No. 705,550. Patented July 29, 1902.

M. H. BALLARD.

POLISHING MACHINE.

(Application filed Jan. 13, 1902.)

(No Model.)

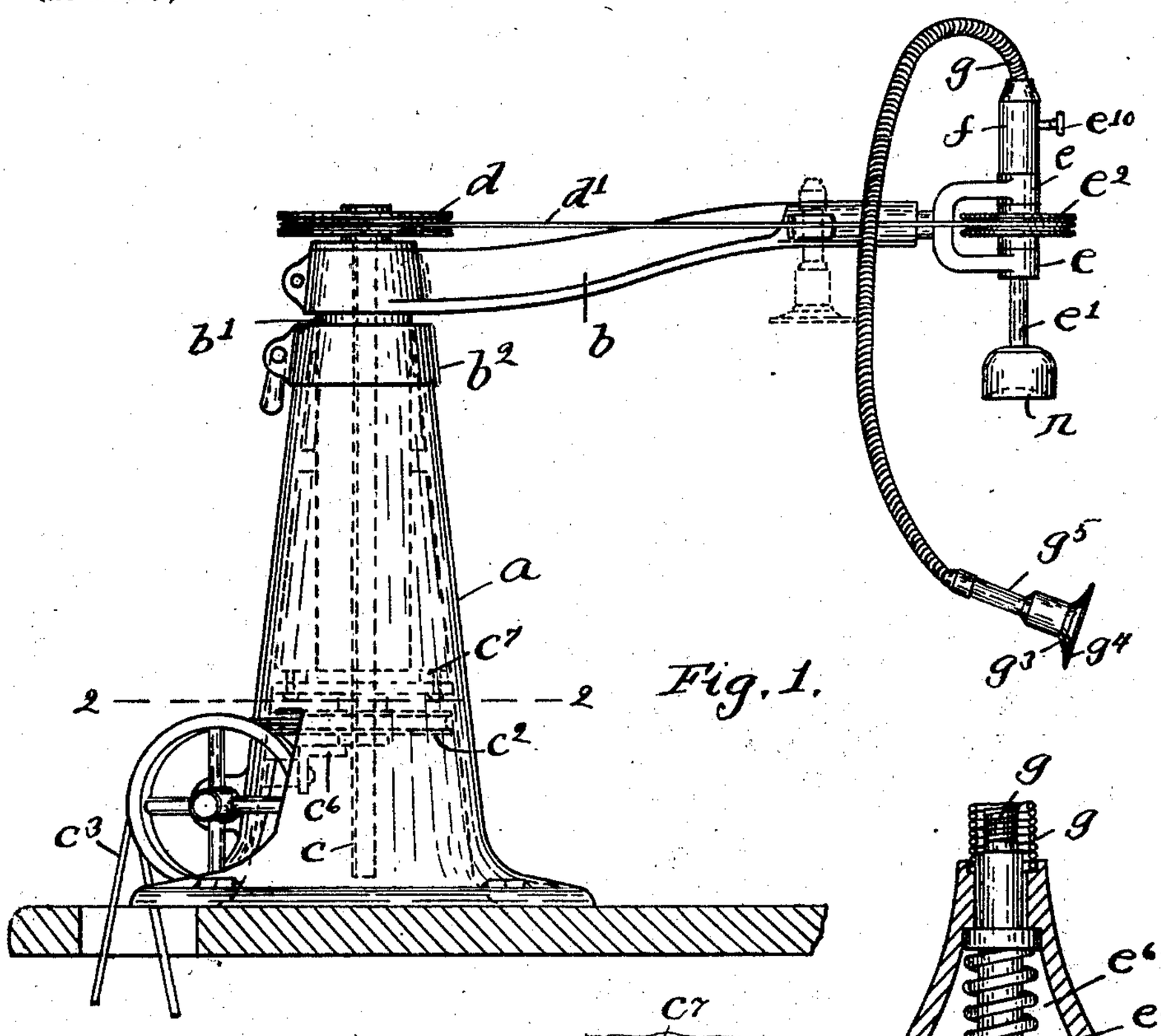

Fig. 1.

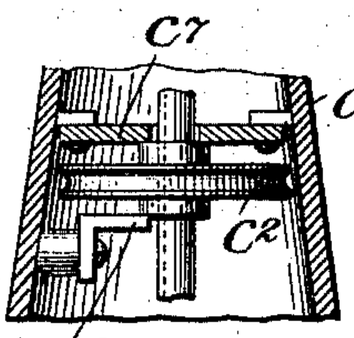

Fig 6.

