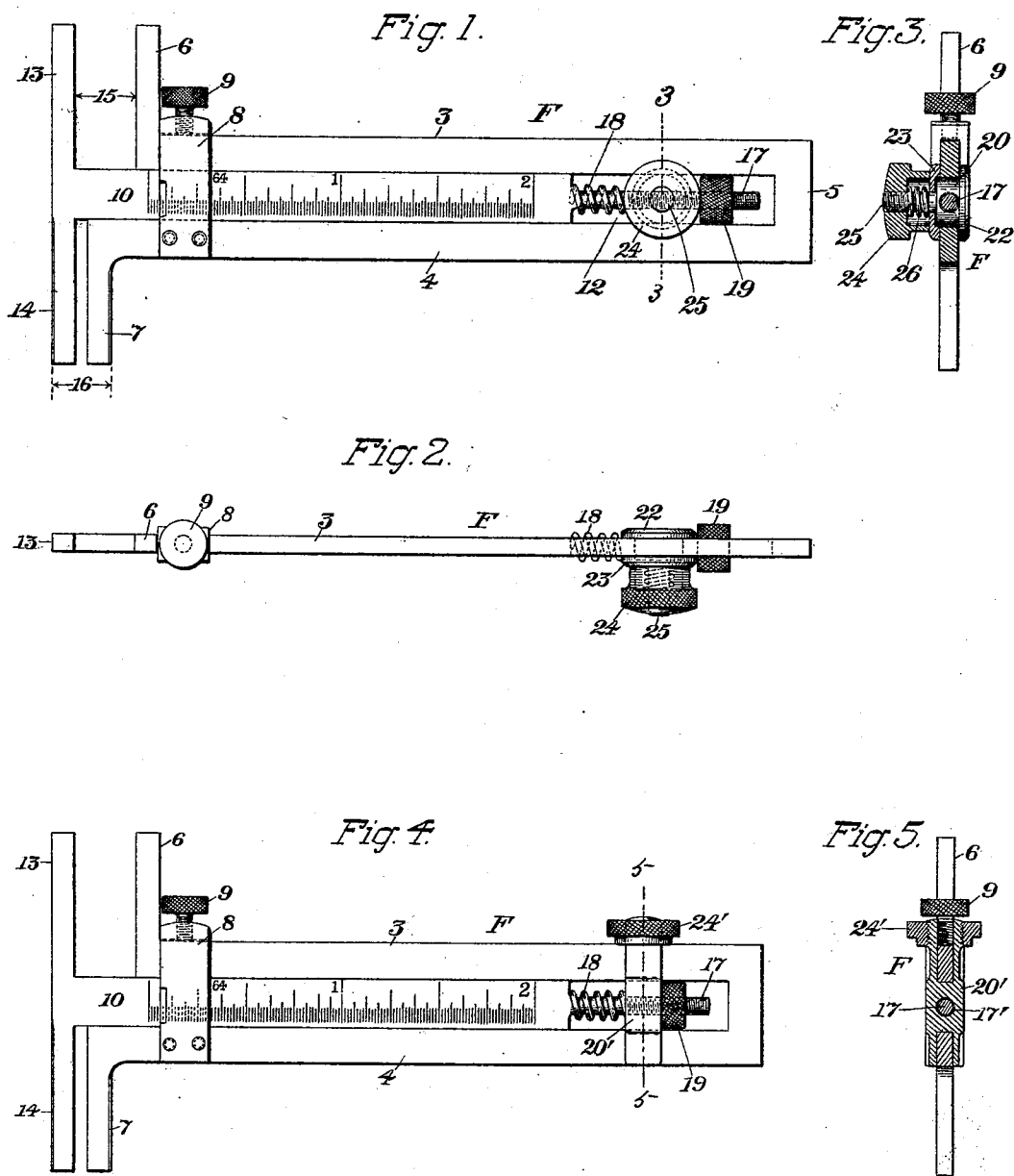


C. E. BILLINGS.
CALIPER GAGE.

No. 517,208.

Patented Mar. 27, 1894.



Witnesses:
John L. Edwards Jr.
Fred J. Dole.

Inventor:
Charles E. Billings.
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Fig. 6.

