No. 794,500. PATENTED JULY 11, 1905.

C. J. W. HAYES.

GAGE OR SIMILAR TOOL.

APPLICATION FILED OCT. 3, 1896.

Fig. 8

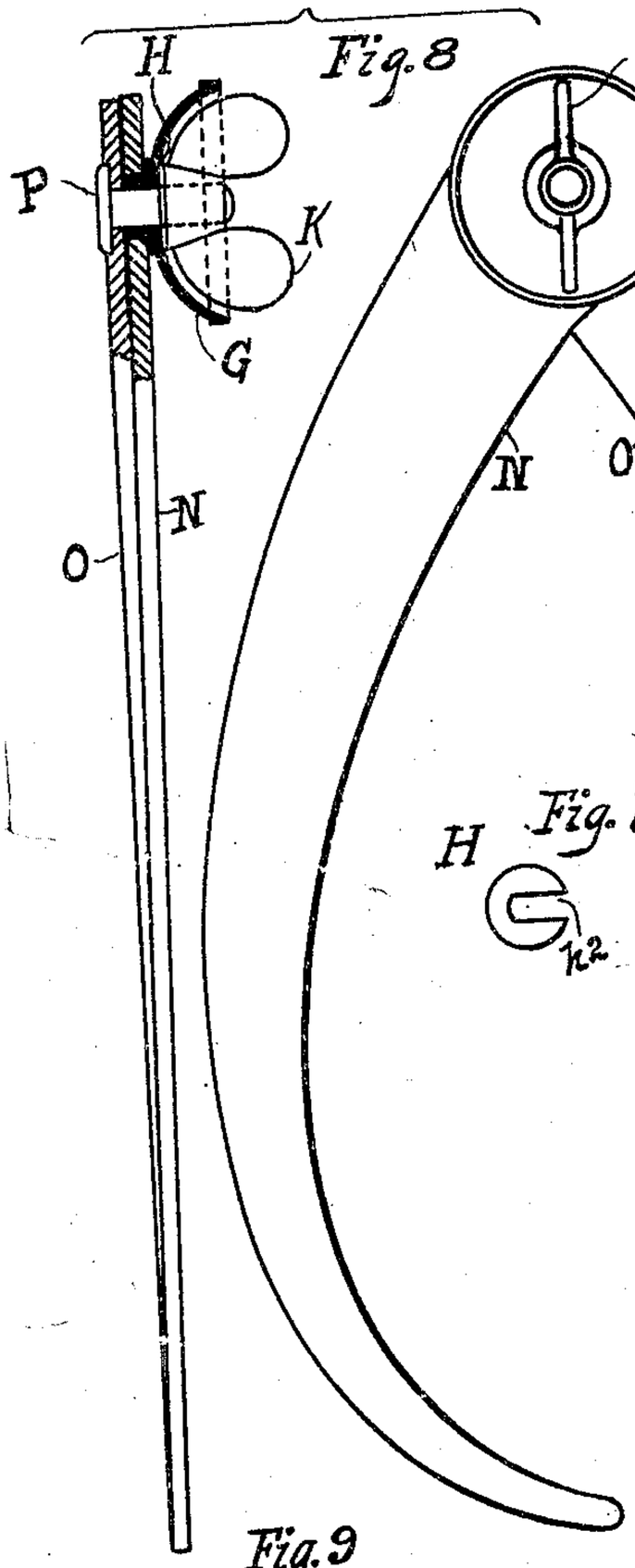


Fig. 1

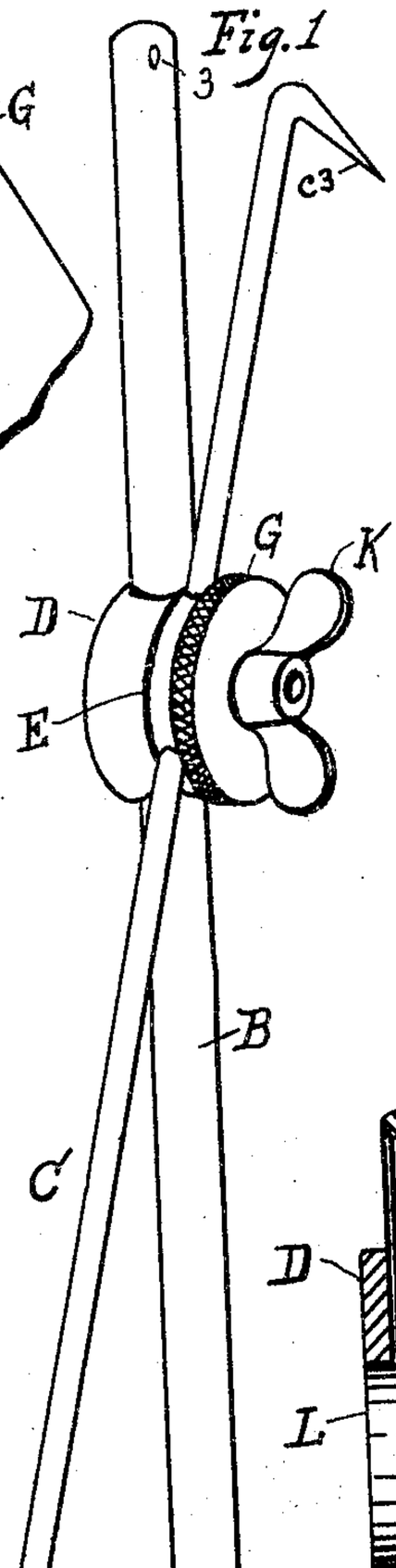


Fig. 6

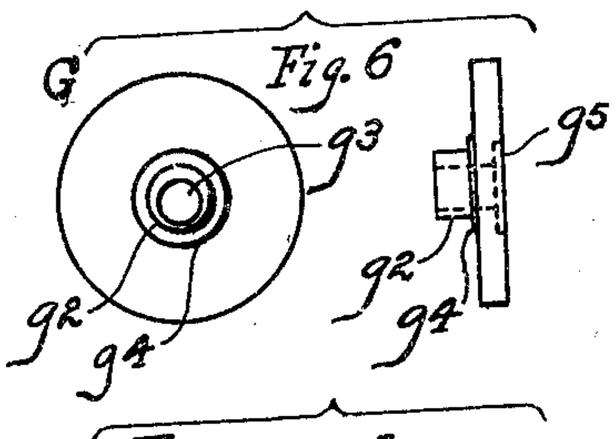


Fig. 5

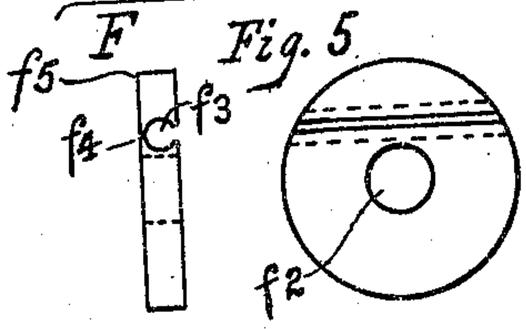


Fig. 3

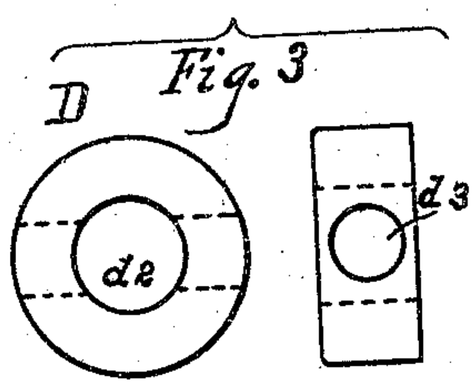


Fig. 7

Fig. 2

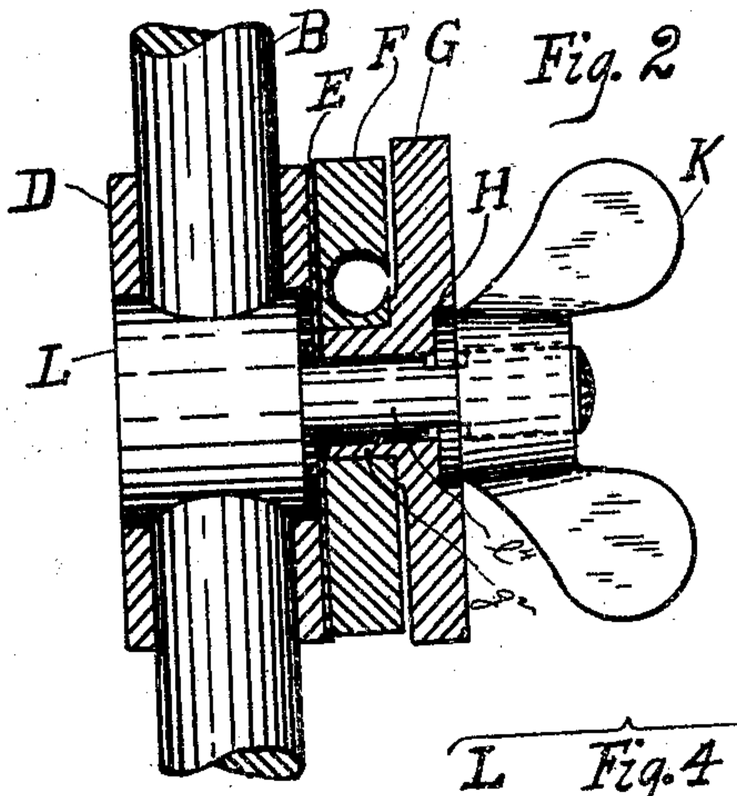


Fig. 9

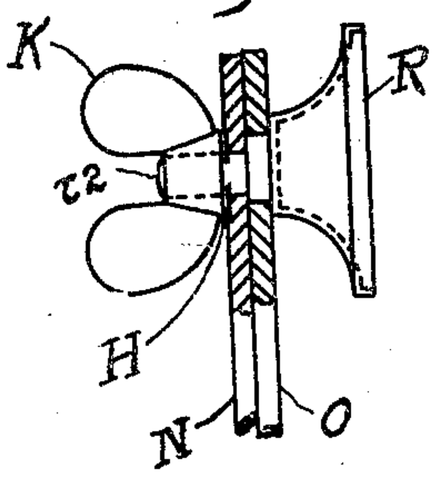
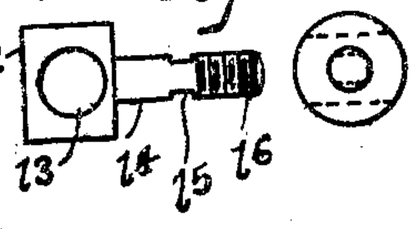


Fig. 4



WITNESSES.

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No. 794,500. Patented July 11, 1905.

UNITED STATES PATENT OFFICE.

CHARLES J. W. HAYES, OF DETROIT, MICHIGAN, ASSIGNOR TO BROWN & SHARPE MANUFACTURING COMPANY, OF PROVIDENCE, RHODE ISLAND, A CORPORATION OF RHODE ISLAND.

GAGE OR SIMILAR TOOL.

SPECIFICATION forming part of Letters Patent No. 794,500, dated July 11, 1905.

Application filed October 3, 1896. Serial No. 607,756.

To all whom it may concern:

