No. 637,923. Patented Nov. 28, 1899.

E. F. CHASE.

TRACING INSTRUMENT.

(Application filed Mar. 16, 1899.)

(No Model.)

Fig. 1.

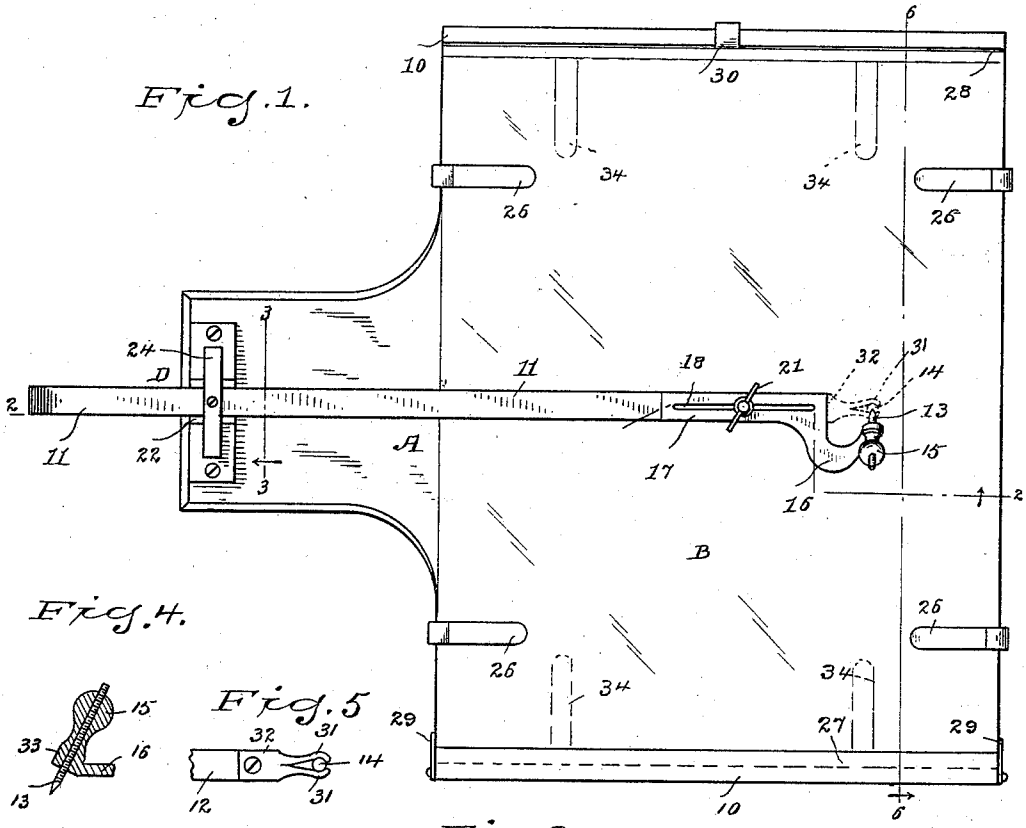


Fig. 4.

Fig. 5

Fig. 2.

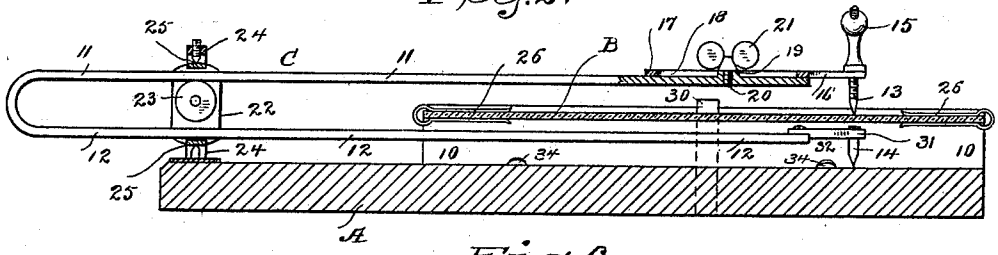


Fig. 6.

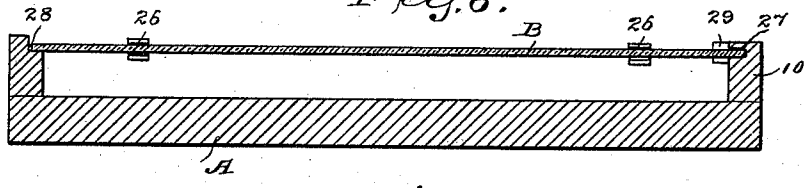
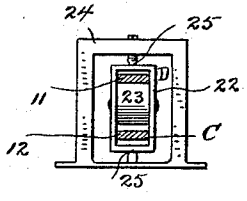


Fig. 3.