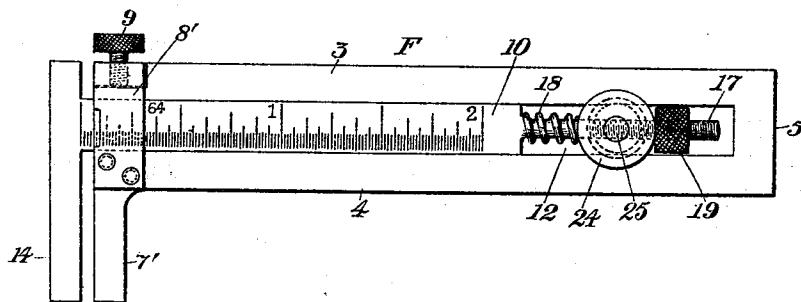


Fig. 7.

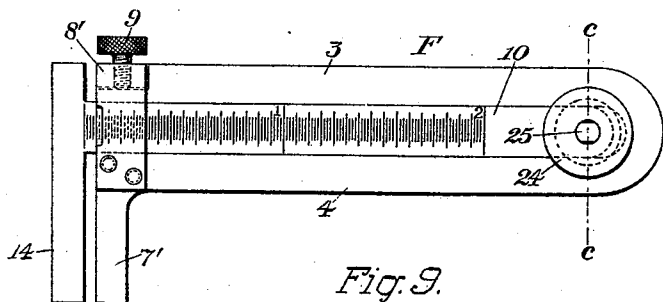


Fig. 8.

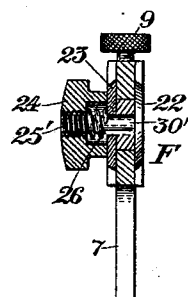


Fig. 9.

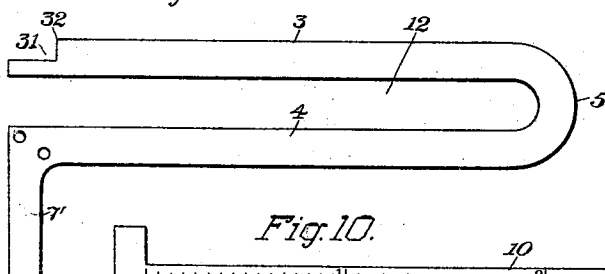
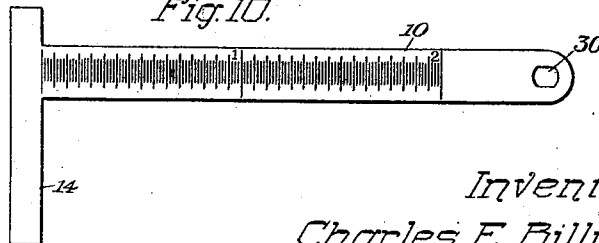


Fig. 10.



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UNITED STATES PATENT OFFICE.

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CALIPER-GAGE.

SPECIFICATION forming part of Letters Patent No. 517,208, dated March 27, 1894.

Application filed November 3, 1893. Serial No. 489,932. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. BILLINGS, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Caliper-Gages, of which the following is a specification.

This invention relates to the class of caliper-gages which are usually provided with parallel caliper-jaws and are especially intended for the use of machinists and tool-makers for making accurate measurements; the object being to furnish a caliper-gage of that class in which the principal bar or frame, and also the slide-bar, together with the caliper-jaws on said bars respectively, may be made of sheet-metal suitably cut out and finished; and which shall have improved adjusting and fastening devices for regulating and holding in place the slide-bar.

In the drawings accompanying and forming a part of the specification, Figure 1 is a plan view of a complete caliper-gage embodying my present improvements. Fig. 2 is an edge view of the caliper-gage as seen from above in Fig. 1. Fig. 3 is a sectional view of the gage, in line 3—3, Fig. 1, showing the parts at the left-hand of said line as seen from a point at the right-hand thereof. Fig. 4 is a plan view, similar to Fig. 1, of a caliper-gage having a modification of the slide-bar-adjusting devices. Fig. 5 is a sectional view (similar to Fig. 3) in line 5—5, Fig. 4, showing the parts at the left-hand of said line as seen from a point at the right-hand thereof. The caliper-gages shown in Figs. 1 to 5, inclusive, are provided with two pairs of caliper-jaws, one for outside and the other for corresponding inside measurement. Fig. 6 is a plan view, similar to Fig. 1, of a caliper-gage corresponding to the one shown in Figs. 1, 2 and 3, but having certain features omitted. Fig. 7 is a plan view, similar to Fig. 6, of a further modification of the gage. Fig. 8 is a sectional view in line c—c, Fig. 7. Fig. 9 is a plan view, corresponding in position to Fig. 7, of the frame or principal bar of this modification of the caliper-gage. Fig. 10 is a similar plan view of the slide-bar of the caliper-gage shown in Figs. 7 and 8.

