Aug. 12, 1924. 1,504,377

H. PLUMMER

SHOE CLEANING AND POLISHING MACHINE

Filed Feb. 16, 1921 7 Sheets-Sheet 1

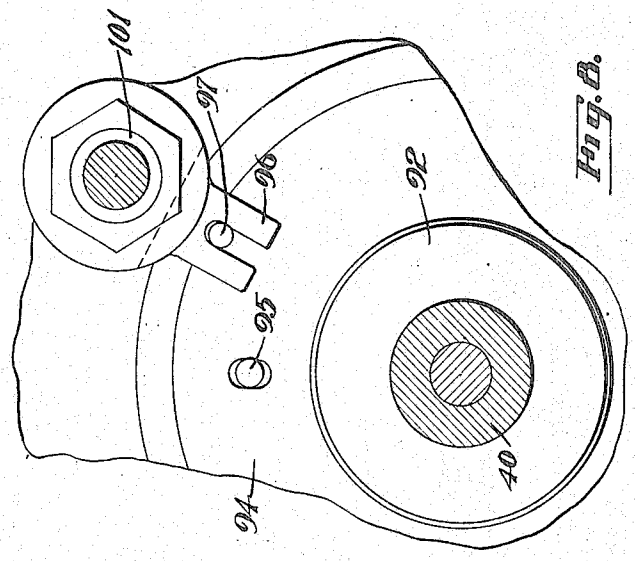


Fig. 6.

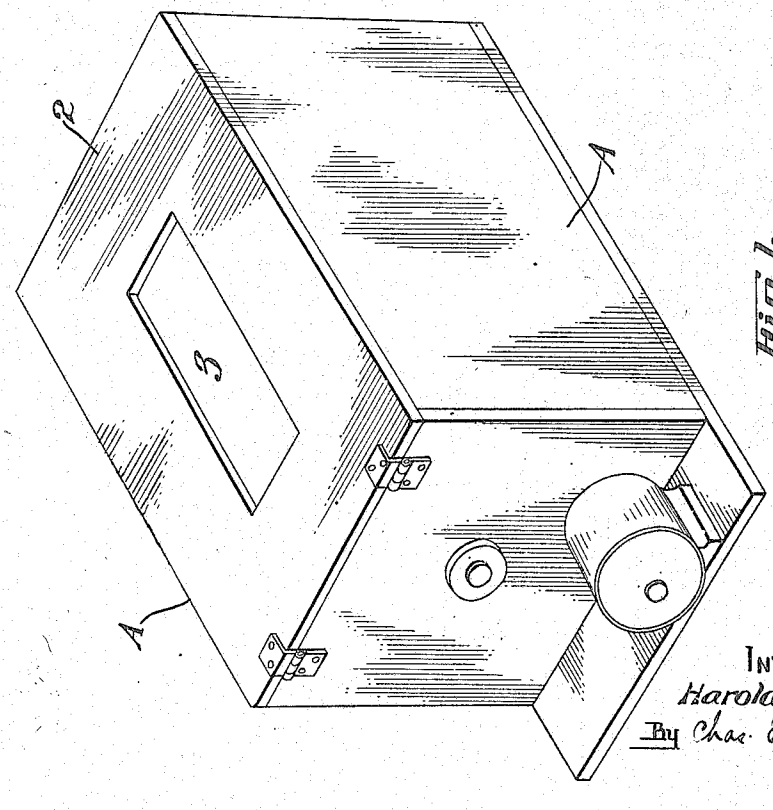


Fig. 1.

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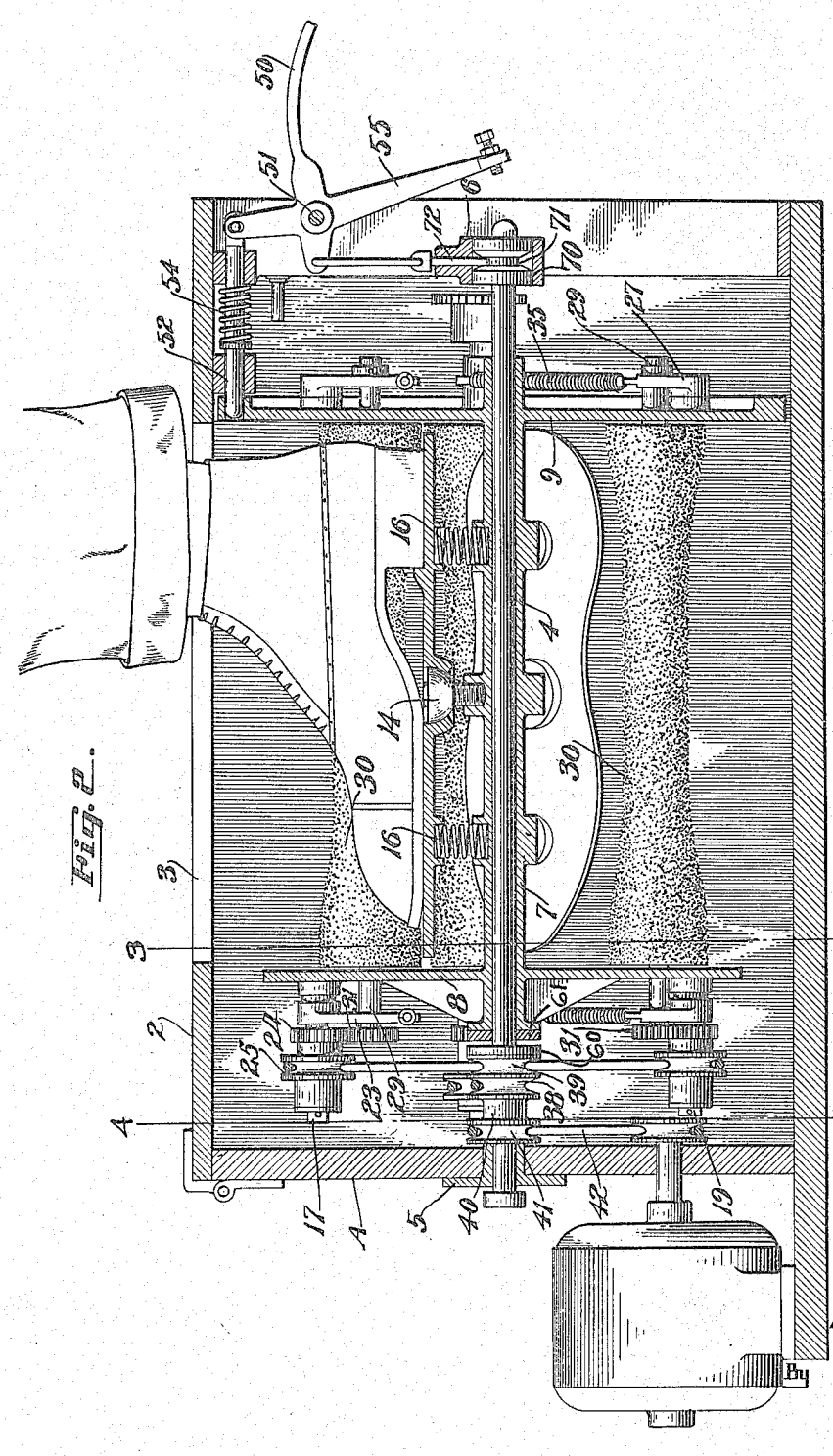


