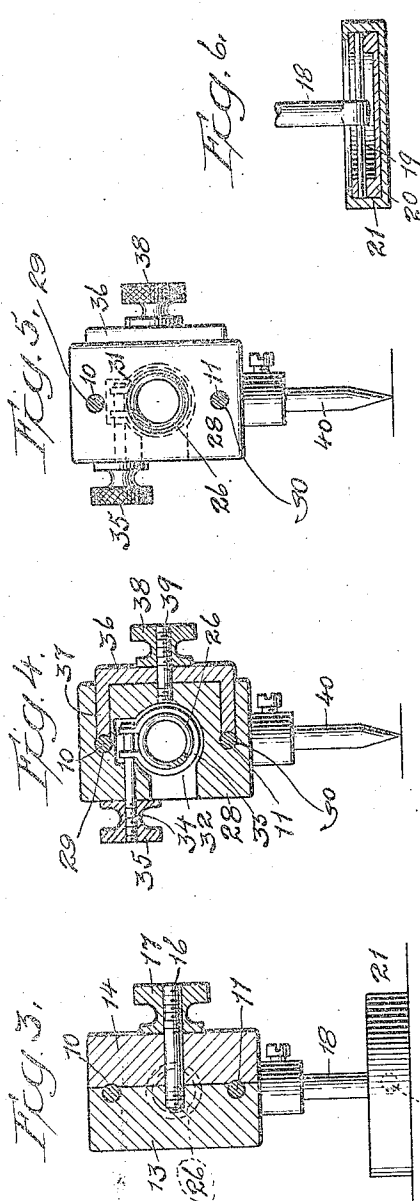
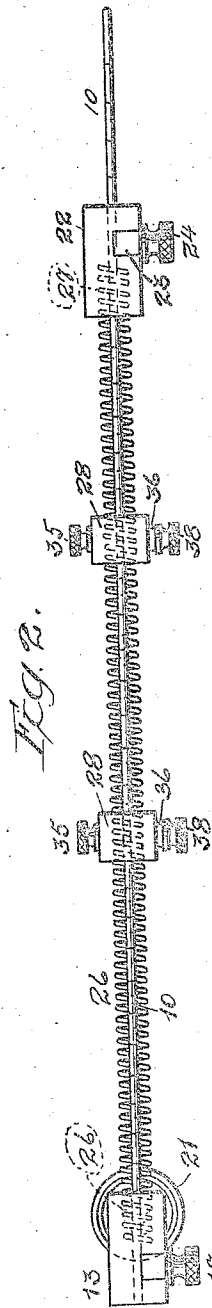
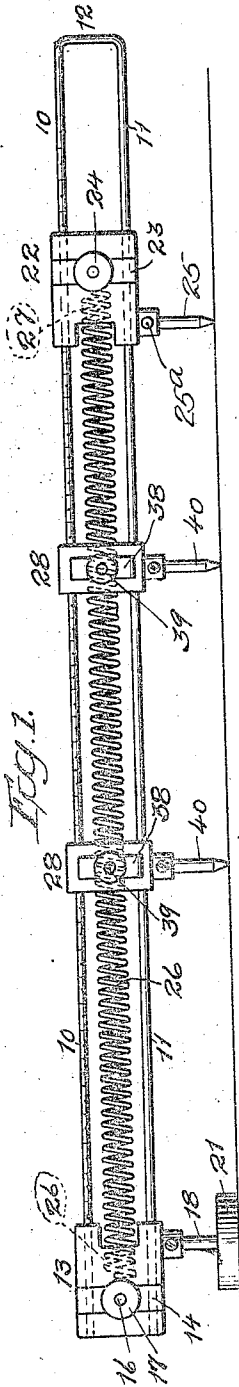


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 PROPORTIONAL SCALING INSTRUMENT.
 APPLICATION FILED FEB. 11, 1921.

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PROPORTIONAL SCALING INSTRUMENT.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JAMES D. CARTER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Proportional Scaling Instruments, of which the following is a specification.

This invention relates to a scaling instrument primarily designed for drafting purposes, although the mechanism shown is equally adapted for use in connection with machinery or tools used for engraving, routing, carving, or other operation which requires the employment of a multiplicity of marking or cutting tools adapted to operate in unison and in a space ratio with one another.

The primary object of the invention is to provide a mounting for such tools or instruments, together with suitable adjustment mechanism, so that the several tools may be simultaneously adjusted to different positions without altering the spacial ratio between the respective tools or instruments, thereby at all times maintaining a predetermined spacial ratio irrespective of the scale chosen for the operations. The invention is one which permits the several tools or instruments to be individually adjusted to the desired ratio with respect to one another, and thereafter permits the entire series of tools to be adjusted as a group to any scale desired without interfering with the space ratio of the individual units. This arrangement permits the use of a master pattern of given size to be employed as a guide for the scaling therefrom of one or more copies drawn to a different scale, and the device illustrated is usable under any conditions where such a scheme of operations is required.

In the form shown for purposes of exemplification, the device is illustrated as a drafting instrument, but it is obvious that the marking points shown might be replaced by carving or cutting instruments, actuated by power, if desired, without in any way altering the mechanism employed for maintaining the ratio between the parts.

