J. M. CHRISTINE.

APPARATUS FOR POLISHING PLANE SURFACES.

APPLICATION FILED MAR. 23, 1921.

1,417,593.

Patented May 30, 1922.

2 SHEETS—SHEET 1.

Fig. 1.

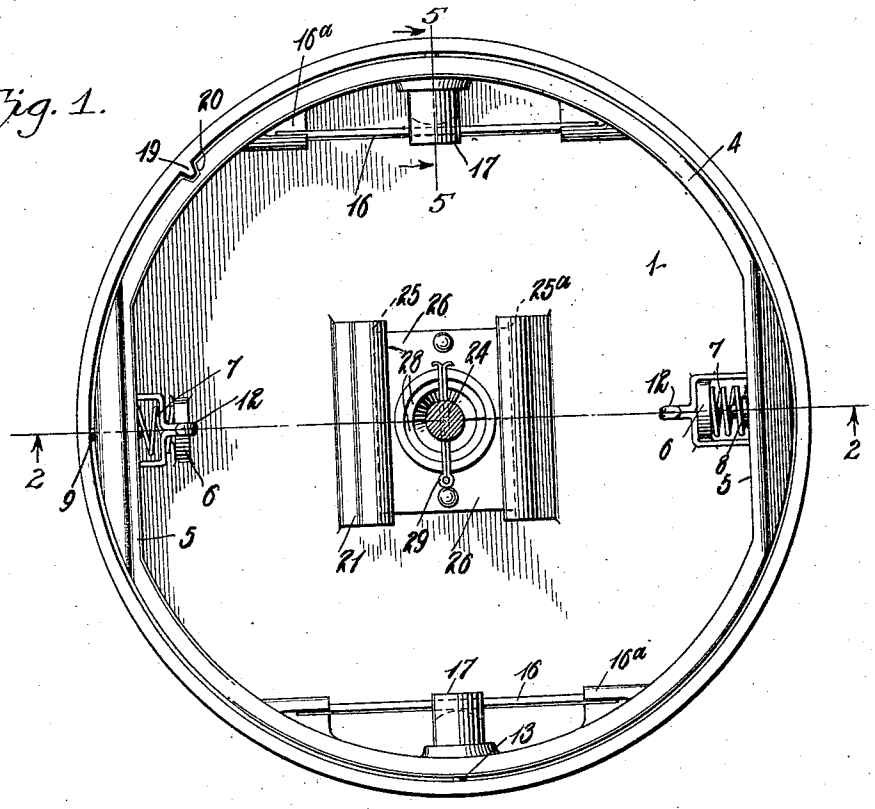
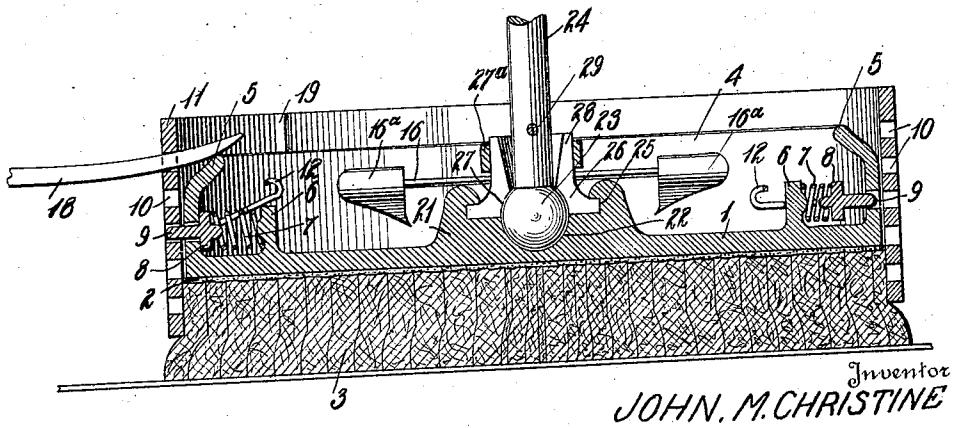


