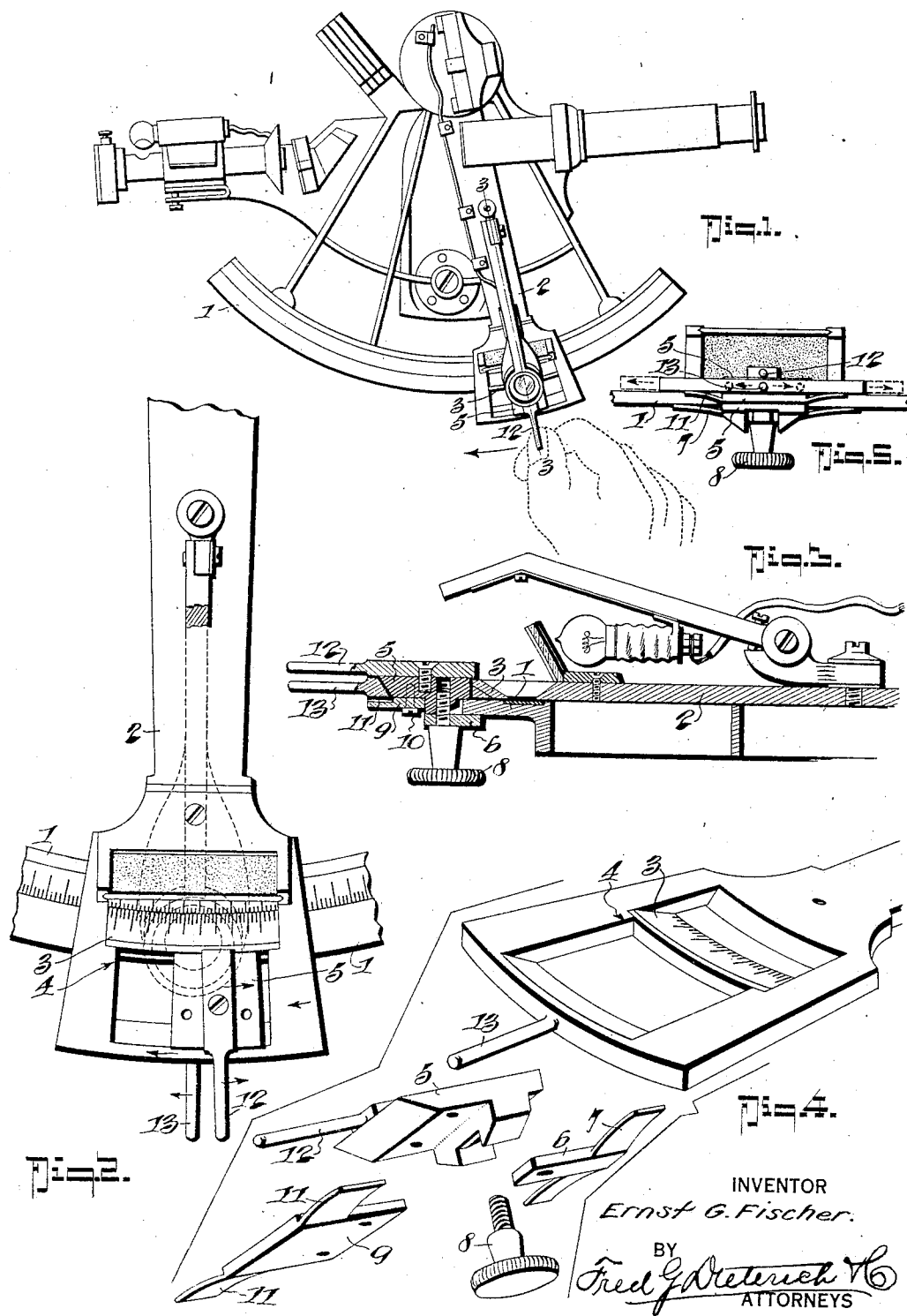


E. G. FISCHER.  
FINE MOTION DEVICE FOR SURVEYING AND OTHER INSTRUMENTS.  
APPLICATION FILED DEC. 18, 1919.

1,376,327.

Patented Apr. 26, 1921.



INVENTOR  
Ernst G. Fischer.

BY  
Fred G. Dietrich & Co.  
ATTORNEYS

# UNITED STATES PATENT OFFICE.

ERNST G. FISCHER, OF WASHINGTON, DISTRICT OF COLUMBIA.

FINE-MOTION DEVICE FOR SURVEYING AND OTHER INSTRUMENTS.

1,376,327.

Specification of Letters Patent. Patented Apr. 26, 1921.

Application filed December 18, 1919. Serial No. 345,710.

*To all whom it may concern:*

Be it known that I, ERNST G. FISCHER, a citizen of the United States, residing at Washington, in the District of Columbia, have invented a new and Improved Fine-Motion Device for Surveying and other Instruments, of which the following is a specification.

My present invention has for its object to provide a fine motion device which is especially useful on portable surveying instruments and other apparatus requiring quick and definite setting to directions or angles.