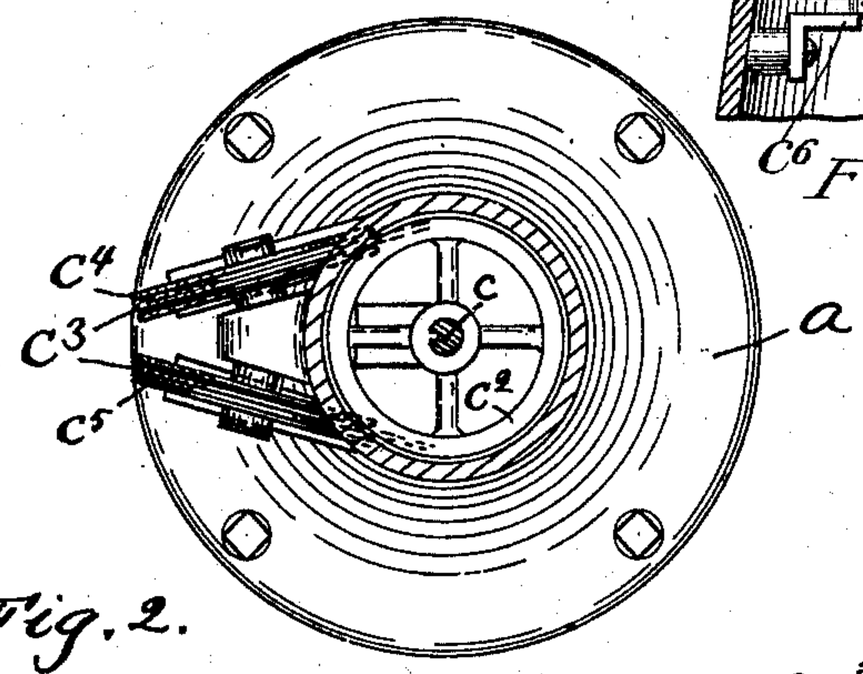

Fig. 2.

Fig. 3.

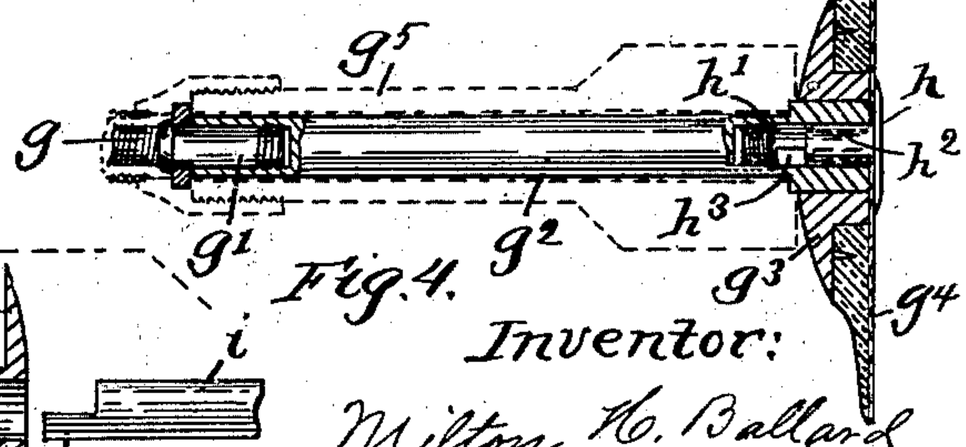

Fig. 4.

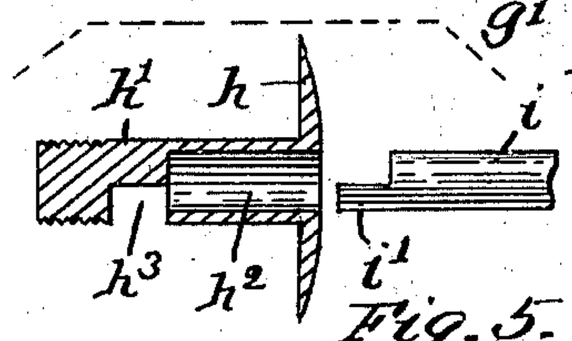

Fig. 5.

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UNITED STATES PATENT OFFICE.

MILTON H. BALLARD, OF LYNN, MASSACHUSETTS, ASSIGNOR TO GEORGE W. EMERSON & CO., OF LYNN, MASSACHUSETTS.

POLISHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 705,550, dated July 29, 1902.

Application filed January 13, 1902. Serial No. 89,435. (No model.)