Fig. 2.

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Filed Feb. 16, 1921 7 Sheets-Sheet 3

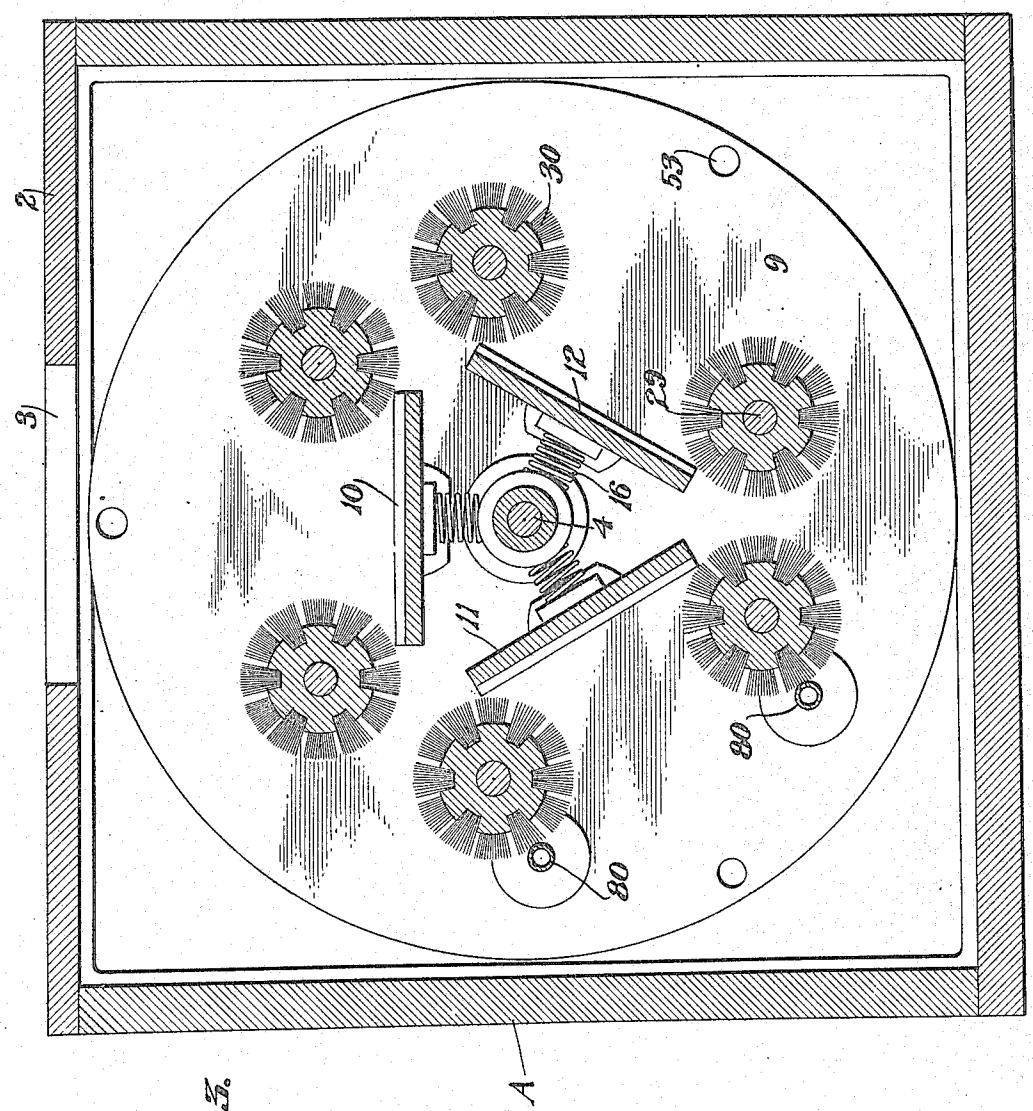


Fig. 3.