Be it known that I, CHARLES J. W. HAYES, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Gages or Similar Tools; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to gages, and has for its object an improvement in a device for the delicate adjustment of the pointer of a surface-gage, the leg of a caliper, or a similar part of similar tools.

The particular object of this invention is to provide a means whereby the user may slowly actuate the pointer, the leg, or similar part to bring it exactly to the desired position.

In the drawings, Figure 1 shows the assembled gage in perspective. Fig. 2 shows the assembled gage partly in section. Fig. 3 shows a side and end elevation of the sliding disk. Fig. 4 shows a side and end elevation of the clamping-bolt. Fig. 5 shows a side and end elevation of the disk that holds the pointer. Fig. 6 shows a side and end elevation of the adjusting-disk. Fig. 7 shows a side and end elevation of the locking-washer. Figs. 8 and 9 show, partly in section, two forms of the device as applied to calipers, dividers, &c., Fig. 8 being a side and end elevation.

In the surface-gage the base A and the standard B are of the ordinary form.

D indicates a sliding disk, preferably round and provided with a diametrical hole d^3 of a size to engage easily on the standard B. It is also provided with a concentric hole d^2 of a size to engage easily the head l^2 of the bolt L. Through the head l^2 of the bolt is a diametrical hole l^3 of a size to engage easily over the standard. The shank of the bolt L is provided with a short part l^4, that is used as a journal for the adjusting-disk G, and with a short part l^5, that is slabbed flat on both sides to receive the lock-washer H, and with a threaded part l^6, on which screws the wing-nut K. The adjusting-disk G is provided with an eccentric hub or projection g^2, which constitutes a bearing or journal for the disk F and which is made eccentric for a purpose hereinafter described.