To all whom it may concern:

Be it known that I, MILTON H. BALLARD, of Lynn, county of Essex, State of Massachusetts, have invented an Improvement in Polishing-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to polishing-machines, and while adapted for many uses is especially devised for use in boot and shoe factories for repolishing patent-leather tips. Among the many other uses to which my invention is particularly applicable is burnishing or polishing the bottoms of boots and shoes which have been treated with what is commonly called an "electric finish."

The invention has for its object to improve and simplify the construction of the machine in many particulars, especially adapting it to its preferred use.

The invention consists, essentially, in a revoluble spindle or shaft borne by an arm and having connected with it by suitable clutch mechanism a flexible shaft to the extremity of which a polishing tool or pad is attached.

The clutch mechanism employed is constructed and arranged to slip in case the polishing tool or pad is applied with too great pressure to the work, and means are provided for throwing the members of said clutch mechanism into and out of engagement.

The flexible shaft, which is revolved when the members of the clutch mechanism are in engagement, has at its extremity a tubular spindle which is inclosed within and has suitable bearings in a shell or case, and the polishing tool or pad is attached to this tube, and novel means are provided for detachably holding the polishing-disk in position.

The flexible shaft is inclosed within a flexible tube, so that the polishing tool or pad may be manipulated or moved about at will.

Figure 1 shows in side elevation a polishing-machine embodying this invention. Fig. 2 is a horizontal section of the stand and parts supported by it, taken on the dotted line 2 2, Fig. 1. Fig. 3 is an enlarged vertical section of the inclosing case for the clutch mechanism, which latter is shown in elevation. Fig. 4 is a longitudinal vertical section of the polishing tool or pad and support therefor. Fig. 5 represents details of the means employed for holding the polishing-disk in position on its support. Fig. 6 is a detail to be referred to.

a represents the upright stand or column of the machine, which is made hollow.

b represents an arm which is secured to the upper end of a cylindrical bar b', disposed vertically within said hollow stand. The bar b' is adapted to be turned on its axis and also raised and lowered, so that the arm may be set in different radial positions and also adjusted to different elevations. The bar b' is held fixed in any position that it may be set by a clutch band or ring b^2, which will be of any usual or suitable construction.

A shaft c (see dotted lines, Fig. 1) passes down through the center of the bar b' and is formed with a splineway, and said shaft projects beyond the lower end of said bar b' for a considerable distance, and its lower projecting end portion passes through a central hole in the hub of a belt-pulley c^2, around which a belt c^3 passes, which also passes around the belt-pulleys c^4 c^5, and thence to a suitable driving belt-pulley. The central hole in the hub of the belt-pulley c^2 is formed with a spline which enters the splineway in the shaft c. The belt-pulley c^2 is contained within the hollow stand, and the belt-pulleys c^4 c^5 are supported outside of said stand. The belt-pulley c^2 is held in a predetermined position by a plate c^7, located above it and secured to the stand, and a bracket c^6, located below it and also secured to the stand. As the belt-pulley c^2 is revolved the shaft c will be revolved by it, and as said shaft is connected with said belt-pulley by a spline it will be seen that said shaft will be revolved even though the bar b' is adjusted to different elevations. The belt-pulley d is secured to the upper end of the shaft c, around which a belt d' passes. At the extremity of the arm b a yoke e is formed or provided, which affords bearings for a vertical spindle e', upon which the belt-pulley e^2 is secured, and said belt-pulley e^2 occupies a position in a horizontal

plane with the belt-pulley d, and the belt d' passes around said belt-pulley e^2. To the upper end of the vertical spindle e' a crown ratchet-toothed clutch member e^3 is secured, which engages a corresponding crown ratchet-toothed clutch member e^4, mounted upon a vertical stem e^5. The clutch member e^4 is normally held pressed into engagement with the clutch member e^3 by a spring e^6 surrounding the stem. The clutch member e^4 has an annular flange e^7, projecting over or above an eccentric-pin e^8, and said eccentric-pin projects inwardly from a pin e^9, to which a thumb-piece e^{10} is attached. By turning said pin e^9 the eccentric-pin e^8 will be moved in a circular path about the axis of said pin e^9 and will engage said flange e^7 and lift the clutch member e^4 free from the clutch member e^3. A tubular shell f is secured to the yoke e, which incloses the clutch mechanism thus described, and provides a bearing at its upper end for the stem e^5, and also provides a bearing for the pin e^9. A flexible shaft g is connected to the stem e^5, which will be made of any suitable length and adapted to be rotated by the vertical spindle e' when the members of the clutch are in engagement. The outer end of said flexible shaft g has connected to it a pin g', which is screwed into one end of a tubular or other spindle g^2, thereby connecting them together.