In many instruments, particularly those in which a direction or angle is to be determined in degrees, minutes and seconds, it is necessary to put an index or vernier arm approximately into the right place, and then to make the final and exact pointing by means of a fine threaded screw commonly known as a tangent screw. In the case of an instrument which must be held in the hand and therefore involves considerable strain of nerves and muscle, it is of great advantage if the final pointing can be made more quickly and yet the index or vernier arm moved with certainty through very small spaces for accurate observation. My invention has for its object to accomplish this aim.

In order to illustrate the invention, I have shown it in its application to a sextant. The usual tangent screw is eliminated and my device employed in lieu thereof.

My device comprises a small pin projecting radially out beyond the vernier arm and mounted on the clamp block and located immediately above and in close proximity to a like pin fastened to the vernier arm so that when the clamp is free the two pins may be grasped by the fore-finger and thumb and the vernier arm, with the clamp, moved quickly into the approximate position desired; tightening the clamp, the pin carried by the clamp becomes fixed to the arc of the sextant and forms a fulcrum from which the lower pin, fast to the vernier arm, can be moved back and forth quickly and to very small amounts by a rotary or twisting force applied to the two pins by the fore-finger and thumb.

In its more detailed nature, the invention also resides in those novel features of construction, combination and arrangement of parts, all of which will be first fully described, then be specifically pointed out in

the appended claims and illustrated in the accompanying drawing which illustrates one embodiment of the invention, and in which:

Figure 1 is an elevation of a sextant with the invention applied.

Fig. 2 is an enlarged elevation of the vernier arm and a portion of the arc of the sextant, the magnifying glass arm being broken away.

Fig. 3 is a detail section on an enlarged scale on the line 3—3 of Fig. 1.

Fig. 4 is a detail view of the end of the vernier arm and the parts constituting my invention separated therefrom.

Fig. 5 is a detail enlarged edge view of a portion of the device shown in Fig. 1.

In the drawing, in which like numerals of reference indicate like parts in all of the figures, 1 designates the arc of the surveying instrument which is graduated in the usual manner, and 2 represents the vernier arm, the vernier arm carrying the vernier 3 and being recessed at 4 to receive the clamp block 5, the clamp block 5 having a member 6 carrying a friction spring 7 and adapted to be secured by the set screw 8 in the usual way to hold the vernier arm at its approximate position of adjustment with relation to the arc 1. 9 designates a plate which is secured to the clamp block 5 by suitable screws 10 and is provided with spring members 11 to engage the vernier arm and hold the arm and clamp block in frictional connection so as to sustain these two parts in their relative positions when the finger adjustment is made.

12 designates a pin projecting from the clamp block over the edge of the vernier arm and coöperative with a similar pin 13 carried by the vernier arm, the pins 12 and 13 being adapted to lie parallel and in close proximity so that the user may grasp the pins 12 and 13 for the purpose of moving the vernier arm along the arc in making the initial or approximate adjustment and for the further purpose of moving the vernier arm with relation to the clamp block after the latter has been fastened, in order to effect the final adjustment.

In using the invention, the operator grasps the pins 12 and 13 between the fore-finger and thumb, and, having loosened the clamp screw 8, he is thus able to move the vernier arm to its approximate position with relation to the arc 1. Having moved the vernier arm to the approximate position de-

sired, he tightens the clamp screw 8 to secure the block 5 to the arc 1 and then, by grasping the pins 12 and 13 between the fore-finger and thumb and by imparting a  
 5 rotating or twisting force the pins 12 and 13 are readily moved apart in one direction or the other, to change the relative location of the clamp block in the opening 4, thereby effecting the final adjustment of the vernier  
 10 arm.

While I have illustrated my invention as applied to a sextant, it will be clear to those skilled in the art that it is applicable to the use of other analogous instruments of precision requiring the use of a vernier in effecting the final adjustment of the parts.

From the foregoing description taken in connection with the accompanying drawing, it is thought the complete construction, operation and advantages of my invention will be readily understood by those skilled in the art.

What I claim is:—

1. In an instrument of the character described, the combination with the vernier member, the graduated portion of the instrument coöperative therewith and the clamp block and means for securing the clamp block to the graduated portion of the instrument, of finger engageable pins carried respectively by the vernier member and by the clamp block whereby final adjustment of the vernier member may be effected.

2. In apparatus of the class described, the combination with the vernier carrying member and the scale plate coöperative therewith, of a clamp block slidably connected with the vernier carrying member whereby when the clamp block is tightened on the scale plate the vernier member may yet have limited movement with respect to the scale member, finger engageable pins carried by the vernier member and the clamp block respectively, said pins lying in proximity whereby the same may be grasped by the fore-finger and thumb of the operator to move the vernier member and clamp block along the scale member when the clamp block is loosened and to effect the independent movement of the vernier member when the clamp block is tightened.

3. In apparatus of the class described, the combination with the vernier arm and the arc member, of a clamp block adapted to be movably secured to the arc member, said clamp block and said vernier arm being connected whereby said vernier arm may have limited movement with regard to the clamp block, and operating pins secured to the clamp block and to the vernier arm respectively and adapted to be simultaneously grasped by the fore-finger and thumb of the operator, substantially as shown and for the purposes described.

ERNST G. FISCHER.