W. W. HARTMAN & H. S. CAHN.

OPERATING MEANS FOR CLUTCHES.

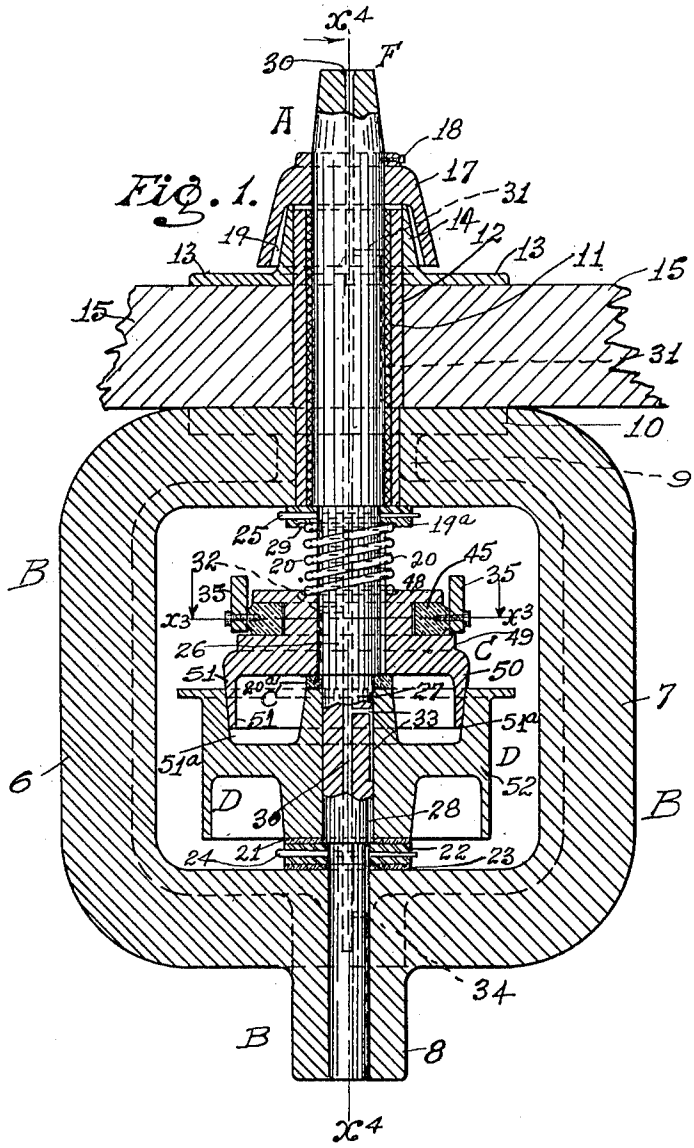
APPLICATION FILED JAN. 24, 1912.

1,072,116.

Patented Sept. 2, 1913.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.