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

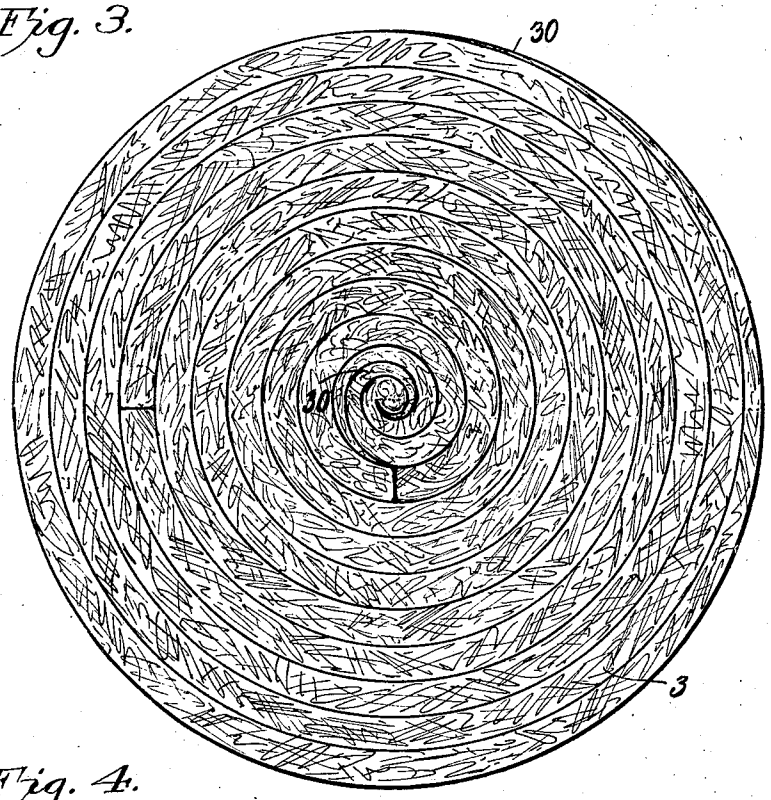


Fig. 4.

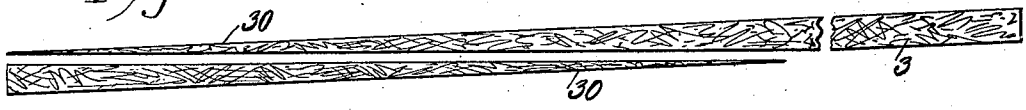


Fig. 5.

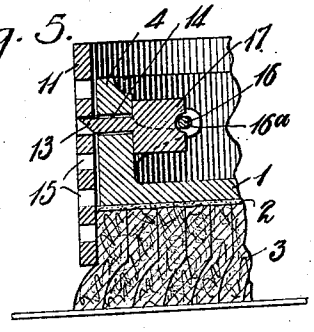
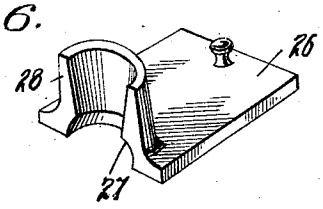


Fig. 6.



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APPARATUS FOR POLISHING PLANE SURFACES.

1,417,593. Specification of Letters Patent. Patented May 30, 1922.

Application filed March 23, 1921. Serial No. 454,614.

To all whom it may concern:

Be it known that I, JOHN M. CHRISTINE, a citizen of the United States, residing at Ford City, in the county of Armstrong and State of Pennsylvania, have invented new and useful Improvements in Apparatus for Polishing Plane Surfaces, of which the following is a specification.

My invention relates, in general terms, to improvements in apparatus for polishing plane surfaces such, for instance, as those presented by glass, marble, plate metal and the like, and more particularly it has reference to the provision of an improved polishing block including an adjustable pad which is especially designed for use with machines for polishing glass.