Similar characters designate like parts in all the figures.

In the more complete modification of my

improved caliper-gage which is shown in Figs. 1, 2 and 3, the frame or principal bar consists of the two side-bars, 3 and 4, respectively, connected at one end by the cross-bar 5, and each having at the other end thereof laterally-projecting jaws or caliper-arms, 6 and 7, respectively, set out of alignment with each other, longitudinally of the implement, by a distance equal to the combined widths of the inside-measurement caliper-arms. The aforesaid caliper-frame, designated in a general way by F, will usually be made from sheet-metal, preferably steel of suitable quality, the frame being cut out and finished after the manner usually adopted in the manufacture of this class of machinists' tools. Near its working-end, the caliper-frame F is provided with a clamp-and-guide loop, 8, which is furnished with a set-screw, 9, having a knurled head, and whose point bears upon the side-bar 3 of said frame for the purpose of forcing the same inwardly to clamp the slide-bar 10 between the two sides, 3 and 4, of the frame. The two side-bars, 3 and 4, of the frame F are set remotely from each other, in the same plane, and have between them a parallel space, or slot, for receiving the slide-bar, and are rigidly connected at one end, while at the other end the frame is provided with one or more caliper-jaws. The slide-bar, 10, of the caliper consists of a flat bar whose parallel edges are fitted to slide closely but freely between the side-bars 3 and 4, in the space 12 of the frame. On its projecting end the slide-bar has the oppositely-extending jaws, or gage-arms, 13 and 14, respectively. The depending arm 14 is designated as the inside-measurement arm or jaw, and the upwardly-extending arm 13 as the outside-measurement arm or jaw. The distance 15, Fig. 1, between the two upwardly-extending jaws, 6 and 13, of the frame and slide-bar respectively, is intended to be exactly equal to the distance 16, Fig. 1, outside of the two depending gage-arms, or jaws, 7 and 14, of said frame and slide-bar respectively. By means of this construction, the caliper-gage is adapted for transferring measurements, the two dimensions 15 and 16 being equal. For instance: the inside-measurement jaws 7 and 14 being set to measure the inside of a cylindrical bore, the opposite jaws 6 and 13 will at the same time be set for measuring the outside of a cyl-

inder which will enter said bore. This construction and arrangement of the two pairs of caliper-jaws is also shown in Figs. 4 and 5, but is omitted from the caliper-gages shown in Figs. 6 to 10, inclusive.

The inner end of the gage-bar is shown provided with a rod, or extension, 17, which, on the end thereof next to the gage-bar itself, is provided with a push-spring, 18, and on the outer end thereof is threaded for receiving the adjusting-nut 19. Said gage-bar rod 17, between said spring and adjusting-nut 19, passes through a clamp-block, or member, 20, which is fitted to slide longitudinally of the caliper-frame and is furnished with means whereby it may be clamped and unclamped to and from said frame. In the modification of this device which is shown in Figs. 1, 2 and 3, the clamp-block consists of the stud, having its larger portion fitted to slide in said frame-slot 12, and transversely perforated for the slide-bar rod 17, as will be understood by comparison of Figs. 1 and 3. Said clamp-block 20 is held in place by means of the head 22 thereof bearing against one side of the frame F, and by means of a washer, 23, and a thumb-nut, 24, on the threaded projecting end, 25, of said stud or clamp-block. The thumb-nut 24 is shown hollowed out to form a space for receiving the clamp-spring 26, which acts between said nut and washer, 24 and 23, respectively, to normally clasp the frame F between the washer 23 and head 22, notwithstanding the thumb-nut may be turned back some distance from its tightened position. By this means a moderate pressure is maintained on the frame F for holding the slide-bar in position when the aforesaid thumb-nut 24 is loosened.