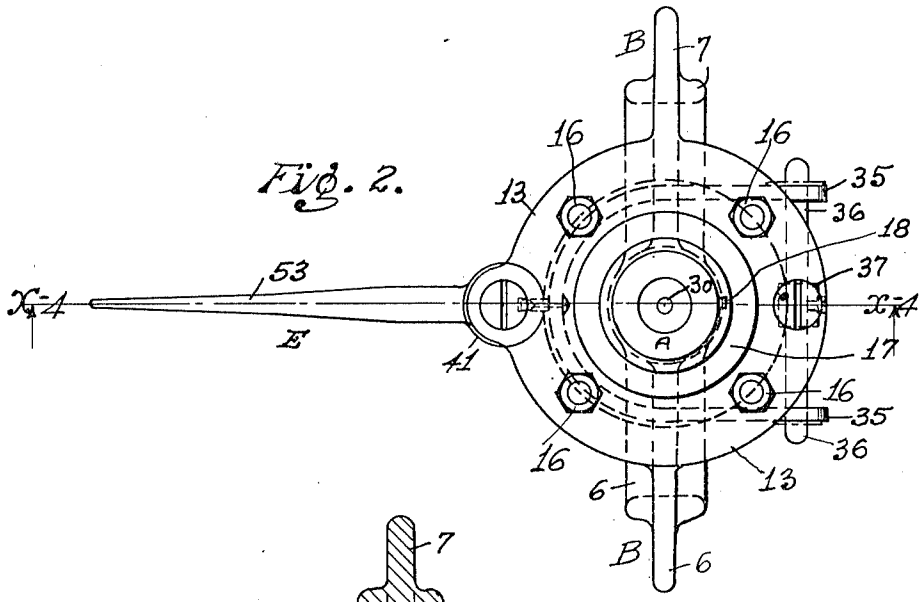


Fig. 3.

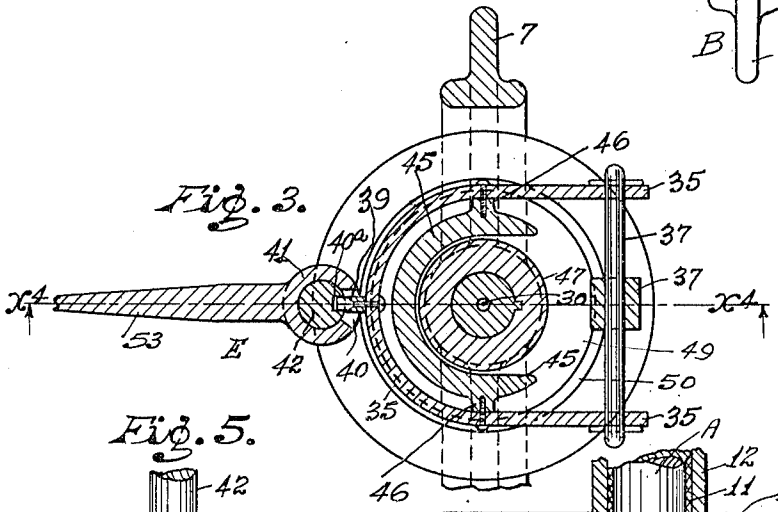


Fig. 5.

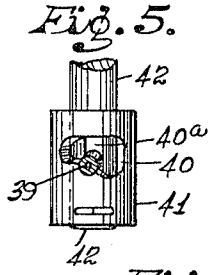


Fig. 4.

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UNITED STATES PATENT OFFICE.

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OPERATING MEANS FOR CLUTCHES.

1,072,116. Specification of Letters Patent. Patented Sept. 2, 1913.

Application filed January 24, 1912. Serial No. 673,255.

To all whom it may concern:

Be it known that we, WILLIAM W. HARTMAN and HENRY S. CAHN, citizens of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have jointly invented new and useful Improvements in Operating Means for Clutches, of which the following is a specification.

This invention relates to operating means for clutches, particularly as employed in surfacing machines for optical goods and the like, such as optical lenses, and it has for its object to provide improvements in machines of this character which will be relatively superior in point of simplicity and inexpensiveness of construction and organization combined with positiveness and efficiency in service, facility in control and adjustment, durability, and adaptability to varying conditions of use and service; and which will be generally superior in performance of the functions for which it is devised and adapted.

In constructing and organizing a machine of the character under consideration, it is of extreme desirability that the same be capable of ready installation in and removal from working position, that it be capable of long continued use and service with a minimum of attention, that it be compact in form so as to be as much as possible out of the way of the operator, and that it may be thrown into or out of operation by means which may be utilized without the operator taking either hand from the work. It will be found that all of these desiderata have been taken into consideration and provided for in carrying our invention into effect; and with the above objects in view, the invention consists in the new and useful provision, construction, formation, combination, association and relative arrangement of parts, members and features, all as hereinafter described, shown in the drawings, and finally pointed out in claims.