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SHOE CLEANING AND POLISHING MACHINE

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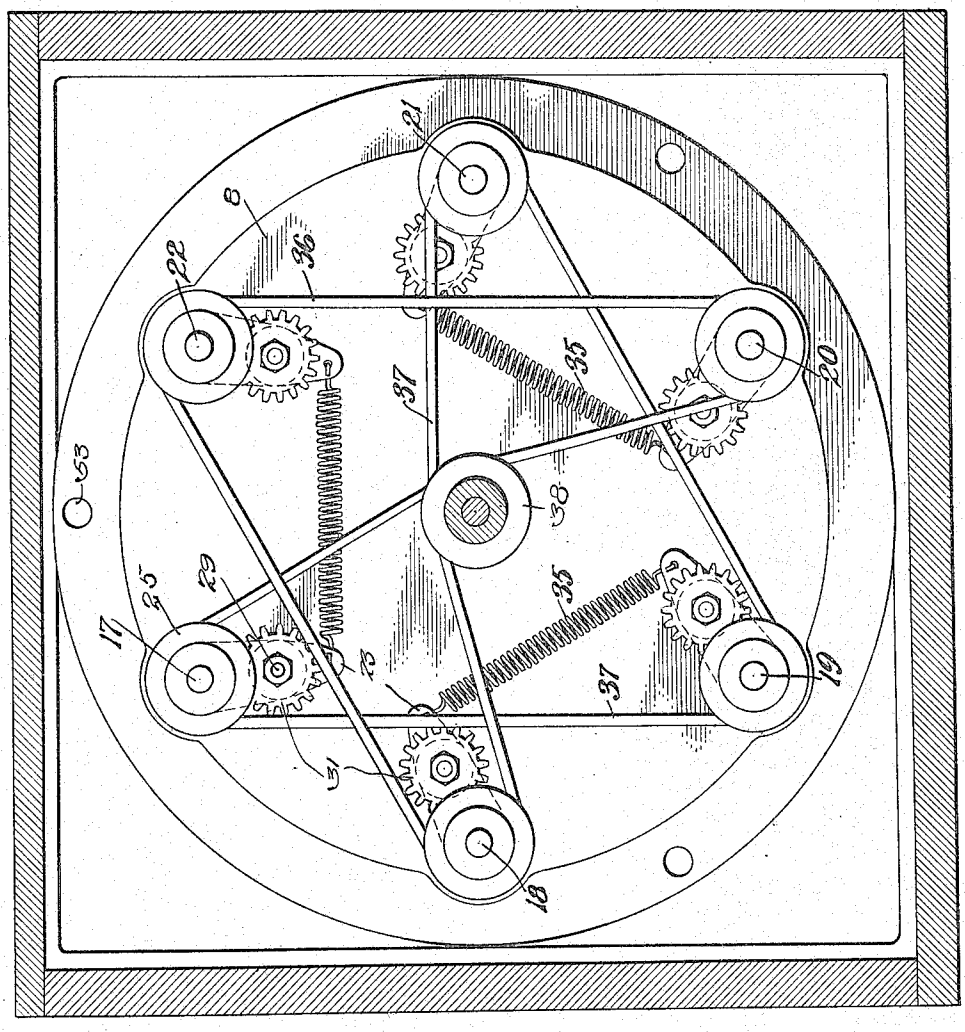


Fig. 4.

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SHOE CLEANING AND POLISHING MACHINE

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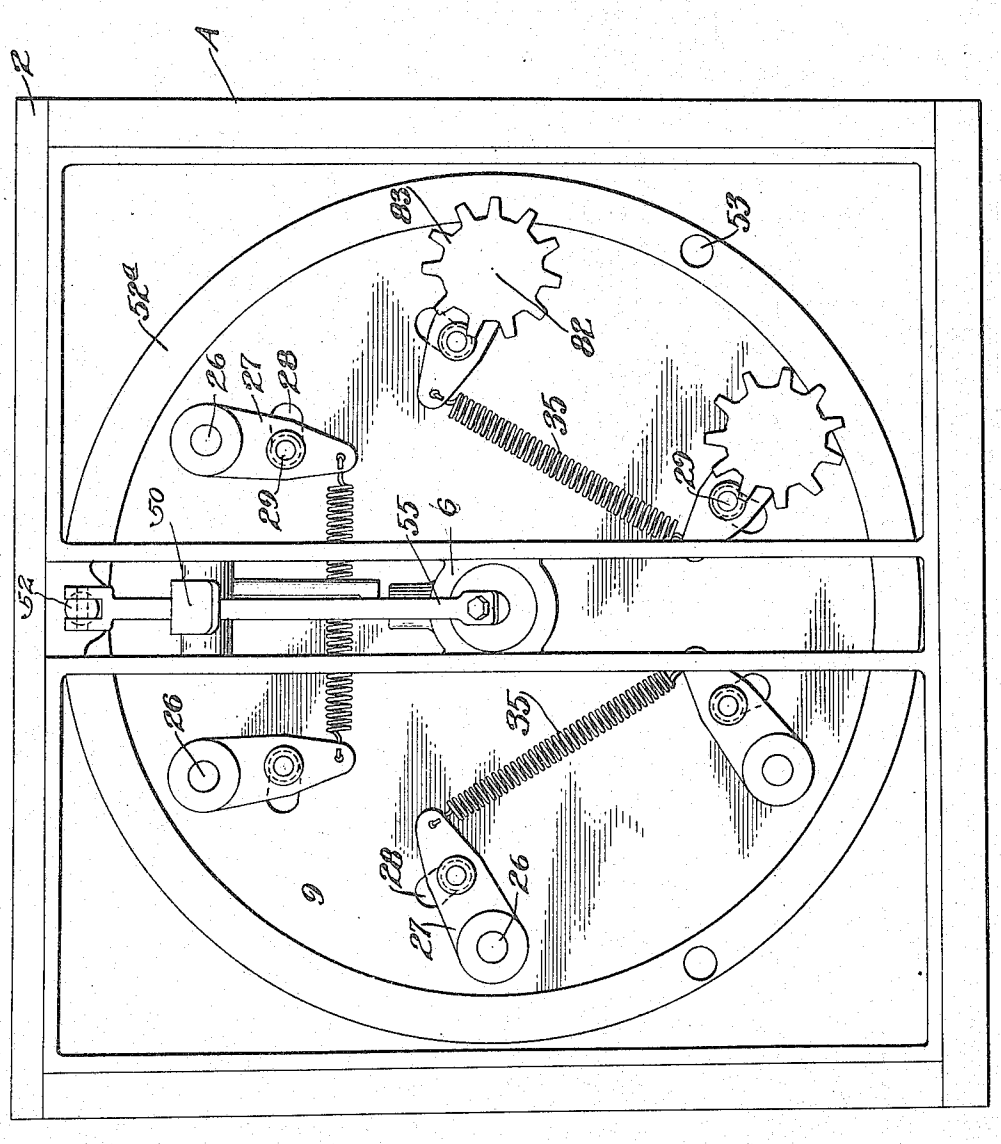