In order to clearly define the novel features and advantages of my invention, it is pointed out that certain well known types of polishing blocks now upon the market contemplate the use of felt pads carried by fixed backings and compression rings. These pads are mounted upon polishing machines through the medium of bolts, screws or other auxiliary attaching means. As distinguished from the foregoing and other types of polishing blocks my invention contemplates the arrangement of a novel pad within a compression ring in a manner which will permit of relative adjustment therebetween, and furthermore the disc which forms the body of my block is rotatably attached to the spindle of a polishing machine through the instrumentality of a separable, universal connection in the assembly of which no screw-threaded connections or pinning or bolting devices are used. The most obvious advantages resultant from the foregoing differentations in structure between my polishing block and those heretofore known are: first, that the maximum efficiency of my pad is attained by adjusting the same to compensate for wear and the like, whereas heretofore when pads have become worn they have been thrown away or scrapped; second, the possibility of the compression ring engaging the surface of the glass or becoming completely detached from the pad is eliminated; third, there are no parts included in the assembly of my polishing block which can become detached; and forth, my polishing block in its entirety can be attached to the spindle of a polishing machine in a relatively short time, and when it is so attached it is positively locked against possible disengagement therefrom, although free rotation of the same is permitted.

While certain of the principal advantages and objects of my invention have been pointed out above in contrast with the ends attained by polishing blocks now in common use it is also pointed out that adjustment may be effected of my pad without detaching the block from the spindle of a polishing machine or the utilization of intricate tools, and furthermore it is no less an important object of my invention to provide a novel polishing pad which will not become quickly or unevenly worn out and which may be readily replaced when expedient.

To these and other ends, my invention consists in the construction, arrangement and combination of parts described hereinafter and pointed out in the claims forming a part of this specification.

One embodiment of my invention is represented by way of example in the accompanying drawings, wherein:—

Figure 1, is a top plan view of my polishing block.

Figure 2, is a sectional view taken on the line 2—2 of Figure 1.

Figure 3, is a plan view of my polishing pad showing the manner of coiling the felt strips.

Figure 4, is a detail view of the gradually reduced ends of the innermost and outermost strips of material of which my pads are formed.

Figure 5, is a detail view of one of the adjusting and retaining latches used in my block, and

Figure 6, is a perspective view of one element of the female section of the universal ball and socket joint used in attaching the block to a spindle of a polishing machine.

Like characters of reference designate like or similar parts throughout the several views of the drawings, in which—

The body portion of my polishing block comprises a circular disc (1), to the under face of which is attached by means of suitable cement, designated by (2), a polishing pad (3) formed of felt or other suitable material. The details of the pad (3) and the manner of mounting the same will be hereinafter described in detail with reference to Figures 3 and 4. Formed upon the peripheral edge of the upper face of the disc is a

relatively wide annular flange (4), two diametrically opposed portions of which are bent inwardly toward each other as at (5). Also formed upon the upper face of the disc and disposed one adjacent to each of the inwardly bent portions (5) are a pair of lugs (6) against which are seated the coil springs (7) of locking spring catches (8) which pass through openings (9) in the flange (4) to engage any one of a plurality of vertically aligned slots (10) formed in a compression ring generally designated by (11). In addition to the obvious purpose of the compression ring (11) it also serves to retain the sides of the pad at a true right angle to its upper and lower faces, thereby preventing uneven wear of the pad or "running over" which impairs its efficiency. In order that the catches (8) may be held from engagement with the slots in the ring (11) when it is desired to adjust the same with respect to the body or disc (1), each of the catches (8) is provided with a pivoted bent wire finger grip (12) which when engaged over its respective lug (6) holds the catch in a passive position (see Figures 1 and 2). In addition to the catches (8) which positively prevent any relative movement between the ring (11) and disc (1) when they are engaged, there are also provided auxiliary spring catches (13) (see Figure 5), which extend through openings (14) in the flange (4) to engage within certain of vertically aligned slots (15) in the flange. However these catches (13) are provided with one beveled edge so that relative movement of the ring (11) with respect to the body or plate (1) will be prevented except in one direction when they are engaged. In order to hold the catches (13) normally in an engaged position, spring wires (16), removably carried by pockets (16^a) on the flange (4), are provided, which extend back of the catches and are engaged intermediate their extremities in slots formed in the heads (17) thereof. In operation when it is desired to move the compression ring (11) upwardly with respect to the body or plate (1) to expose more of the material of the polishing pad (3) the catches (8) are released, and tools (18), such as illustrated in Figure 2, are inserted in certain of the slots (10) to engage the inwardly bent portions (5) of the flange, whereupon the ring is raised through the instrumentality of the tools until the catches (13) engage in the next of their respective slots. When the catches (13) are so engaged the proper slots (10) will be positioned for the reception of the locking catches (8) which are then released to fix the ring in position. It is to be noted that the catches (13) also serve to positively prevent creeping of the compression ring (11) downwardly when the polishing block is in use, and furthermore it is here especially pointed out that adjustment of the pad (3) can be accomplished with very little expenditure of energy and without disassembling the block or using a variety of tools. In order that the proper slots for receiving the catches (8) and (13) will be disposed in position a guide rib (19) is provided on the inner face of the ring (11) which must be engaged within a recess (20) in the flange (4) of the plate (1) in assembling the same. It is also pointed out that the rib (19) also prevents relative circumferential creeping of the ring with respect to the body or plate when the polishing block is in use.