In the drawings:—Figure 1 is a vertical sectional view, parts being in elevation, of a machine embodying the invention and shown installed in position for service; Fig. 2 is a top plan view of the same; Fig. 3 is a detail transverse sectional view, taken upon the line X^3—X^3, Fig. 1, and looking in the direction of the appended arrows; Fig. 4 is a vertical sectional view, fragmentary, taken upon the lines X^4—X^4, Figs. 1 and 3, and looking in the direction of the appended arrows in each instance; and, Fig. 5 is a fragmentary face view of a detail of the construction shown in the other figures.

Corresponding parts in all the figures are denoted by the same reference characters.

Referring with particularity to the drawings, the improved surfacing machine disclosed therein comprises a central vertical shaft A upon which, at the upper end, the surfacing device or tool, (not shown), is placed and suitably held. This surfacing device may be of any particular form, construction or kind, in accordance with the nature of service to be performed, and the work, such as an optical lens, is held to the same by the operator through a suitable agency, not shown, or directly by hand, or by both, so that the work is properly manipulated and kept in contact with the abrasive surface of the tool. The shaft A is shown as suitably journaled in a vertical frame B, comprising oppositely bowed side members 6 and 7 joined at their lower extremities by a bearing member 8, and at their upper extremities by a bearing member 9 capped by an annular plate 10. The lower end of the shaft A fits rotatably directly within the bearing member 8. The upper end is rotatably received within an elongated ring of Babbitt metal or similar anti-friction material 11, held in place by a sleeve 12 the lower end of which constitutes the inner wall of the bearing member 9. Upon the upper end of the sleeve 12 is slidably mounted an annular plate 13 bearing an upwardly directed tapered collar 14. In installing the machine in position for service, the sleeve 12 is passed upwardly through a suitable hole in the supporting structure, such as a work-bench 15, minus the plate 13 and its collar, and these are afterward applied over the upper end of the sleeve 12 and brought to bear upon the upper surface of the bench. The two plates 10 and 13 are then drawn together to clamp the bench and hold the machine thereto, as by bolts 16, which permit the detachment of the machine as desired. Adjustably and detachably mounted upon the shaft A above the sleeve 12 is a bell-shaped or downwardly flaring shield 17 fixed in position by a set-screw 18 or the like which impinges upon

the shaft; and as shown in Fig. 1 this shield, in service, fits down over the tapered collar 14, the formation of which it closely fits, with but a slight clearance between the two, as indicated at the annular space 19.

Before seating the shaft A in the frame B the lower and smaller end thereof, which eventually fits the bearing member 8 as a step-bearing, is passed through a collar 19ª, a coil spring beneath the collar, a clutch member C splined upon the shaft A, a ring 20ª beneath the clutch member C, a clutch member and pulley D loose upon the shaft, a washer 21, a collar 22 and a washer 23, all in the order named. When the shaft is home, in the bearing members 8 and 9, the collar 22 is fixed to the shaft by a pin 24, and the collar 19ª is fixed to the shaft by a pin 25. The shaft is slightly reduced in diameter, as at 26, directly above the collar 19ª; again, as at 27, directly above the clutch member and pulley D; and again, as at 28, directly above the collar 22.

The coil spring 20 bears at one end upon the upper portion of the clutch member C, and at the other end within an annular groove 29 in the lower portion of the collar 19ª. Both collars 19ª and 22 are preferably of hardened steel, the collar 22 acting as a thrust bearing for the shaft at the reduced portion 28 thereof.

E designates operating means for the clutch comprising the two members C and D, it being understood that the member D serves to drive the shaft through the clutch, under motion imparted by a suitable belt, not shown.

The shaft A is provided or formed with lubricating means F which may comprise a longitudinal axial bore or duct 30 leading from the upper end of the shaft downwardly to a point adjacent to the lower end, and provided with a lateral branch passage 31 supplying the bearing member 9, a lateral branch passage 32 supplying the branch member C, a lateral branch passage 33 supplying the pulley D, and a lateral branch passage 34 supplying the bearing member 8. These passages are clearly indicated in Fig. 1 and require no detail illustration to make clear their functions of lubrication.