The polishing tool or pad comprises a circular base g^3, made of any number of component parts, having thereon a polishing-disk g^4, and said base g^3 is rigidly secured to the spindle g'. The polishing-disk g^4 is detachably connected to the tool or pad, and as a simple way of thus connecting the disk to the tool or pad I have provided a slotless headed screw h, (see Figs. 4 and 5,) the screw-threaded shank h' of which is screwed into the outer end of the tubular spindle g'. The screw h is formed or provided with a socket h^2, at one side of the bottom of which a recess h^3 is formed, and a pin i, having a suitable projection i', is adapted to enter said socket, and when bottoming therein its projection i' will enter the recess h^3 in the screw. By turning said pin the screw will be turned. As a simple manner of forming the recess h^3 in the screw I prefer to cut away the shank of the screw externally, thereby forming a recess of suitable depth to open into the socket h^2.

In practice I find that it is practically impossible to employ any ordinary form of slot-headed screw; hence the provision of a novel form to meet the requirements of the case.

The tubular or other spindle g^2 has its bearings in a shell or case g^5, which is made of suitable size and length to serve as a handpiece for the polishing tool or pad.

The flexible shaft g is inclosed within a flexible tube j, one end of which is connected to the shell f and the other end to the shell g^5.

In operation the arm b will be set in whatever position it may be desired, and the operator grasping the handpiece g^5 will properly manipulate the polishing-tool, which is rapidly rotated by the vertical spindle e'.

In operating the polishing-tool it is desired to provide against too heavy pressure upon the work, and in this instance ratchet-toothed clutch mechanism is caused to revolve in the direction of the arrow thereon, so that whenever the tool is held with too great pressure the clutch member e^3 will slip by the clutch member e^4. This is important when operating upon patent-leather tips to obviate burning, and it is also important for many other purposes. Hence in a machine of this character a slip-clutch mechanism becomes necessary.

When not using the polishing tool or pad, the pin e^9 will be turned and the clutch disengaged and the polishing tool or pad placed in a suitable rest provided for it on the arm b, as indicated by dotted lines, Fig. 1.

The vertical spindle e' is made long enough to project down through a yoke, as shown in Fig. 1, and may have secured to its lower end a burnishing-tool n of any suitable description.

I claim—

1. In a polishing-machine, a vertical spindle, a support therefor, and means for revolving it, combined with a flexible shaft, clutch mechanism interposed between said spindle and shaft, and a polishing tool or pad connected to the extremity of said flexible shaft, substantially as described.

2. In a polishing-machine, a vertical spindle, a support therefor, and means for revolving it, combined with a flexible shaft, a slip-clutch mechanism interposed between said spindle and shaft composed of two crown ratchet-toothed members, one of which is connected to the spindle and the other to the shaft, a spring for holding said members in engagement and means for disengaging them, and a polishing tool or pad connected to the extremity of said flexible shaft, substantially as described.

3. In a polishing-machine, a vertical spindle, a support therefor and means for revolving it, combined with a flexible shaft, a clutch mechanism interposed between said spindle and shaft comprising two crown ratchet-toothed members, one of which has an annular flange, an eccentric-pin engaging said flange and means for turning it, and a polishing tool or pad connected to the extremity of said flexible shaft, substantially as described.

4. In a polishing-machine, a vertical spindle, a support therefor, and means for revolving it, combined with a flexible shaft, a flexible tube inclosing it, a tubular case attached to the end of said flexible inclosing tube, a spindle contained in said tubular case, which is connected to said flexible shaft, said spindle projecting from said case, and a polishing tool or pad mounted on the projecting end of said spindle, substantially as described.

5. In a polishing-machine, a vertical spindle bearing a belt-pulley, an arm bearing said spindle, a vertically adjustable and rotatable bar to which said arm is secured, a stand or support for said bar, a shaft passing centrally through said bar having a splineway, a belt-pulley to which said shaft is splined, a belt-pulley secured to the upper end of said shaft which occupies a position in a horizontal plane with the belt-pulley on said vertical spindle, a flexible shaft connected to said vertical spindle, and a polishing tool or pad connected to the extremity of said flexible shaft, substantially as described.

6. A polishing tool or pad consisting of a circular base, a tubular spindle to which it is attached, a slotless headed screw for holding the polishing-disk in position on said base, having a socket formed with an offset portion, to receive a pin having a corresponding offset portion by which said screw is turned, substantially as described.

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

MILTON H. BALLARD.

Witnesses:
JEANNIE K. BETTON,
ELMINA R. TOZZER.