F indicates the pointer-carrier disk, which is preferably round and has a central hole f^2, which is of a size to engage easily upon the eccentric g^2 of the adjusting-disk G. The disk F is also provided with a hole f^3, that is parallel with a diameter of the disk F and cuts through on one side, and the back wall f^4 of which is thin enough to permit the hole f^3 to spring open to allow the passage into it of the body of the pointer C, which is made slightly larger in diameter than the hole f^3, causing the part f^5 to be sprung slightly backward, and when the parts are clamped by the wing-nut K the part f^5 is forced forward, causing the walls of the hole f^3 to wrap around the pointer and hold it firmly in place. Between the pieces D and F is preferably interposed a washer E. The adjusting-disk G being mounted so as to turn on the shank l^4 of the bolt L as a bearing, the disk F is in turn mounted on the eccentric hub or projection g^2 of the disk G and so as to turn thereon as a bearing, said projection g^2 being slightly eccentric to the hole g^3 in the disk G, through which the bolt L passes. By reason of this eccentricity when the adjusting-disk G is turned there will be a slight movement given to the disk F in a direction transverse to the axis of rotation, which movement will serve to overcome any frictional adhesion there may be between the disk F and the disk D or the interposed washer E, if one be employed, and so that a further turning of the adjusting-disk G will frictionally impart a rotary movement to the disk F and the pointer C carried thereby, the construction being such, as hereinafter pointed out, that the rotary movement of the disk F will be a differential movement and much slower than the rotary movement of the adjusting-disk. The eccentricity may be very slight, as I have

found in use that an eccentricity of less than one one-hundredth of an inch will produce the desired results. The piece G is knurled on its outer periphery and should be somewhat larger in diameter than the disk F in order that there may be a free and easy grip on its edge.

On that side of the disk G which lies toward the pointer is a thin boss g^4, concentric with the projection g^2 and also concentric with the outer periphery of the disk G. The boss g^4 bears against the central part of the disk F and furnishes a bearing of less surface and nearer the center between the disk G and the disk F than the surface of the bearing between F and the washer E. The result of this construction is that when the disk G is revolved the disk F, by virtue of the differential application of friction, does not move at the same rate of speed with it, but much slower. That side of the disk G which lies toward the nut K is counterbored (g^5) to receive the lock-washer H, that engages over the shank of the bolt at the slabbed part l^5 and prevents any movement of the adjusting-disk G from turning the nut K. The proportion of the parts is such that this washer can only be placed in or removed from its position when the standard B is removed from the disk D and bolt L. Turning the nut K to tighten it causes it to press upon H, which transmits the pressure to G, which in turn, through the boss g^4, presses upon F, clamping the pointer C. F in turn transmits the pressure to D, which acts upon one side of the standard B, while the head of the bolt L acts upon the other, thus clamping all the parts. The clamping of the disk D to the standard by these means is not claimed as new, as the improvement relates to the means employed for fine or delicate adjustment.

The operation of the gage is as follows: It is placed on the surface in the ordinary way and the clamping parts slid along the standard until the desired place is reached. The pointer is turned to approximately the position it is desired to have it occupy, and the nut K is turned until the parts will hold themselves in place, but without clamping them together tightly. The adjusting-disk G is then turned, and this acts on the disk F, moving it slowly and bringing the end of the pointer gradually to the exact place desired, when a final tightening by the nut K clamps all the parts firmly. The pointer may be revolved slowly through an entire circle by means of the adjusting-disk G.

As applied to caliper or divider joints the caliper or divider legs take the place of the parts C and F and D and B, and the other parts have a somewhat different design.

In the form shown in Fig. 8 one leg O of the calipers tightly engages the head of the bolt P, holding it firmly, while upon it revolves the adjusting-disk G, with its eccentric projection engaging through the hole in the other leg N. In operating one leg is held while the adjusting-disk G is turned until the legs are in the desired position and then clamped by turning the nut K.

In Fig. 9 the bolt and adjusting-disk are shown combined in one piece R. In operating one leg of the calipers is held while the piece R is revolved the desired amount and is clamped by holding piece R while the nut K is turned.

The three varieties of joints illustrated show that there may be quite a variation both in the number of pieces and in the style of the separate parts; but in all the forms shown the same principles are involved. Calling the legs of the calipers and the parts D and F of the surface-gage by the common name "joint-pieces," it will be seen that in all the forms a slow and delicate adjustment of one of the joint-pieces relative to the other is effected by means of a differential rotary movement imparted to said joint-piece, and in all the forms means are provided for giving to said joint-piece a slight movement in a direction transverse to the axis of rotation.

Through the base A near the standard is a hole a', through which the pointer C can be dropped to enable the workmen to use the tool as a depth-gage.

At the upper end of the standard B is a hole or cavity 3 in the standard used as a recipient for the pointed end c^3 of the pointer when the gage is not in use. The hole 3 should be at nearly right angles to a diameter which passes through the hole a', so that when the lower point c^2 is sheathed in the hole a' the point c^3 may be sheathed in the hole 3.