Formed centrally of the plate (1) and upon its upper face is a substantially rectangular enlargement (21) which is provided with a central semi-spherical depression (22) for the reception of the ball terminal (23) upon the polishing machine spindle (24). In order to hold the ball terminal (23) in the depression (22) to form a positive but loose and universal connection between the polishing block and the spindle so that the block may rotate when in use, there are provided along two of the edges of the enlargement (21) undercut flanges (25) within which are received opposed slidable locking plates (26) (see Figure 6). Each of the plates (26) are provided with portions (27) which when placed together (see Figure 1) form a socket for the ball terminal (23, and a ring (27) engaging about the collar portions (28) of the plates securely locks them against accidental displacement. Furthermore, in order to prevent the ring (27) from becoming detached a split pin (29) is inserted through an opening in the spindle (24) to complete a positive, though universal, connection between a polishing machine (not shown) and the polishing block assembly.

Referring now particularly to Figures 3 and 4 it will be noted that my polishing pad (3) is formed of elongated strips of material. The center felt strip (30) is gradually reduced in thickness as shown in Figure 3, and is wound tightly beginning with its thinnest portion. A second strip (31) of uniform thickness throughout is then placed with one end tightly abutting the thick end of the strip (30) and wound or coiled tightly until the pad has approached the desired size. A third strip of felt (32) which is gradually reduced in thickness is then placed with its thick end tightly against the terminal end of the strip (31) and wound about the whole until the pad is completed, whereupon the terminal end of the strip (32) is stitched down or otherwise secured. This formation of the pad produces a perfect circular contour, and a uniform degree of density with no center opening. The peculiar advantages of my pad are its resistance to

wear and deterioration or "running over" of the polishing face. Furthermore in high power polishing machines a pad of uniform density throughout is of first importance as the pad quickly begins to go to pieces at its weakest point. In attaching the pad (3) to the under face of the plate (1), the face of the plate and the meeting surface of the pad are covered with a suitable cement (2), whereupon adjacent parts of the compression ring (11) and plate are wiped with an oily cloth or the like. The pad is then compressed and the cemented surface is forced against the cemented surface of the plate and permitted to set, whereupon the proper adjustment of the compression ring is made, in the manner heretofore described, and the polishing block is ready for attachment to the spindle of a polishing machine.

While the operation of my polishing block and the manner of adjusting and assembling its various parts is thought to be evident from the foregoing description, it is particularly pointed out that the maximum efficiency is attained by my construction and arrangement of the pad, the compression ring and the body, and that damage consequent from disarrangement of working parts and uneven wear or "running over" of the pad is reduced to a minimum. Furthermore, it is pointed out that the peculiar manner of adjusting the compression ring and attaching the block to the spindle of a polishing machine effects the saving of much valuable time which has heretofore been lost in removing worn out polishing pads from polishing blocks heretofore known in the art, and attaching such polishing blocks after new polishing pads have been fitted thereon.