Fig. 5.

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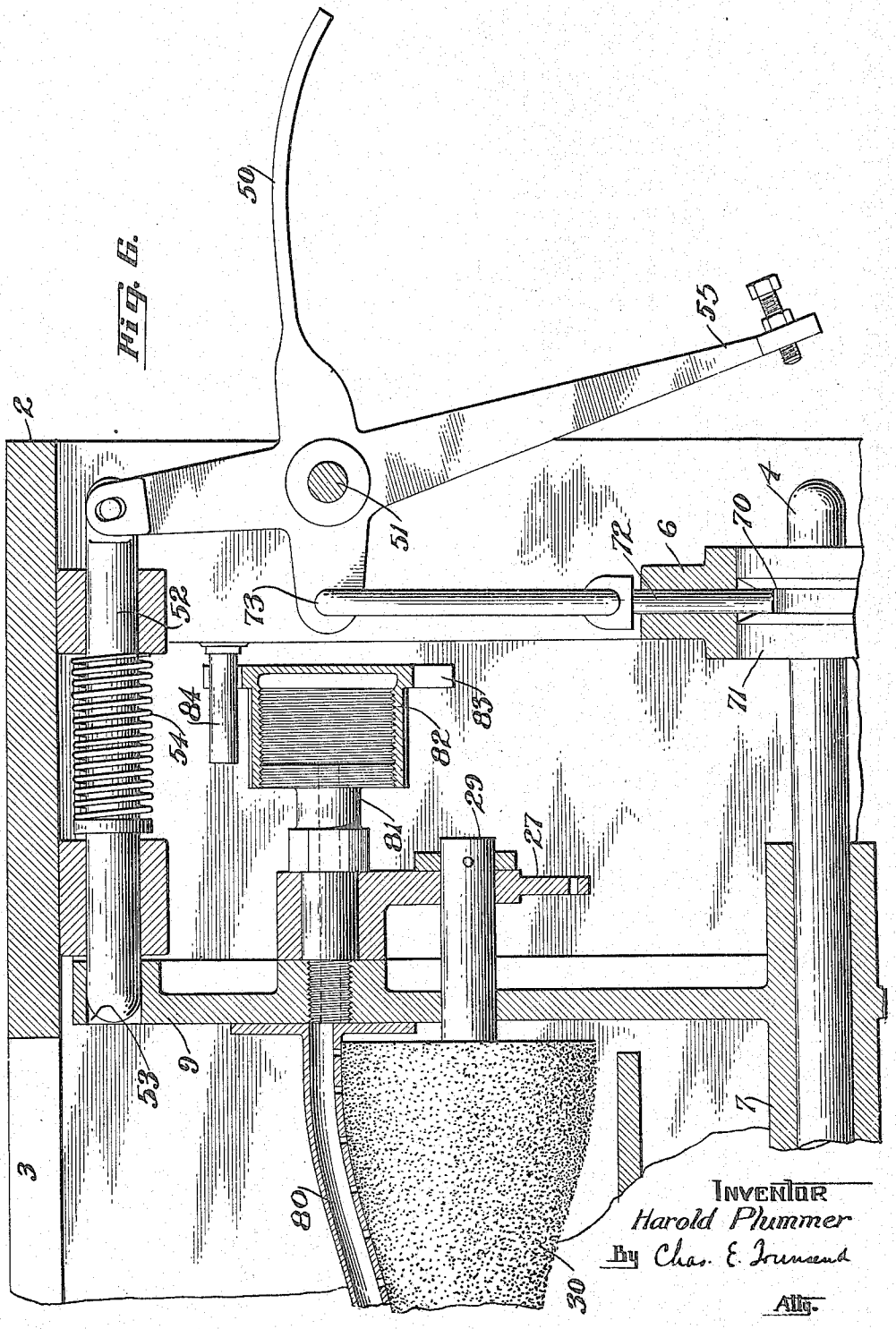
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SHOE CLEANING AND POLISHING MACHINE

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Fig. 6.