WITNESSES

H. A. Lamb

N. Elwood.

INVENTOR

Ernest F. Chase

By A. M. Wooster

Atty.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ERNEST F. CHASE, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR OF ONE-HALF TO FRANK W. CHASE, OF SAME PLACE.

TRACING INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 637,923, dated November 28, 1899.

Application filed March 16, 1899. Serial No. 709,239. (No model.)

To all whom it may concern:

Be it known that I, ERNEST F. CHASE, a citizen of the United States, residing at Bridgeport, county of Fairfield, State of Connecticut, have invented a new and useful Tracing Instrument, of which the following is a specification.

My invention has for its object to provide a tracing instrument or pantograph which shall be adapted for use by draftsmen for enlarging and reducing drawings and which shall be so simple and inexpensive to produce as to place it within the reach of either adults or children who may wish to reproduce drawings for amusement upon any scale within the compass of the instrument. With these ends in view I have devised the novel tracing instrument of which the following description, in connection with the accompanying drawings, is a specification, reference characters being used to designate the several parts.

Figure 1 is a plan view of the instrument complete; Fig. 2, a section on the line 2 2 in Fig. 1; Fig. 3, a section on the line 3 3 in Fig. 1; Fig. 4, a detail sectional view illustrating the construction of the adjustable stylus. Fig. 5 is a detail view showing the spring-arm by which the marker is held, and Fig. 6 is a section on the line 6 6 in Fig. 1.

A denotes a base, which may be of any suitable shape or size, of any preferred material—as wood, cardboard, or metal—and of any desired configuration or ornamentation.

B denotes a smooth upper plate or table—for example, a plate of glass, although wood, cardboard, or metal may be used, if preferred—which is detachably secured at a suitable distance above the base and parallel therewith. In the present instance I have shown the upper plate as carried by side pieces 10, which extend upward from the base. The special means by which the upper plate is held in place may be varied to suit the special requirements of use or the taste of the manufacturer. In the present instance I have shown one of the side pieces as provided with a groove 27 (see Fig. 6 and dotted lines, Fig. 1) and the other side piece as provided with a shoulder or ledge 28. In use one edge of the upper plate is passed into the groove and the other then allowed to rest upon the shoulder or ledge. The upper plate is held against endwise movement by stop-plates 29, secured at the ends of the groove.

30 denotes a spring, which is secured to the base and is curved over the top of the base, the free end extending downward toward the ledge. The action of this spring is to press the opposite edge of the upper plate into the groove and to hold said plate firmly in place under ordinary circumstances, but permitting it to be conveniently removed.

C denotes an arm consisting of upper and lower branches, which are designated, respectively, by 11 and 12. This arm I preferably make of a single strip of metal bent at its center into the shape of an elongated U, thereby giving a slight resiliency to the arms. The upper branch of arm C carries at its inner end an adjustable stylus or pointer 13, and the lower branch carries at its inner end a marker 14—for example, a pencil or a piece of lead or crayon. I have shown the marker as carried by spring-arms 31, forming part of a plate 32, which is rigidly secured to the inner end of the lower branch. The shank of the stylus is threaded, as clearly shown in Fig. 4, and is vertically adjustable in a threaded opening in a head 33 at the end of a curved arm 16, itself formed integral with a plate 17. This plate is provided with a slot 18 and is adapted to slide upon the inner end of the upper branch, as will be more fully explained.

15 denotes a handpiece having a threaded opening through it and adapted to engage the threaded shank of the stylus. In use the handpiece is turned backward and the stylus adjusted in head 33 so as to leave the point slightly above—that is, out of contact with—the upper plate. The stylus is then locked in position by turning the handpiece down upon the head. The head 33 is preferably turned in a plane oblique to the plane of the arm, so as to place the stylus in a plane oblique to a vertical line intersecting the upper plate. This oblique position of the stylus, in connection with the curvature of arm 16, enables the user to get a clear view of the point of the stylus and the lines of a drawing that is being reproduced.

19 denotes an angular boss upon the upper

branch, which is adapted to engage the slot in plate 17, so as to hold said plate against lateral movement. This boss is provided with a threaded opening 20, which is adapted to receive a thumb-screw 21. In practice the boss is of slightly less height than the plate, so that the head of the thumb-screw will bear upon opposite sides of the slot, but not upon the boss. It will readily be seen that by loosening the thumb-screw the curved arm, and with it the stylus, may be moved in or out relatively to the marker, it being apparent that if the point of the stylus be placed directly above the point of the marker—that is, on a vertical line therewith—any drawing reproduced will be on the same scale as the original drawing. If the stylus is moved inward from a vertical line intersecting the marker, the drawing will be enlarged, and if the stylus is moved outward from said vertical line the drawing reproduced by the marker will be reduced in scale.