The operating means E comprise a swinging yoke 35 the ends of which are pivotally engaged with a shaft 36 centrally supported by a bracket 37 depending from the plate 10, said shaft being held fixed in the bracket by a screw or the like 38. Centrally of the yoke 35 is a roller 39 which projects within an inclined cam slot 40 formed in one face of a collar 41 rotatably embracing a short vertical shaft 42 likewise depending from the plate 10 diametrically opposite to the bracket 37. The shaft 42 has an elongated recess 40ª behind the cam slot 40 within which the roller 39 is also received to guide it in a vertical path as the yoke 35 swings vertically. This collar 41 is rotatably supported upon a collar 43 held to the lower end of the stud shaft 42 by a cotter pin 44. A supplemental yoke 45 is pivotally supported adjacent to its ends, as at 46, within the arms of the yoke 35, and fits within a channel 47 between spaced flanges 48 and 49 upon the body 50 of the clutch member C. Depending from the body 50 is the cone crown 51 of the clutch member C, the same entering a complementary conical crown 51ª upon the body 52 of the clutch member C and pulley D; said crowns 51 and 51ª being adapted to co-act in clutch-operation upon their relative approach under actuation of the swinging yokes 35 and 45 which are in turn swung to produce the clutch-operation, by the movement of the roller 39 in the collar 41, plus the urgence of the coil spring 20. The operating means E further include a lever arm 53 projecting outwardly from the collar 41 and whereby the same may be turned upon the shaft 42.

The operation, method of use and advantages of the improvements in surfacing machines shown as embodying the invention will be readily understood from the foregoing description, taken in connection with the accompanying drawings and the following statement: The entire machine, assembled as shown in the drawings, in connection with a bench or the like, is at all times conveniently under control of the operator, with respect to application of the work to the surfacing device at the upper end of the shaft A, and with respect to the stationary or moving condition of the shaft A. The lever arm 53 projects conveniently below the level of the bench or the like 15, so that the operator can throw it with the knee to cause the depression of the yoke 35 and the yoke 45 and the throwing of the clutch into condition to set up operation of the shaft, or so as to cause the elevation of said yokes and the throwing of the clutch out of operation. In the first of these movements the spring 20 assists, the clutch being thrown out of operation against the tension of said spring, and the roller 39 riding into the upper end of the cam slot 40 in which a dwell is provided as shown in Fig. 5, thus holding the clutch members disengaged. The shield 17 tends to deflect the particles of material falling from the work, causing them to be spread laterally and away from the bearing member 9 inclusive of the sleeve 12 and anti-friction material 11, at the upper end of the collar 14. If any such finely divided material works into the space between the shield 17 and the collar 14, rotation of the shield tends to work such material downwardly and outwardly upon the bench, and to keep it out of the working surfaces at the upper end of the shaft. The lubri-

cating duct 30 with its branch passages 31, 32, 33, and 34, effectually lubricates bearing member 9, the clutch member C where it reciprocates upon the shaft A, the pulley D, and the bearing member 8; and it is only necessary to introduce lubricant at one oiling hole to oil the entire machine, or the essential working parts thereof incident to rotation of the shaft A, such hole being the upper end of the duct 30. The end thrust upon the shaft A, due to application of the work to the upper end of the shaft, is transmitted finally to the hard steel collar 22 above the bearing member 8, the reduced portion 28 of the shaft forming an annular shoulder bearing directly upon said collar, and receiving lubricant by feed downwardly from the branch chamber 33. This end thrust is equalized throughout the working parts directly connected with the shaft A, by the provision of the reduced shaft portion 26 bearing upon the collar 19^a, and the provision of the reduced portion 27 bearing upon the pulley D. All of the end thrust being taken up at the collar 22 as recited. The operating means E are particularly positive in their effect, the spring 20 holding the clutch members in engagement but so holding them yieldingly, and thereby imparting to the shaft the proper amount of power required. Application of excessive friction to the upper end of the shaft, in using the machine, will tend to stop the rotation of the shaft, the spring 20 yielding sufficiently to permit the clutch members to operatively disengage. The pivotal mounting of the yoke 45 in the yoke 25 permits the yoke 45 to remain horizontal and in working connection with the clutch body 50 during the swinging of the yoke 35 permits the yoke 45 to remain horizontal and out of working condition; and the combination of the two yokes with the roller 39 and cam slot 40 in the collar 41, plus the lever arm 53, constitutes a working assemblage of proper sensitiveness to slight pressure plus positiveness and high efficiency. It will be further noted that the major portion of the machine is installed out of the way beneath the bench, only the working end of the shaft A and the shield 17 being exposed in addition to the surfacing device. The clear space on the bench is thus but slightly obstructed.