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SHOE CLEANING AND POLISHING MACHINE

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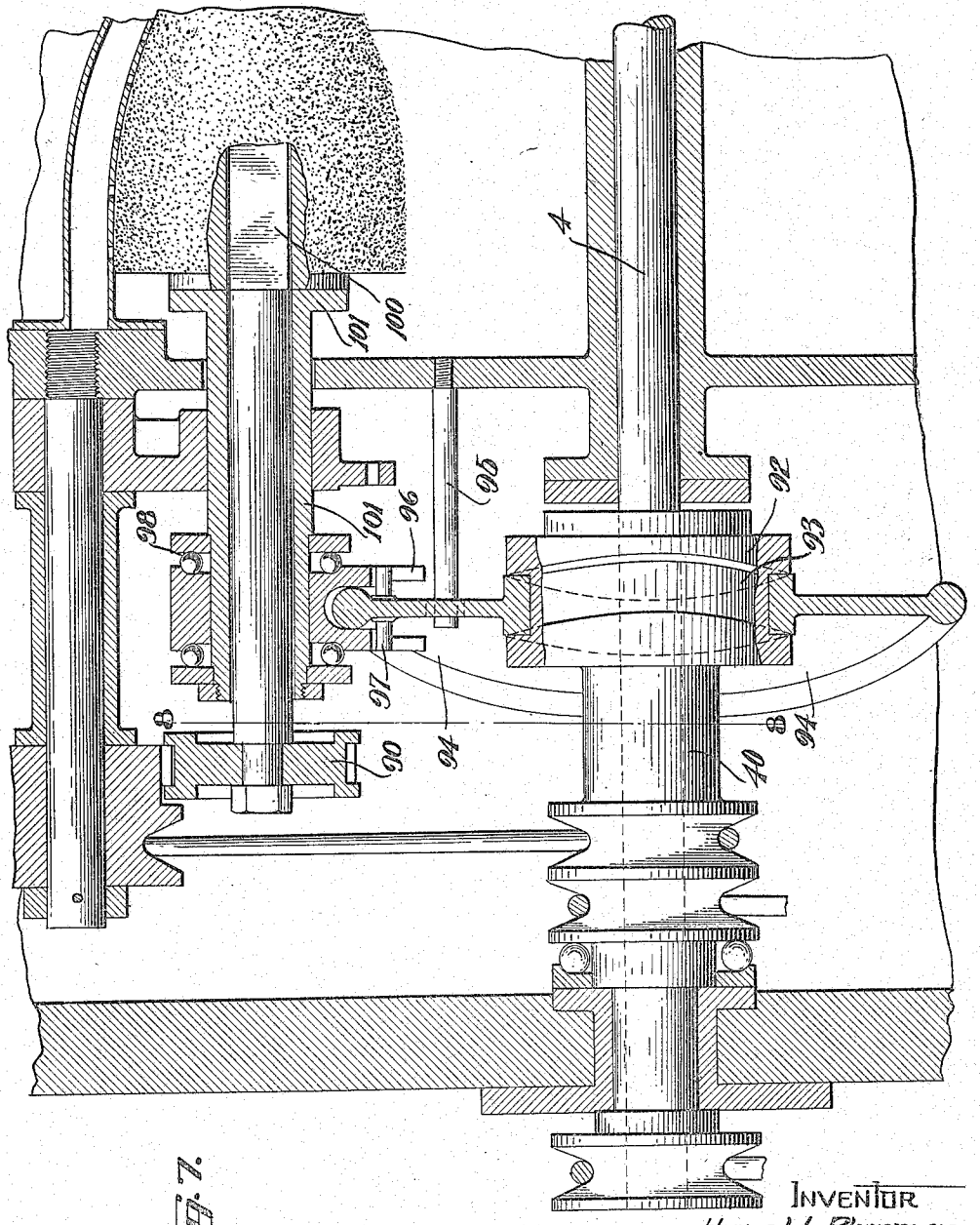


Fig. 7.

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UNITED STATES PATENT OFFICE.

HAROLD PLUMMER, OF OAKLAND, CALIFORNIA.

SHOE CLEANING AND POLISHING MACHINE.

Application filed February 16, 1921. Serial No. 445,429.

To all whom it may concern:

Be it known that I, HAROLD PLUMMER, a British subject, residing at Oakland, in the county of Alameda and State of California, have invented new and useful Improvements in Shoe Cleaning and Polishing Machines, of which the following is a specification.

This invention relates to cleaning and polishing machines for shoes and the like, and more particularly to the type of machine wherein are disposed a series of rotary brushes arranged in pairs and whose external contour substantially conforms to that of the lower portion of a shoe or boot. One pair of brushes is employed for cleaning purposes, a second pair for applying blacking or polishing paste, and a third for finally polishing or shining the shoes. These brushes rotate at a high rate of speed and are automatically brought to bear against the shoe with sufficient pressure to produce the result desired.

One of the objects of the present invention is to simplify and improve the general construction and operation of machines of this character, and to render such machines rapid and efficient in the performance of their work.

Another object is to provide a machine that is of a compact and portable nature and which permits a number of the same to be arranged in row or other suitable formation, thus permitting accommodation of several patrons simultaneously.

Further objects will hereinafter appear.

The invention consists of the construction, combination and arrangement of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Fig. 1 is an exterior perspective view of the machine.

Fig. 2 is a central vertical longitudinal section through the machine.

Fig. 3 is a cross section on line 3—3, Fig. 2.

Fig. 4 is a cross section on line 4—4, Fig. 2.

Fig. 5 is an end view of one end of the machine.

Fig. 6 is an enlarged detail view of the paste container and the mechanism whereby it is automatically actuated.

Fig. 7 is an enlarged detail view of the mechanism employed for imparting a reciprocal movement to the brushes.

Fig. 8 is a cross section taken on line 8—8, of Fig. 7.

Referring to the drawings in detail, and particularly to Fig. 2, A indicates a casing of suitable shape and construction which is provided with a cover 2. Formed in said cover is an opening 3 through which the boot or shoe to be polished may be inserted, and arranged within the casing is a plurality of brushes arranged in pairs, said brushes being so supported that one pair after another may be brought into register with the opening 3, one pair being employed for the purpose of cleaning the shoes, a second pair for applying a paste or polish, and a third pair for the purpose of finally finishing and polishing the shoe.