What I claim is—

1. In a jointed tool, the combination of two joint-pieces, a bolt connected with one of said joint-pieces and provided with a journal for an adjusting-disk, an adjusting-disk arranged to turn on said journal, having a hollow journal projecting from one side, the journal of the disk being eccentric to the journal part of the bolt, and the face of the adjusting-disk being arranged to bear with frictional contact against the face of the joint-piece which is journaled on the eccentric, and a clamping-nut, substantially as described.

2. In a jointed tool, the combination with two joint-pieces, a journal connected with one of said joint-pieces, a second journal sleeved on and eccentric to the first, and upon which the second joint-piece is journaled, an adjusting-disk arranged to turn one of said journals with respect to the other, and means for clamping all the parts together, substantially as described.

3. In a jointed tool, in combination with two joint-pieces, one of which is provided with means for engaging a bar or leg, two journals, one of which is eccentric to the other, and a disk for rotatively actuating one of said journals and for exerting a pressure on the face

of one of said joint-pieces, and means for holding the parts together, substantially as described.

4. In combination with a joint-piece provided with a concentric hole, and a diametrical hole for the passage of a rod or bar, a second joint-piece provided with a concentric hole and a passage-way parallel with its diameter and open through one surface of said joint-piece, a bolt adapted to engage in the concentric hole of said first joint-piece and provided with a hole adapted to register with the diametrical hole therethrough and also provided with a threaded part for engaging a locking-nut, a disk provided with a central hole adapted to engage over said bolt, and with an eccentric journal projecting from the face thereof and adapted to engage in the hole of said second joint-piece, a surface-bearing between the second joint-piece and the said disk, and surface-bearing between the two joint-pieces, substantially as described.

5. In a surface-gage, in combination with a base provided with a vertical hole, a standard carrying a pointer and provided at its upper end with a horizontal hole, the said two holes being arranged and adapted to sheath the ends of the pointer, substantially as described.

6. In gages and similar tools, the combination of two frictionally-engaged joint-pieces, and a rotary adjusting-piece in frictional engagement with one of said joint-pieces for frictionally operating the same, the friction between said joint-pieces being greater than the friction between said adjusting-piece and the movable joint-piece, substantially as described.

7. In gages and similar tools, the combination of two frictionally-engaged joint-pieces, one fixed and the other movable, and a rotary adjusting-piece in frictional engagement with the movable joint-piece for frictionally operating the same, the friction between said joint-pieces being greater than the friction between said adjusting-piece and the movable joint-piece, substantially as described.

8. In gages and similar tools, the combination of two frictionally-engaged joint-pieces, and a rotary adjusting-piece in operative frictional engagement with one of said joint-pieces for turning the same, said adjusting-piece being constructed to give to said joint-piece a preliminary transverse movement, substantially as described.

9. In gages and similar tools, the combination of two frictionally-engaged joint-pieces, and a rotary adjusting-piece in operative frictional engagement with one of said joint-pieces, said adjusting-piece being constructed to impart a transverse and a rotary movement to said joint-piece, substantially as described.

10. In gages and similar tools, the combination of two frictionally-engaged joint-pieces, and a rotary adjusting-piece in frictional engagement with one of said joint-pieces, said adjusting-piece being constructed to impart positively a transverse movement and frictionally a rotary movement to said joint-piece, substantially as described.

11. In gages and similar tools, the combination of two frictionally-engaged joint-pieces, and a rotary adjusting-piece in operative frictional engagement with one of said joint-pieces for turning the same, said adjusting-piece being provided with an eccentric hub upon which said joint-piece is journaled, substantially as described.

12. In gages and similar tools, the combination of two frictionally-engaged joint-pieces, one of said joint-pieces being provided with a journal, a rotary adjusting-piece mounted on said journal and provided with a hub on which the second joint-piece is mounted, said adjusting-piece being in operative frictional engagement with said second joint-piece for turning the same.

13. In gages and similar tools, the combination of two joint-pieces, an eccentric journal for one of said joint-pieces, an adjusting-disk for turning said eccentric journal, the bearing-surfaces between said joint-pieces and between one of said joint-pieces and said adjusting-disk respectively being differential, and means for holding the parts together, substantially as described.

14. In gages and similar tools, the combination of a joint-piece, a journal connected with said joint-piece, a second journal mounted on and eccentric to said first-named journal and provided with an adjusting-disk for turning the same, a second joint-piece mounted on said eccentric journal, the bearing-surfaces between said joint-pieces and between one of said joint-pieces and said adjusting-disk respectively being differential, and means for holding the parts together, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

CHARLES J. W. HAYES.

Witnesses:
CHARLES F. BURTON,
VIRGINIA M. CLOUGH.