No. 682,452. Patented Sept. 10, 1901.

A. H. BUHNER.

PARALLEL RULER.

(Application filed May 28, 1901.)

(No Model.)

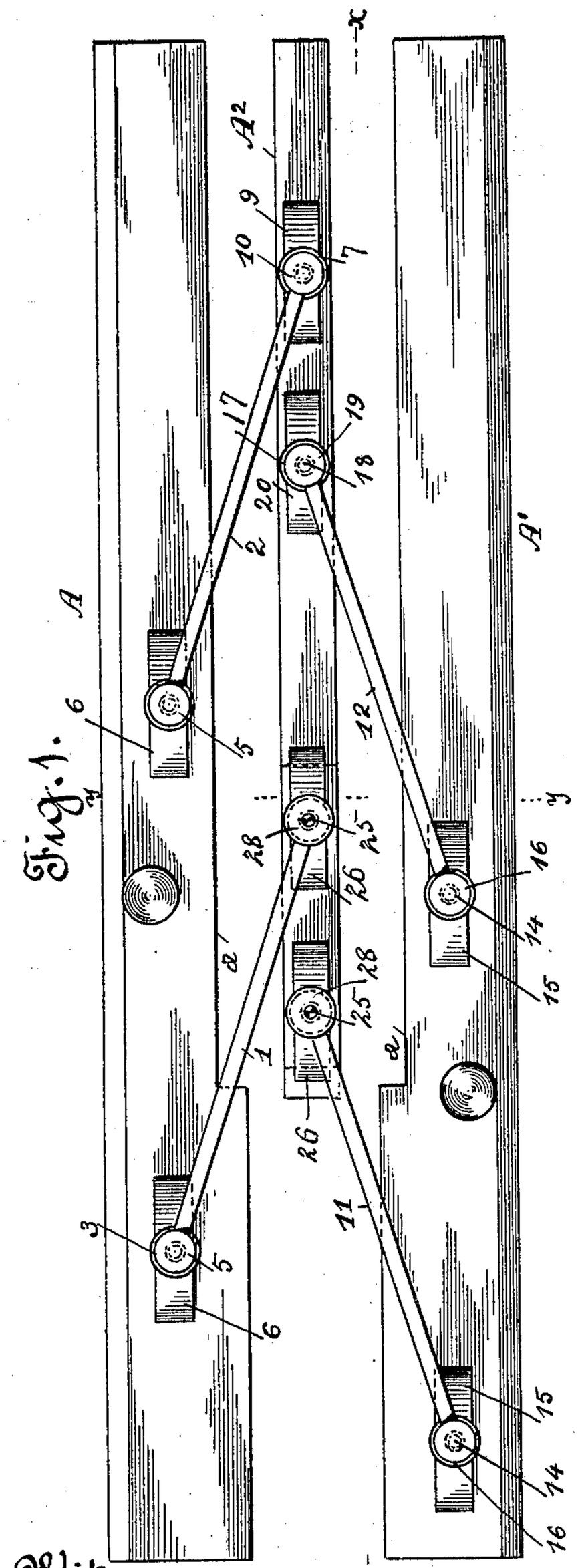

Fig. 1.

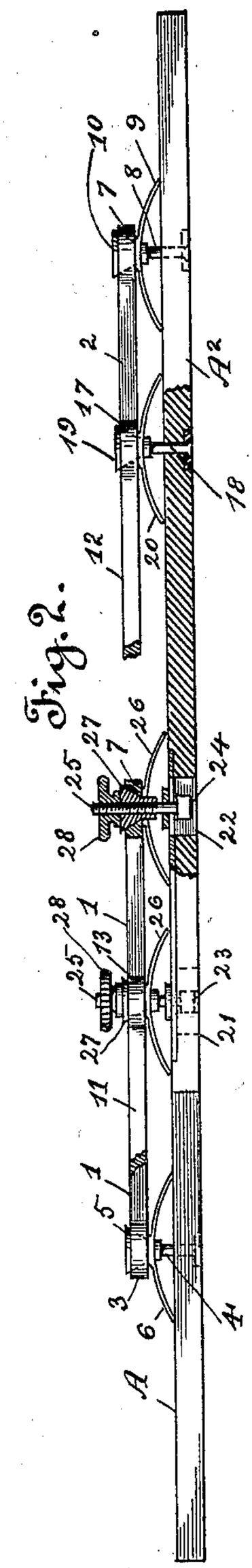

Fig. 2.