Extending longitudinally through the housing A and secured against rotary movement is a shaft 4, said shaft being supported at one end as at 5 and at the opposite end in a bracket or hanger 6. Loosely supported by the shaft and centrally disposed thereon is a sleeve-like member 7, and formed integral therewith or otherwise secured thereto is a pair of head members 8 and 9. Disposed between the head members just referred to is a series of foot plates, all told three in number, and equally spaced; said foot plates being indicated at 10, 11 and 12. The foot plates are supported by the sleeve member 7 and have a universal movement with relation thereto, that is they may be rocked sideways or endwise from a central support which consists of a screw 13 terminating in a semicircular ball shaped member 14, said member being received by a socket 15 formed centrally of the plate. Interposed between the ends of the respective plates and the sleeve 7 are springs 16 which normally maintain the respective plates in a horizon-

tal or parallel position with relation to the sleeve. These springs exert an upward pressure against the plate and thereby maintain a perfect joint between the ball and the socket, and they at the same time permit a lateral rocking movement and endwise rocking movement to be transmitted to each plate when foot pressure is exerted thereon; this being of considerable importance as will hereinafter be described.

Mounted on the head member 8 and on the exterior side thereof are six stud shafts as indicated at 17, 18, 19, 20, 21 and 22. These shafts are radially disposed with relation to the central shaft 5 and are equally interspaced. Pivotally mounted on each shaft near the inner end thereof is a hanger 23, and adapted to rotate about each stud shaft is a spur gear 24 and a driving pulley 25; the members 24 and 25 being formed as integral parts or so connected that they will rotate in unison. Secured to the head member 9, and also on the exterior side thereof, are a similar number of stud shafts as indicated at 26. These shafts are aligned with the first named shafts and they each support a hanger 27 similar to those indicated at 23. Formed in the respective head members 8 and 9, at points adjacent the hangers 23 and 27, are arcuate slots 28, and extending through the slots of the respective head members are shafts 29 which are journalled in the hangers 23 and 27. There are six pairs of aligned stud shafts, six pairs of aligned hangers, and six shafts such as indicated at 29; each of said shafts 29 being journalled in a pair of cooperating hangers such as described. Each shaft 29 supports a revolving brush 30, and each shaft and brush is driven from its cooperating gear 24 by a pinion 31 intermeshing therewith; the pinions 31 being secured at one end of each shaft 29 at a point where it will constantly intermesh with the respective gears 24.

The brushes as stated in the first part of the specification are arranged in pairs. Each pair is interspaced and one pair cooperates with each foot plate or platform shown; the brushes of each pair being disposed on opposite sides of the several platforms. These brushes are yieldably supported, that is automatic adjustment or separation of each pair of brushes takes place when shoes of varying sizes are inserted. This automatic adjustment is obtained by supporting the shafts 29 in the hangers 23 and 27 respectively. These hangers, as previously stated, are pivotally mounted in their respective supporting shafts and as such have an arcular swinging movement; this movement being limited by the arcuated slots 28 formed in the respective heads. The hangers are slightly extended beyond the bearing portions formed therein, in which the shafts 29 are supported, and these extensions are connected by coil springs as shown at 35. The coil springs normally exert a pull which maintain the brushes close together, but when a shoe larger than the spacing formed between the same is inserted, automatic expansion or separation takes place as the yielding movement of the springs will permit the hangers to swing outwardly and the brushes to separate, the springs at the same time exerting a uniform pull or pressure on the brushes to perform the work of cleaning, polishing, etc.

For the purpose of rotating the several brushes in unison, and each brush of each pair in opposite directions, two separate driving belts are shown as at 36 and 37. The belt 36 passes over the pulleys supported by the shafts 18, 20 and 22, and a central pulley 38 carried by the shaft 4, while the belt 37, which is a cross belt, passes over the pulleys carried by the shafts 17, 19 and 21, and a second pulley 39 carried by the central shaft. The pulleys 38 and 39 are secured to a sleeve 40 turnably mounted on the shaft 4, and this sleeve also carries a third pulley indicated at 41 which is driven from an electric motor or other suitable drive by a belt indicated at 42. In other words power transmitted from the electric motor shown rotates the sleeve 40. This in turn carries the pulleys 38 and 39 and therefore transmits power through the belts 36 and 37 to the pulleys journalled on the several stud shafts previously mentioned. These last named pulleys transmit power to the gears 24 and these in turn to the pinions 31 which are secured on the shafts 29 and as the brushes are secured on said shafts, it is obvious that all will rotate in unison and that each pair will rotate in opposition to each other. The driving connection between the gears 24 and 31 will in no instance be interrupted when the brushes are separated or contracted as the hangers 23 swing in a true circular arc about the gear 24, due to the fact that the hangers are pivotally mounted on the same shafts upon which the gears 24 are journalled.

In actual operation we will suppose that the cleaning brushes are in alignment with the opening 3 and that the foot is inserted and placed upon the foot plate disposed between said brushes. If the machine is in operation it should be obvious that the respective brushes will engage the sides of the shoe and that thorough cleaning thereof will be quickly effected as the brushes are rotating at a comparatively high speed and are exerting considerable pressure against the sides of the shoe; said pressure being regulated by the tension of the springs 35. The mere placing of the foot on the plate

