c^3 is fastened to the heads. A pinion-wrench I takes about the stud-pin c^3, the pinion *i* thereon meshing with the gear *h'* on the plate H. When the jaws are open, the pins *g'* are in the extreme end of the eccentric part of the contact-faces farthest removed from the axis of the plate. When the wrench I is turned, it rotates the plate H, causing the pins *g'* to follow the path of the contact-faces and drawing the jaws G inwardly, the latter being held against rotation by means of the gibs g^3 and ways c^2. When the pins *g'* reach the other end of the eccentric part of the contact-faces, the paper or abrading material will have been sufficiently clamped between the jaws and the ends of the cylinder. Further rotation of the plate causes the pins to follow the concentric part of the contact-faces, and the turning of the plate is in operation continued until the pins have passed substantially between the concentric part of the contact-faces or are seated against the farther end of the slots, thereby retaining the clamping-jaws in clamped positions irrespective of a limited turning of the plate. The eccentric and concentric parts of each contact-face are connected, and thereby form a continuous contact-face extending in a plane longitudinally of the plane of the face of the plate. Cushions g^4, of felt or other suitable material, are secured to the inner faces of the flanges *g* of the jaws and are adapted to more securely hold the abrading material to the cylinder. The end of the abrading-cylinder under the jaws is preferably unyielding to prevent the abrading material under the jaws being crowded below the surface-line of the periphery of the cylinder adjacent thereto when the clamping-jaws are clamped, thereby preventing buckling of the abrading material.

A suitable lock K may be provided to securely hold the plate in position after the abrading material has been clamped, and consists, preferably, of the trigger *k*, pivoted on a pin *k'* on the plate and adapted to engage a pin k^2 on one of the jaws taking through a slot k^3 in the plate. A spring k^4 holds it in place. The trigger may be thrown out of engagement with the pin by means of a grip k^5.

Two of the slots h^2 may be elongated to accommodate the shaft 8 and stud-pin c^3, and the corresponding jaws may be provided with slots g^5 g^6 to allow the passage of the same parts.

The heads may be provided with threaded ends c^4 and nuts c^5 and lock-nuts c^6 to secure the plate in position.

In operation after the jaws have been opened and the nut 1 drawn about the reënforce or shaft to its limit, thus reducing the length of the cylinder, the abrading material is preferably circled about the fixed end of the cylinder and clamped thereto by means of the jaws and the material properly wound about the cylinder, so that its edges may correspond with the groove therein. The other end of the material is then placed under the jaws at the movable end of the cylinder and clamped in position. The pinion 10 is then caused to revolve, drawing out the nut and lengthening the abrading-cylinder, the movable part A^2 thereof moving under and with the abrading material while it is being stretched and causing the material to be uniformly and tightly spanned in all its parts.

The groove adapted to receive the edges of the abrading material is coincident with one of the joints between the two parts of the cylinder and the direction of strain is on the same line, causing the abrading material to be uniformly stretched in the direction of its length.

If it is desired, a slight space may be left between the two parts of the cylinder and projections or lugs *a* secured to one of the parts and sliding on the other.

It is obvious that both parts of the cylinder may be made movable in opposite directions; but I have shown and described the one part fixed and the other movable.

The groove F may be arranged so that one part of the depression will be taken out of each side of the joint, as shown in Fig. 6, or the entire depression may be taken out of one side thereof, as shown in Fig. 7, or the groove omitted entirely and preferably sufficient space left between the two parts to receive the edges of the abrading material.

If it is desired, a suitable felt or other packing may be secured to the face of the cylin-

der and act as a cushion between the cylinder and the abrading material.

It is obvious that changes may be made in the construction I have preferred to show without departing from the spirit of my invention.

I claim—

1. In an abrading-cylinder, a plurality of radially-unyielding parts divided on spiral lines along its length, in combination with an abrading material taking thereabout, substantially as described.

2. In an abrading-cylinder, the combination of radially-unyielding spiral sections with a spiral groove coincident with one of the division-lines of the sections, substantially as and for the purpose specified.

3. In an abrading-cylinder, the combination of a plurality of parts divided on spiral lines along its length for forming the cylinder, abrading material taking thereabout and a shaft taking therethrough, with a spreading device for moving a spiral part of the cylinder with and under abrading material, substantially as described.

4. In an abrading-cylinder, the combination of a plurality of radially-unyielding parts divided on spiral lines along its length, with an abrading material spirally wound thereon, the edges of the abrading material being coincident with one of the spirals, substantially as and for the purpose specified.

5. In an abrading-cylinder divided on spiral lines along its length, the combination of projections between the sections for holding the same apart, an abrading material spirally wound on the cylinder, and means for moving a section of the cylinder, substantially as and for the purpose specified.

6. In an abrading-cylinder, the combination of spiral sections having an abrading material spirally wound thereon, with a clamp at each end of the cylinder on different sections for fastening the abrading material and means for moving a section with the clamp thereon for tightening the material on the cylinder, substantially as and for the purpose specified.