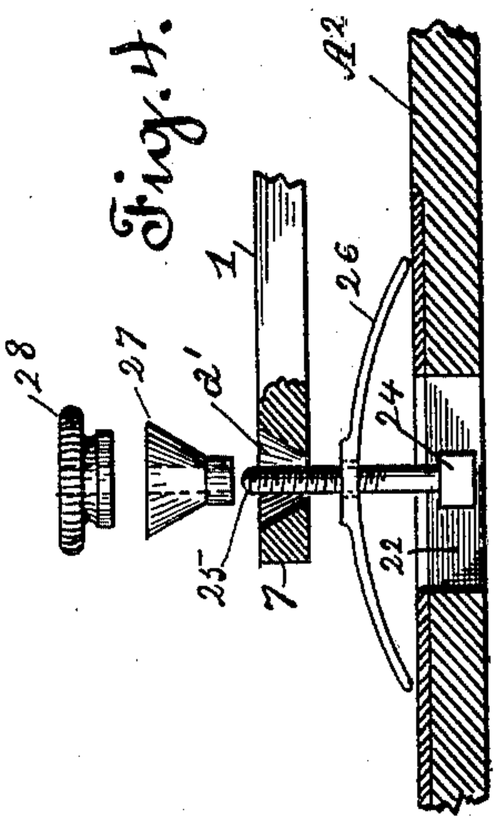

Fig. 4.

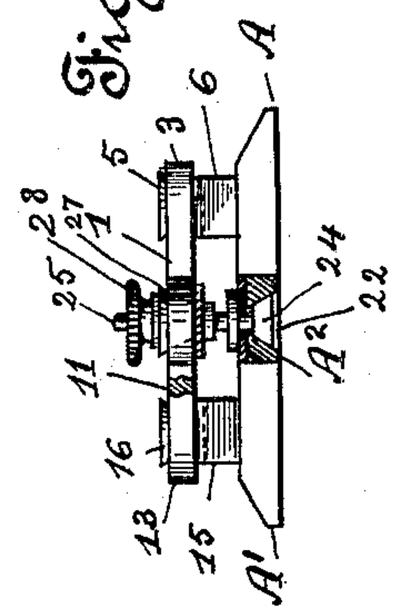

Fig. 3.

Witnesses.
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UNITED STATES PATENT OFFICE.

ALBERT H. BUHNER, OF SAN FRANCISCO, CALIFORNIA.

PARALLEL-RULER.

SPECIFICATION forming part of Letters Patent No. 682,452, dated September 10, 1901.

Application filed May 28, 1901. Serial No. 62,196. (No model.)

To all whom it may concern:

Be it known that I, ALBERT H. BUHNER, a citizen of the United States, residing at the city of San Francisco, in the county of San Francisco, State of California, have invented certain new and useful Improvements in Parallel-Rulers; and I do hereby declare the following to be a full, clear, and exact description of the same.

The present invention relates to certain new and useful improvements in parallel-rulers designed for securing mathematical correctness thereof; and the object of the invention is to provide means whereby lost motion of the parts is prevented and whereby the parallelism of the members is maintained, thus obviating untrueness of the ruler and compensating for changes due to climatic influences.

To comprehend the invention, reference must be had to the accompanying sheet of drawings, wherein—

Figure 1 is a plan view of the ruler, partly opened. Fig. 2 is a longitudinal sectional view in side elevation, taken on line $x\,x$, Fig. 1. Fig. 3 is a detail cross-sectional end view of the ruler closed, taken through line $y\,y$ of Fig. 1; and Fig. 4 is an enlarged detail longitudinal sectional view of a portion of the third or middle member of the ruler, the adjusting means being illustrated separated.

The ruler consists of the outer or straight-edge members A A′ and the middle or third member A^2, which member when the parts are closed rests within the cut-away portion a of the straight-edge members. Connection is made between the middle member and straight-edge member A by means of the rods 1 2. The outer end of each rod is formed with an enlarged head 3, which fits over the studs 4, projecting from member A, and is held thereon by a cone-shaped collar 5. The enlarged head 3 bears upon the spring 6, interposed between the head and surface of member A. The spring 6 maintains a constant upward pressure upon the head 3 and holds same firmly pressed against the cone-shaped collar 5, which is prevented from being lifted off of its stud by reason of the fact that its upper end is headed or upset.