provided for its reception and holding it stationary would not effectively clean the entire surface, hence the reason for the universal mounting provided. This mounting permits the foot to be rocked from side to side or the toe or heel to be raised or lowered and thereby effectively engaged by the brushes. Again it is obvious that the foot may have a limited movement with relation to the plate upon which it is supported. When the shoe has been brushed clean, and it is desired to apply a blacking or paste, it will first be necessary to remove the shoe and to bring the paste applying brushes in alignment with the opening 3. This is accomplished by depressing a lever 50 pivotally supported as at 51, at one end of the casing. This lever is connected at its upper end with a latch 52, the inner end of which normally engages one or another of a series of recesses 53 formed in the face of the head member 9; there being three recesses all told, one for each set of brushes. The latch is normally held in engagement by a spring 54, but it is retracted against the tension of this spring when pressure is applied to the lever 50. The lever has a second extension 55 formed thereon, the lower end of which is adapted to engage the end of the shaft 4 when it swings inwardly. This causes the shaft to move endwise a slight distance or a distance just sufficient to cause a pair of clutch members 60 and 61 to engage; one of said clutch members being carried by the sleeve 40 and the other by an extension of the head 8. This engagement of the clutch sections 60 and 61 will cause the sleeve 40 to impart a rotary movement to the shaft 4 and the sleeve 7 and the head members attached thereto, and the next pair of brushes will thus swing into position, being stopped at the exact position when the latch 52 engages the next recess. In other words lever 50 is merely depressed until the clutch member is engaged and it is then instantly released so that the latch 52 will engage the raised surface 52^a formed on the head 9, and ride thereon until it registers with the succeeding aperture. The shaft 4 returns to normal position the moment the latch 52 engages the next aperture thereby releasing the lever 50, that is the shaft 4 will only assume its advanced position as long as pressure is brought to bear thereon by means of lever 55, and it will instantly return to normal position when the clutch is disengaged or when the latch returns to normal position; this being accomplished by forming a wedge-shaped or angularly walled annular groove 70 in the exterior face of a collar 71 formed on the end of shaft 4. This groove is engaged by a plunger 72 attached to the lever 50 as at 73, and raised or lowered in unison therewith.

With the paste applying brushes swung into position, the shoe is again inserted and the paste is now applied. The shoe is again removed and the head members partially rotated to assume the final position where the polishing or shining brushes are aligned with the opening 3; the final turning movement being accomplished by again depressing the lever 50 as previously described, the paste applied to the brushes applying the same is delivered by means of a perforated tube 80 secured between the respective head members. This tube is connected with a cup 81, in construction very similar to an ordinary grease cup. This cup is filled with paste and a screw cover 82 applied. This screw cover has a series of projecting lugs 83 formed on its peripheral edge which alternately engage a stationary pin 84 secured on the hanger 6, that is once during each complete revolution of the heads 8 and 9 engagement is made with the pin 84 and a partial rotation is thus imparted to the screw cover 82 and a predetermined quantity of paste is thus discharged from the tube 80 and applied to the brushes cooperating therewith.

In Fig. 7 a slight modification of the structure shown in the remaining figures is illustrated. In this instance means are provided for imparting not only a rotary movement to the individual brushes but also a slight reciprocal movement. The shafts supporting the brushes are also in this instance journalled in pivotally mounted hangers as illustrated, and they are rotated in exactly the same manner as previously described, that is a flanged pinion 90 is secured on the outer end of each brush supporting shaft, which intermeshes with a driving pinion and pulley journalled on the adjacent stud shaft. The flanges on the pinion 90 embrace the sides of the driving pinion and secure the brush supporting shaft against endwise movement when a reciprocal movement is transmitted to the brush proper. To impart the reciprocal movement just specified, a collar 92 is secured or otherwise attached to the driving sleeve 40 mounted on the main shaft. Formed in the face of this collar is an annular groove 93, which is disposed on an angle, and mounted in the groove is a disk 94 to which a wobbling movement is imparted during the rotation of the collar. The collar turns in unison with the sleeve supporting the same, while the disk is held against rotation by a pin 95 passing through a slot formed in the disk. The wobbling movement imparted to the disk is in turn transmitted to the brush proper which is slidably mounted on the shaft supporting the same. The shaft of course drives or rotates the brush, but the shaft proper does not reciprocate. The

brush proper is reciprocally mounted on the squared portion of the shaft indicated at 100, and a sleeve is attached to one end of the brush as at 101. Mounted on the outer end of the sleeve is a hanger such as indicated at 96. The lower end of this hanger is fork-shaped and straddles the peripheral edge of the wobbling disk 94. Each side of the fork-shaped projections are again forked as shown in side elevation, see Fig. 8, and straddle pins 97 secured in the wobbling disk. The sleeve 101 turns in unison with the brush so it may therefore be stated that the pins 97 serve the function of securing the hanger 96 against rotation with the sleeve. A reciprocal movement will be transmitted from the wobbling disk through the hanger and the sleeve to the brush, and friction between the hanger and the sleeve supporting the same will in this instance be reduced to a minimum by the provision of ball thrust bearings 98 disposed on each side of the hanger.

From the foregoing description it can be seen that an exceedingly compact and simple mechanism has been provided for cleaning shoes, applying paste and polishing the same, each operation being taken care of by individual pairs of brushes provided for the several operations required, and each set movable into or out of operating position, the brushes having a shape which substantially conforms to the contour of the shoe and being automatically adjustable to receive and handle shoes of varying sizes. A platform universally removable with relation to the cooperating brushes is provided which materially increases the effect and work performed by the brushes, and means for automatically applying the paste is employed; the operation of swinging the several brushes into place being accomplished by the depression of the lever 50.

The machine here shown may be driven from a single motor as illustrated, or the several machines may be arranged in row formation and driven from a line shaft, if desired. It should therefore be universally adaptable as one or more may be employed as conditions may demand.

While certain features of the present invention are more or less specifically illustrated, I wish it understood that various changes in form and proportion may be resorted to within the scope of the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is—

1. In a machine of the character described a casing, a shaft extending longitudinally therethrough, a pair of interspaced head members mounted on the shaft, a plurality of pairs of cooperating brushes supported by said head members, an opening being formed in the casing, and means for imparting a turning movement to the head members to bring the brushes successively into alignment with the opening.

2. In a machine of the character described a casing, a shaft extending longitudinally therethrough, a pair of interspaced head members mounted on the shaft, a plurality of pairs of cooperating brushes supported by said head members, an opening being formed in the casing, means for imparting a turning movement to the head members to bring the brushes successively into alignment with the opening, and a foot plate disposed between each pair of brushes.