In the modification shown in Figs. 4 and 5, the clamp-bar consists of a bar, 20', which is slotted at its ends for receiving the side-bars, 3 and 4, of the frame F, and is perforated at 17', between said slots, for receiving the rod, 17, of the slide-bar. At one end of the clamp-block 20', the sides of this block project beyond the frame F and are threaded on the outer sides thereof; as will be understood by comparison of Figs. 4 and 5, to receive the binding-nut 24', which bears upon the outer edge of the frame-side 3, for binding this side-bar within the slot of the clamp-block and thus holding all the described parts rigidly in position. In this modification of the caliper-gage, the slide-bar 10, the same as in the gage shown in Figs. 1, 2 and 3, is provided with the resistance-spring 18 and the adjusting nut 19.

The caliper-gage shown in Fig. 6 corresponds in all respects to the one shown in Figs. 1, 2 and 3, with the exception of the caliper-jaws. This modification has but one pair of jaws, which may be used both for inside and outside measurements.

In the modification shown in Figs. 7 to 10, inclusively, the slide-bar of the gage is not provided with the rod 10 of the preceding

modifications, but has a perforation, 30, Fig. 10, through which passes the stem, 25' of the clamp-bolt 30', (Figs. 7 and 8,) whereby the slide-bar is held in place. Said perforation 30 is elongated, and the stem, 25', of the clamp-bolt is shown fitted on its sides (see Fig. 7) for preventing the bolt from turning in the slide-bar. As in the preceding instance, as illustrated in Figs. 1, 2 and 3, the stem 25' is provided with a washer, 23, clamp-nut, 24, and spring, 26; the frame F of the gage being clamped between said washer 23 and the head 22 of said stem. The operation of this device, as a means for normally restraining the free movement of the slide-bar in the frame F, is the same as the operation of the similar holding device described in connection with Figs. 1, 2 and 3.

In the modifications shown in Fig. 6 and in Figs. 7 to 10, inclusive, the clamp-and-guide loop 8' is shown fixed on the side-bar 4 of the frame F at the extreme end thereof, one side of said loop coinciding substantially with the outer side of the frame-jaw 7', as more clearly shown in Figs. 6 and 7. This is deemed the preferable arrangement, since the binding-screw 9 is thereby brought to act on the extreme end of the opposite side-bar, 3, of the frame, and through this to bind the slide-bar 10 firmly within the frame F at a point adjacent to the frame-jaw 7'. As a further improvement in this modification, the outer side-bar, 3, of the frame F is cut away at 31, as indicated in Fig. 9, to receive the connected end of the loop 8', so that this loop may not project beyond the frame F on that side thereof, thereby securing a better finish, as indicated in Figs. 6, 7 and 8, and also providing a shoulder at 32 for preventing displacement of the loop 8'.

Having thus described my invention, I claim—

1. In a caliper-gage of the class specified, the combination of the frame consisting of two side-bars set remotely from, and parallel to, each other, and having one or more caliper-jaws at one end thereof, and rigidly connected at the other end thereof, a slide-bar fitted to slide in the space between the side-bars and provided on its projecting end with one or more caliper-jaws, a clamp-device carried by the slide-bar in connection with the inner end thereof and adapted for being clamped to and unclamped from the caliper-frame, and means, substantially such as described, for clamping and unclamping the frame to and from the slide-bar at a point adjacent to the caliper-jaw of the frame, substantially as described.

2. In a caliper-gage of the class specified, the combination of a frame consisting of two remotely-disposed parallel side-bars joined at one end by a cross-bar and having at the opposite end thereof one or more caliper-jaws extending outwardly crosswise thereto, a slide-bar fitted to slide between the adjacent faces of the side-bars of the frame and hav-

ing one or more caliper-jaws at its projecting end in parallelism with the caliper-jaw or jaws of the frame, a detent clamp device carried by the slide-bar at the inner end thereof and adapted to be clamped to and unclamped from the caliper-frame, a guide-loop secured to one of the side-bars of the frame adjacent to the caliper-jaw, and a clamping-device in connection with said guide-loop adapted to bear against one side-bar of the frame and tightly impinge the slide-bar between the side-bars of said frame, substantially as described.