7. In an abrading-cylinder, the combination of two spiral sections, a shaft, means for stationarily securing one of the sections with relation to the shaft, an abrading material spirally wound on the cylinder, a clamp on each section of the cylinder for fastening the ends of the abrading material thereto respectively, and means for moving the sliding section with relation to the shaft, substantially as and for the purpose specified.

8. In an abrading-cylinder, the combination of a plurality of parts divided on spiral lines, a shaft, and webs interposed between the shaft and the cylinder, substantially as described.

9. In an abrading-cylinder, the combination of two parts divided on spiral lines, a shaft, a series of webs surrounding the shaft and secured with relation thereto and to one of the parts of the cylinder, and a second series of webs surrounding the shaft and movable with relation thereto and secured to the second part of the cylinder, substantially as and for the purpose specified.

10. In an abrading-cylinder, the combination of a plurality of parts divided on spiral lines, a shaft, a reinforce taking about the same, and webs interposed between the reinforce and the cylinder, substantially as and for the purpose specified.

11. In an abrading-cylinder, the combination of a shaft, a cylinder, abrading material taking about the cylinder, a plate at the end of the cylinder rotatable about the shaft, clamping-jaws extending from the plate and taking over the end of the cylinder for clamping the abrading material between the jaws and the cylinder, contact-faces partly eccentric and partly concentric to the axis of the plate, the eccentric and the concentric part of each contact-face being connected to form a continuous contact-face and extending in a plane longitudinally of the plane of the face of the plate, with parts taking against the contact-faces, with a relative movement between the parts and the contact-faces, and constructed and arranged for drawing the jaws toward the cylinder to clamp the abrading material between the jaws and the cylinder while the movement between the eccentric part of the contact-faces and the said parts taking against them is effected and retaining the jaws in clamped position after the concentric part of the contact-faces and the said parts taking against them are in substantial contact, by allowing a limited turning of the plate without changing the position of the jaws, substantially as described.

12. In an abrading-cylinder, the combination of a shaft, a cylinder, abrading material taking about the cylinder, a plate at the end of the cylinder rotatable about the shaft, clamping-jaws extending from the plate and taking over the end of the cylinder for clamping the abrading material between the jaws and the cylinder, contact-faces partly eccentric and partly concentric to the axis of the plate, the eccentric and the concentric part of each contact-face being connected to form a continuous contact-face and extending in a plane longitudinally of the plane of the face of the plate, with parts taking against the contact-faces, with a relative movement between the parts and the contact-faces, and constructed and arranged for drawing the jaws toward the cylinder to clamp the abrading material between the jaws and the cylinder while the movement between the eccentric part of the contact-faces and the said parts taking against them is effected and retaining the jaws in clamped position after the concentric part of the contact-faces and the said parts taking against them are in substantial contact, by allowing a limited turning of the plate without changing the position of the jaws, and a lock between the jaws and the

plate for holding the jaws and plate fixedly in relative position, substantially as described.

13. In an abrading-cylinder, the combination of a shaft, a cylinder, an abrading material taking about the cylinder, a clamping agency taking over the end of the cylinder and the end of the abrading material, means for clamping the clamping agency about the end of the cylinder, an unyielding surface at the end of the cylinder opposite the clamping agency, constructed and arranged for preventing the crowding of the abrading material under the clamping agency substantially below the surface-line of the periphery of the cylinder adjacent thereto to prevent buckling of the abrading material when the clamping agency is clamped, and a yielding retaining-cushion between the abrading material and the clamping agency with the unyielding surface for the cylinder under the abrading material opposite the cushion, substantially as described.

14. In an abrading-cylinder, the combination of a shaft, a cylinder, an abrading material taking about the cylinder, clamping-jaws taking over the cylinder and the end of the abrading material, means for moving the clamping-jaws radially to and from the cylinder, with a cushion on the jaws between the jaws on one side and the ends of the abrading material and cylinder on the other side, and constructed and arranged to move radially with the jaws to and away from the cylinder and detached from the latter, substantially as described.

15. In an abrading-cylinder, the combination of a shaft, a cylinder, abrading material taking about the cylinder, a plate at the end of the cylinder rotatable about the shaft, clamping-jaws extending from the plate and taking over the end of the cylinder for clamping the abrading material between the jaws and the cylinder, contact-faces partly eccentric and partly concentric to the axis of the plate, the eccentric and the concentric part of each contact-face being connected to form a continuous contact-face and extending in a plane longitudinally of the plane of the face of the plate, with parts taking against the contact-faces, with a relative movement between the parts and the contact-faces, and constructed and arranged for drawing the jaws toward the cylinder to clamp the abrading material between the jaws and the cylinder while the movement between the eccentric part of the contact-faces and the said parts taking against them is effected and retaining the jaws in clamped position after the concentric part of the contact-faces and the said parts taking against them are in substantial contact, by allowing a limited turning of the plate without changing the position of the jaws, with a cushion on the jaws between the jaws on one side and the ends of the abrading material and cylinder on the other side, and constructed and arranged to move radially with the jaws to and away from the cylinder and detached from the latter, substantially as described.

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