3. In a machine of the character described a casing, a shaft extending longitudinally therethrough, a pair of interspaced head members mounted on the shaft, a plurality of pairs of cooperating brushes supported by said head members, an opening being formed in the casing, means for imparting a turning movement to the head members to bring the brushes successively into alignment with the opening, a foot plate disposed between each pair of brushes and rotatable with the head members, and a support for each plate permitting universal movement thereof with relation to the cooperating brushes.

4. In a machine of the character described a pair of interspaced brushes, a foot plate disposed between the same, a support for the foot plate permitting endwise tilting movement and lateral tilting movement, and means for normally retaining the plate in a predetermined position.

5. In a machine of the character described a casing having an opening formed therein for the insertion of a shoe, a shaft extending longitudinally through the casing, a pair of interspaced head members secured to the shaft, a plurality of stud shafts supported by the respective head members, a hanger pivotally mounted on each stud shaft, axles journalled in the hangers, a brush carried by each axle, said hangers and axles being arranged in pairs, and means for transmitting a rotary movement to each axle.

6. In a machine of the character described a casing having an opening formed therein for the insertion of a shoe, a shaft extending longitudinally through the casing, a pair of interspaced head members secured to the shaft, a plurality of stud shafts supported by the respective head members, a hanger pivotally mounted on each stud shaft, axles journalled in the hangers, a brush carried by each axle, said hangers and axles being arranged in pairs, means for transmitting a rotary movement to each axle, and a foot plate disposed between each pair of axles and supported by the first named shaft extending longitudinally

through the casing, said support permitting universal movement of the foot plate with relation to the axles and the shaft.

7. In a machine of the character described a casing having an opening formed therein for the insertion of a shoe, a shaft extending longitudinally through the casing, a pair of interspaced head members secured to the shaft, a plurality of stud shafts supported by the respective head members, a hanger pivotally mounted on each stud shaft, axles journalled in the hangers, a brush carried by each axle, said hangers and axles being arranged in pairs, means for transmitting a rotary movement to each axle, and a foot plate disposed between each pair of axles, manually controlled means for imparting a rotary movement to the interspaced heads to bring one pair of brushes after another into register with the opening in the casing.

8. In a machine of the character described a pair of interspaced head members supporting a pair of cleaning brushes, a pair of paste applying brushes, and a pair of polishing brushes, a casing enclosing the heads and the brushes and having an opening formed therein through which a shoe may be inserted, means for imparting a step by step rotary movement to the heads to swing each set of brushes successively into register with the opening, and means actuated by said step by step rotary movement of the head members for automatically delivering paste to the paste applying brushes.

9. In a machine of the character described a casing having an aperture formed therein through which a shoe may be inserted, a shaft extending through the casing, a pair of interspaced head members carried by the shaft, a pair of cleaning brushes, a pair of paste applying brushes and a pair of polishing brushes carried by the head members, a sleeve journalled on the shaft and adapted to be continuously rotated, a clutch member on said sleeve, a cooperating clutch member on one of the head members, a latch mounted in the casing and adapted to engage successively pockets formed in one of the head members, and a manually depressible lever adapted to release the latch and to engage the clutch members to impart a partial rotary movement to the head members and thereby swing the brushes successively into alignment with the aperture in the casing.

10. In a machine of the character described a pair of head members, a plurality of aligned stud shafts secured to each of the head members, a hanger pivotally mounted on each shaft, an axle journalled in each pair of aligned hangers, a driving gear on each stud shaft on one of the head members, and a pinion on each axle supported by the hangers intermeshing with said driving gears.

11. In a machine of the character described a pair of head members, a plurality of aligned stud shafts secured to each of the head members, a hanger pivotally mounted on each shaft, an axle journalled in each pair of aligned hangers, a driving gear on each stud shaft on one of the head members, a pinion on each axle supported by the hangers intermeshing with said driving gears, and means for imparting a rotary movement to the gears on the respective stud shafts in unison.

12. In a machine of the character described a pair of head members, a plurality of aligned stud shafts secured to each of the head members, a hanger pivotally mounted on each shaft, an axle journalled in each pair of aligned hangers, a driving gear on each stud shaft on one of the head members, a pinion on each axle supported by the hangers intermeshing with said driving gears, means for imparting a rotary movement to the gears on the respective stud shafts in unison, and other means for imparting a step by step rotary movement to the heads.

13. In a machine of the character described comprising a casing having an opening therein, a pair of interspaced rotatable head members, a plurality of pairs of brushes carried by the head members and rotatable therewith to a position beneath the opening in the casing, a foot plate for each of the pairs of brushes rotatable with the head members and means for rotating the head members.

14. In a machine of the character described comprising a casing having an opening therein, a pair of interspaced rotatable head members, a plurality of pairs of brushes and a foot plate for each pair of brushes carried by the head members and rotatable therewith to a position beneath the opening in the casing, a latch for the head members and manually controlled means for releasing the latch and imparting rotary motion to the head members.

15. In a machine of the character described comprising a casing having an opening therein, a shaft extending therethrough, a pair of interspaced head members rotatably mounted on the shaft, a plurality of pairs of brushes and a foot plate for each pair carried by the head member and rotating therewith, means for rotating the head members, a latch for the head members and manually operable means for releasing the latch and shifting the head members into engagement with the head rotating means whereby the brushes and foot plate are brought into position beneath the opening in the casing.

16. In a machine of the character de-

scribed comprising a casing having an opening therein, a shaft extending therethrough, a pair of interspaced rotatable head members carrying brushes and foot plates thereon mounted on the shaft, means for rotating the head members, a latch for the head members, manually operable means for releasing the latch and shifting the head members into engagement with the head member driving means and means for automatically returning the head members and latch to normal position.

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