D denotes a carrier for the arm, which preferably consists of a frame 22, having journaled at its mid-height a roller 23, which is adapted to be engaged by the upper branch of the arm, as is clearly shown in Figs. 2 and 3.

24 denotes a housing rigidly secured to the base, in which frame 22 is journaled so as to oscillate freely in the horizontal plane. I have shown the frame as journaled upon points 25, the upper point being made adjustable in the housing, so as to take up lost motion and insure that the frame will at all times work smoothly. It will be seen that the motion of arm C is thus made universal and in a very simple and inexpensive manner. The manner in which the upper branch of the arm is supported by roller 23 permits the inward and outward and also the vertical movement of said arm with the least possible friction, and the movement of the frame on the points permits the frame, and with it the arm, to oscillate freely in the horizontal plane.

26 denotes clips the arms of which engage the upper and lower sides of the upper plate, the upper arm acting to hold the drawing that is to be reproduced firmly in place upon said upper plate. The piece of paper upon which the new drawing is to be made is secured in place upon the base by means of springs 34, the ends of which are upwardly turned, as clearly shown in Fig. 2, in order to permit the edge of the paper to be slipped under them.

The operation will be readily understood from the drawings. In starting to reproduce a drawing the operator turns the arm out of the way, removes the upper plate, and then secures the piece of paper upon which the new drawing is to be made by passing the edges thereof under springs 34, which clamp it to the base. The upper plate is then placed in position, where it is retained by spring 30, and the drawing which is to be reproduced is secured thereon by clips 26. If the drawing is to be reproduced on the original scale, the stylus is adjusted so that the point thereof is on a vertical line with the marker. If the drawing is to be enlarged, the point of the stylus is moved inward from the marker, and if to be reduced in scale the stylus is moved outward from the marker. When the reproduction is either an enlargement or a reduction of the original drawing, the proportions are slightly changed. Reproductions made on the same scale as the original have the exact proportions of the original. The pressure of the marker upon the paper in making the new drawing is determined by the height at which the stylus is adjusted above the upper plate. Should it be required at any time to change the pressure of the marker, the handpiece is turned backward and the stylus raised or lowered, as may be, it being obvious that the higher the stylus is raised above the upper plate the greater will be the pressure transmitted to the marker through the resilient upper and lower branches of the arm when the stylus is pressed down into contact with the drawing upon the upper plate.

Having thus described my invention, I claim—

1. A tracing instrument comprising a base, an upper plate, an arm having two resilient branches one branch carrying a stylus adapted to engage the upper plate the other a marker adapted to engage the base and a horizontally-oscillating carrier which supports the arm and in which the latter moves freely.

2. A tracing instrument comprising a base, an upper plate, an arm having two resilient branches one branch carrying a stylus adapted to engage the upper plate the other a marker adapted to engage the base, a horizontally-oscillating carrier comprising a frame with a roller journaled at its mid-height upon which the upper branch of the arm rests, and a housing in which the frame is mounted.

3. A tracing instrument comprising a base, an upper plate, an arm having two resilient branches, and a horizontally-oscillating carrier in which the arm moves freely said arm comprising an upper branch having at its inner end an adjustable stylus adapted to engage the upper plate and a lower branch having at its inner end spring-arms which carry a marker adapted to engage the base.

4. In an instrument of the character described the combination with a base, an upper plate, a carrier and an arm comprising upper and lower resilient branches which moves freely in the carrier, of a marker carried by the lower branch and adapted to engage the base, a stylus adapted to engage the upper plate 17 and a sliding plate on the upper branch by which the stylus is carried.

5. In an instrument of the character described, the combination with a base, an upper plate, a carrier and an arm comprising upper and lower resilient branches which moves freely in the carrier, of a marker adapted to engage the base, a plate carried by the lower branch having spring-arms 31 which

retain the marker, a stylus adapted to engage the upper plate and having a threaded shank, an arm which is adjustably secured to the upper branch and carries a head having a threaded opening to receive the stylus, and a threaded handpiece by which the stylus may be locked in position after vertical adjustment in the head.

6. The combination with a base, an upper plate, a carrier and an arm comprising upper and lower resilient branches which moves freely in the carrier, of a marker carried by the lower arm and adapted to engage the base, a stylus adapted to engage the upper plate and having a threaded shank, a curved arm on the upper branch which carries a head having a threaded opening to receive the stylus and turned in a plane oblique to the plane of the arm, and means for adjustably securing the arm to the upper branch, substantially as shown for the purpose specified.

In testimony whereof I affix my signature in presence of two witnesses.

ERNEST F. CHASE.

Witnesses:
A. M. WOOSTER,
S. V. HELEY.