In conclusion, we do not desire to be understood as limiting ourselves to the specific provision, formation, construction, combination, association and relative arrangement of parts, members and features shown and described; but reserve the right to vary the same, in adapting the improvements to varying conditions of use, without departing from the spirit of the invention and the terms of the following claims:—

Having thus described our invention, we claim and desire to secure by Letters Patent:—

1. An operating shaft, and operating means therefor comprising a two-member clutch one of which is mounted to rotate with the shaft and the other of which is free upon the shaft, tension means acting to force the clutch members into co-engagement, and means for relatively separating the clutch members and so holding them; said last-named means comprising a first pivoted part, a second part pivotally connected with said first pivoted part and loosely connected with one of said clutch members, and cam means for swinging said first pivoted part; said cam means comprising a collar having a cam slot, and a roller upon said first pivoted part and entering said cam slot; said collar being provided with a lever arm.

2. An operating shaft, and operating means therefor comprising a two-member clutch one of which is mounted to rotate with the shaft and the other of which is free upon the shaft, tension means acting to force the clutch members into co-engagement, and means for relatively separating the clutch members and so holding them; said last named means comprising a first pivoted part, a second part pivotally connected with said first pivoted part and loosely connected with one of said clutch members, and cam means for swinging said first pivoted part; said cam means comprising a collar having a cam slot, and a roller upon said first pivoted part and entering said cam slot; said collar being provided with a lever arm; there being a shaft upon which said collar is slidably mounted, said shaft having an elongated recess receiving a portion of said roller.

3. An operating shaft, and operating means therefor comprising a two-member clutch one of which is mounted to rotate with the shaft and the other of which is free upon the shaft, tension means acting to force the clutch members into co-engagement, and means for relatively separating the clutch members and so holding them; said last-named means comprising a second shaft at right angles to said first-named shaft, a first yoke pivoted at its ends to said second shaft, a second yoke pivoted to said first yoke and loosely connected with one of said clutch members, and cam means co-acting with said first yoke; said cam means comprising a third shaft, a collar slidably and rotatably mounted upon said third shaft and provided with a cam slot, and a lever arm for actuating said collar; said first yoke being provided with a roller entering said cam slot.

4. An operating shaft, and means for operating the same comprising two clutch members one of which is loose upon the

shaft and the other of which is mounted to rotate with the shaft; and means for relatively moving the clutch members comprising a first pivoted yoke, a second pivoted yoke pivotally connected with the first yoke and loosely connected with one of the clutch members, and cam means co-acting with said first yoke; said cam means comprising a rotatably and slidably mounted collar having a cam slot; said first yoke being provided with a roller entering said cam slot.

5. An operating shaft, a frame for the same provided with oppositely bowed side members and with bearing members at the points of connection of said side members, and operating means for said shaft applied to the same between said side members of the frame; said operating means comprising clutch members and means for relatively moving the same; said shaft being reduced in diameter beneath said clutch members; there being a collar applied to the shaft above one bearing member and upon which the end thrust of the shaft is received at said reduced portion thereof.

In testimony whereof, we have signed our names to this specification in the presence of two subscribing witnesses.

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HENRY S. CAHN.

Witnesses:
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RAYMOND I. BLAKESLEE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."