The inner end of each connecting-rod 1 2 is formed with an enlarged head 7, that of rod 2, fitting over stud 8, projecting from member A^2. The said head rests or bears upon spring 9 and is held in place by cone-shaped collar 10, said collar being prevented from upward movement by reason of the same being rigidly secured to the stud 8. Similar connection is made between the members A′ and A^2 by rods 11 12. The enlarged heads 13 of these rods are pivoted to the studs 14, projecting from member A′, and each head rests upon a spring 15. Each rod is held to its respective stud by a cone-shaped collar 16, rigidly secured to the stud. The enlarged head 17 of rod 12 is pivoted to stud 18, projecting from member A^2, being held in place by cone-shaped bearing-collar 19, rigidly secured to said stud. This end of the rod bears upon spring 20.

Within the member A^2 of the ruler are formed the wedge-shaped longitudinal slots 21 22, within which are fitted to slide the blocks 23 24. Each block is provided with a screw-threaded stem 25, which extends through the slots and projects above the member A^2. Upon these stems loosely work the enlarged head 7 of rod 1 and enlarged head 13 of rod 11. These heads bear upon springs 26 and are held in place by the cone-shaped bearing-collars 27. Said collars are secured to the stems by thumb-screws 28, which screw onto the screw-threaded end of the stems 25. It will be understood that in each enlarged head of the connecting-rods a cone-shaped seat a' is formed for the reception of the cone-shaped bearing-collar. As the ends of each rod are held pressed outward by the springs it is obvious that as wear takes place, due to the movement of the members, the same is compensated for by the rods seating against the cone-shaped bearing-blocks. The parts are thus held tight at all times.

In case the straight-edge members become out of parallel, due to injury during handling, warping, or otherwise, true parallelism is obtained by simply unscrewing the thumb-nut and loosening the slide-block of the stem holding the member to be adjusted. Then by moving the slide-block forward or backward the said member will be moved outward or inward until parallelism with its opposing member is obtained. For instance, if member A is out of parallel with straight-edge member A′ and it is desired to place the same

in true parallelism it is only required that slide-block 24, which carries rod 1, be moved forward in order to cause the connecting-rod to throw such end of the member outward the desired distance or by moving the slide-block backward to cause the connecting-rod to draw the said member inward. In a similar manner straight-edge member A′ may be adjusted to member A.

Having thus described the invention, what is claimed as new, and desired to be protected by Letters Patent, is—

1. A parallel-ruler consisting of the straight-edge members, the middle member, pivoted rod connections between the straight-edge members and the middle member, and means permitting an adjustment of one of the rod connections longitudinally of the middle member independently of the other rod connections, substantially as described.

2. A parallel-ruler consisting of oppositely-disposed straight-edge members, an intermediate member, means movably connecting the straight-edge members with the intermediate member, including means connected to and adjustable longitudinally of one of the members to maintain the parallelism of the straight-edge members, substantially as described.

3. A parallel-ruler consisting of the straight-edge members, the middle member, separated pivoted rod connections between the middle member and the respective straight-edge members, said connections being provided with automatic adjusting means for preventing lost motion and means for shifting the pivot between the end of one of the rods and the member to which it is attached longitudinally independently of the other pivots, substantially as described.

4. The combination with the straight-edge members, of the middle member, a series of rod connections between the said members, of means whereby adjustment is permitted one pair of said connecting-rods, and a spring-bearing interposed between the pivotal joint of each rod and its respective member.

5. In a parallel-ruler, the combination with the oppositely-arranged straight-edge members, the middle member, rods connecting the straight-edge members with the middle member, pivots for the connecting-rods, springs interposed between each connecting-rod and the surface of the member to which it is attached, and cone bearing-collars working over the pivots and bearing upon the rods from the outside in a manner to oppose the springs, substantially as described.

6. A parallel-ruler consisting of the straight-edge members, the middle member, connecting-rods, means for pivotally securing each rod to the middle member and one of the straight-edge members, including devices whereby one of said pivot means may be shifted independently of the others, substantially as described.

In witness whereof I have hereunto set my hand.

ALBERT H. BUHNER.

Witnesses:

N. A. ACKER,

D. B. RICHARDS.