3. The improved caliper-gage herein described, consisting of a one-piece U-shaped metal frame having one or more caliper-jaws extending outward at the open end thereof, a slide-bar adjustably secured between adjacent faces of the U-shape frame and having one or more caliper-jaws at its projecting end, means substantially as described for clamping the slide-bar to the frame at its rear or inner end, and means substantially as described for guiding said slide-bar in its movements and clamping it to the frame at a point adjacent to the caliper-jaws of the frame, substantially as and for the purpose set forth.

4. The improved caliper-gage herein described, consisting of an oblong U-shaped frame formed of two remotely-disposed parallel side-bars connected at one end, but open at the opposite end thereof, and provided at the open end with one or more caliper-arms or jaws extending outwardly crosswise to, but in alignment with, said frame, a graduated slide-bar interposed and sliding between the adjacent faces of the side bars of the frame and provided with a caliper-arm or jaw at its projecting end and having a screw-threaded rod or extension at its inner end, a U-shaped clamp-block adjustably engaging the slide-bar extension and side-bars of the frame, a clamping-device, substantially as described, in connection with and adapted for clamping the clamp-block to the frame, a clamp-and-guide-loop upon the frame adjacent to the caliper-arm, and an adjusting-nut in engagement with the slide-bar extension and adapted for minutely adjusting said slide-bar longitudinally of the frame, substantially as and for the purpose described.

5. In a caliper-gage of the class specified, the combination of an oblong U-shaped frame comprising two remotely-disposed parallel side-bars connected at one end but open at the opposite ends and provided at their open ends with a caliper-jaw, a slide-bar fitted to slide between the adjacent faces of the side-bars and having a caliper-jaw at its outer end, and a diametrically-reduced extension at its inner end, a clamp-block adjustably engaging said extension and the side-walls of the frame and having a screw-threaded projection adapted to be engaged by a thumb-nut, a thumb-nut engaging said projection and adapted for clamping the clamp-block to the frame, a spring interposed between the clamp-

block and enlarged portion of the slide-bar, an adjusting-nut engaging the slide-bar extension in the rear of the clamp-block, and a clamp-guide secured to the frame adjacent to the caliper-jaws, all substantially as shown and described and for the purpose set forth.

6. In a caliper-gage, the combination with the U-shaped frame consisting of two remotely-disposed parallel side-bars 3, 4, connected at one end by the cross-bar 5, and having caliper-jaws or -arms at the opposite end thereof, of a slide-bar fitted to slide between adjacent faces of the side-bars and having caliper-jaws or -arms at its outer end, and a clamping-device in engagement with the inner end of the side-bar and constructed for longitudinal adjustment between the side-bars of the frame and consisting of a stud having a head adapted to bear against one side of the frame and having a screw-threaded projection adapted to be engaged by a nut at the opposite side of the frame, a recessed thumb-nut engaging said screw-threaded projection, a washer interposed between said thumb-nut and frame, and a spiral spring interposed between said washer and thumb-nut, all constructed substantially as and for the purpose described.

7. In a caliper-gage of the class specified, the combination of the oblong U-shaped frame consisting of two parallel remotely-disposed side-bars, having at the open ends thereof one or more caliper-arms or -jaws, and with a slide-bar fitted and sliding between the adjacent faces of the side-bars and having one or more caliper-jaws or -arms at its outer end, of a clamping-and-guiding device fixed to the frame adjacent to the caliper-jaws, and a clamping-and-adjusting device adjustably connected to the frame and to the rear or inner end of the slide-bar, substantially as shown and described.

8. The improved caliper-gage herein described, consisting of a rectangular or U-shaped frame formed of two remotely-arranged parallel side-bars connected by a cross-bar at one end and open at their opposite ends, where one or both of which bars may have a caliper-jaw, a slide-bar fitted and sliding between the adjacent faces of the side-bars with its side-face flush with the outer faces of said side-bars, and having one or more caliper-jaws at its outer end, an adjustable clamping-device, substantially such as described, engaging the rear end of said side-bar and adapted to be clamped to the frame, an adjusting device engaging the rear or inner end of the slide-bar at a point intermediate to the clamping-device and closed end of the frame, and a guide-and-clamping loop engaging the frame adjacent to the caliper-jaw thereof, all substantially as described and for the purpose set forth.

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