While in the foregoing, there has been illustrated and described such combination and arrangement of elements as constitute the preferred embodiment of my invention, it is nevertheless desired to emphasize the fact that interpretation of the invention should only be conclusive when made in the light of the subjoined claims.

Having described my invention and its objects with such attention to detail as will thoroughly acquaint one skilled in the art with its construction and advantages, I claim—

1. In an apparatus for polishing plane surfaces, a plate, a flange rising from the peripheral edge of one side of the plate, a polishing pad attached to the opposite side of the plate, and an adjustable compression member loosely engaging the flange on the plate and bindingly engaging the pad whereby to retain the pad and expose additional portions of the same to compensate for wear.

2. In an apparatus for polishing plane surfaces, a plate, an annular flange arising from the peripheral edge of the upper side of the plate, a polishing pad attached to the opposite side of the plate, a compression member loosely engaging the flange on the plate and bindingly engaging the pad, means carried by the flange for locking the compression member against downward movement with respect to the plate, and means carried by the flange for locking the compression member against independent movement in any direction with respect to the plate.

3. In an apparatus for polishing plane surfaces, a plate formed with a depression for receiving the ball end of a polishing machine spindle, locking members slidable to engagement with the ball end of a spindle seated in the depression, and a ring engaging and encircling the locking members to prevent movement of the same to release the spindle.

4. In an apparatus for polishing plane surfaces, a plate formed with a central semi-spherical depression for receiving the ball end of a polishing machine spindle, opposed parallel under cut flanges formed on the plate on opposite sides of the depression, locking members receivable in the under cut portions of the flanges and slidable therebeneath to engagement with the ball end of a spindle seated in the depression, upstanding flanges on said locking members rising above the flanges on the plate, and a removable ring engaging said flared flanges to hold the locking members in position.

5. In an apparatus for polishing plane surfaces, a rotatable plate, a polishing pad attached to the plate, said pad formed with a central strip gradually reduced toward one end and spirally wound from the reduced end to form a closed center of uniform density, a strip of uniform thickness spirally wound about the central strip, and an outer strip gradually reduced toward one end and spirally wound to form a pad having perfect circular conformation.

6. A pad for polishing plane surfaces comprising a central strip gradually reduced toward one end and spirally wound from the reduced end to form a closed center of uniform density, an intermediate strip of uniform thickness throughout spirally wound about the center strip with one of its ends abutting the thick end of the center strip, and an outer strip gradually reduced toward one end and spirally wound about the intermediate strip with its thick end abutting the remaining end of the intermediate strip and its reduced end fastened down to form a pad having a perfect circular contour and of uniform density throughout.

7. In an apparatus for polishing plane surfaces, a compression ring provided with a plurality of rows of aligned openings, a plate movable in the compression ring for receiving a polishing pad, and a plurality of

catches carried by the plate for engagement in the openings in the compression ring for holding the compression ring positively and adjustably in engagement with the plate for the purpose set forth.

8. In a polishing block for glass machines, a circular plate, an annular flange formed on the plate, a compression ring formed with a plurality of rows of aligned openings extending about the plate and movable with respect thereto, means carried by the plate for engagement within certain of the openings in the compression ring to positively lock the compression ring against movement with respect to the plate, and means carried by the flange on the plate for engagement with others of the openings in the compression ring for locking the compression ring against movement with respect to the plate in one direction only for the purpose set forth.

9. In a polishing block for glass machines, a compression ring formed with a plurality of rows of vertically aligned openings, a plate receivable within the compression ring, a polishing pad carried by the plate, a flange formed on the plate, and said flange provided with diametrically opposed inwardly bent portions for receiving a tool inserted through the openings in the compression ring whereby to move the compression ring with respect to the pad and plate.

In testimony whereof, I affix my signature hereto.

JOHN M. CHRISTINE.