The invention consists in the features of construction and combinations of parts hereinafter described and claimed.

In the drawings:

Figure 1 is a side elevation of the device;

Fig. 2 is a plan view of the same;

Fig. 3 is a cross sectional view of the swivel head;

Fig. 4 is a cross sectional view of one of the riders and associated parts;

Fig. 5 is an end view of one of the riders; and

Fig. 6 is a sectional detail of the mounting for the swiveled head.

The device comprises a pair of parallel guide rails 10 and 11 united at the outer end by a cross head 12. The guide rails and cross head are preferably formed of a stiff steel rod bent to the required configuration, and the inner ends of the rails are preferably socketed within upper and lower parallel socket holes in a swiveled head 13, which, as shown, is of generally rectangular formation. The ends of the guide rods may be brazed or otherwise permanently secured in place within the head, although it is preferred to provide means whereby these parts may be disassembled. As shown such means comprise a clamping plate 14 which is entered within a vertically arranged recess 15 in the swiveled head. The clamping plate, as shown in Fig. 3, is arranged to bear against the sides of the guide rods, and a threaded stem 16 is provided which extends freely through the clamping plate, and is threaded at its outer end to receive a thumb nut 17 which bears against the clamping plate, so that a turning of the thumb nut will draw the latter tightly in contact with the contiguous portions of the upper and lower rails, thereby clamping the same tightly in position.

The swiveled head is mounted upon a post 18, which, at its lower end, carries a cross trunnion 19, the ends of which are socketed within a recessed swiveled plate 20 which is free to rotate within a recessed base plate 21 shown in Fig. 6. The cross trunnion 19 is disposed in transverse relation to the guide frame, so that the latter may be raised and lowered, or turned around the axis of the swiveled post 18 as a center, but is held against tipping or tilting in a sidewise direction.

The swiveled head 13 co-operates with a slidably mounted outer head 22 which rides upon the upper and lower guide rails, and is provided with a clamping plate 23 and a thumb nut 24 similar to those previously described. The outer head 22 carries a marker 25 which, however, may obviously be re-

placed by a stylus, drill, router or other drill or instrument, these parts being removable by the loosening of a set screw 25^a or the like.

5 Between the swiveled head and the outer head is mounted an elastic adjusting element 26 which, in the form shown, consists preferably of a coiled spring of uniform tension throughout. As shown, the ends of the
10 coiled spring are fixedly secured to the swiveled head and outer head respectively, so that the latter may be adjusted to varying positions upon the guide frame and afterwards clamped in position by means of the
15 thumb nut 24, thereby expanding the elastic element—spring or the like—to a greater or less degree of expansion. As shown, the ends of the spring are threaded onto socket holes 26 and 27 in the oppositely disposed
20 heads which affords a convenient and satisfactory method of securing these parts together, although obviously other suitable or convenient means might be provided for securing the parts together.

25 Between the two heads are mounted one or more riders 28, two being shown for purposes of illustration, which riders are provided with upper and lower guide holes 29 and 30 through which the guide rods extend, the arrangement being one which permits the riders to slide smoothly and evenly along the guide rods without cramping or binding, and at the same time serves to maintain the riders against vibration or displacement when brought to the intended position.
35 Each of the riders is provided with means for clamping the same securely to the elastic element, a suitable and convenient form being shown for purposes of illustration. As shown, each of the riders is provided
40 through its center with a hole or bore 31 of a size to permit the spring or other elastic element to pass therethrough and the rider is also provided on its interior with a recess 32 within which is housed a split spring clamping ring 33 which embraces the coiled
45 spring or other elastic element, the free ends of the split spring ring having entered therethrough a draw stem 34 threaded at its outer end and provided with a thumb
50 nut 35 adapted to draw the free ends of the split spring ring together, so as to tightly clamp the parts together. The split spring clamping ring being closely housed within
55 the recess in the rider will prevent any fore and aft movement of the parts when clamped together.

In order to more effectively prevent any accidental movement of the parts, means are
60 provided for clamping the rider onto the rails of the guide frame, and a convenient means for this purpose consists of a plate 36 provided with inwardly extending clamping fingers 37 which bear against the upper
65 and lower guide rails and are adapted to be

brought into clamping engagement there-with by means of a thumb nut 38 threaded onto a stem 39, which latter passes freely through the clamping plate 36 and is
70 threaded or otherwise rigidly entered into the contiguous wall of the rider. Each of the riders is provided with a marking tool 40 or other requisite tool or instrument depending upon the use for which the device is intended.

75 In use, one or more riders can be mounted in position upon the guide rails by removing the latter from the swiveled head and passing the riders onto the rails and spring, after which the ends of the rails are entered
80 and clamped within the swiveled head. Assuming that two riders are to be employed, the same will be adjusted to the desired positions, so that the intended space ratio of the several marking or cutting instruments will
85 be established, after which the riders will be tightly clamped to the coiled spring or other elastic element by tightening the clamping ring or rings 35. Thereafter the entire series may be adjusted as a unit by
90 moving the outer head to the desired position, and this will result in automatically repositioning the riders without disturbing the space ratio between the several parts, since each portion of the elastic element will
95 expand or contract in uniform ratio with every other portion. It is thus evident that if an initial adjustment of the parts in the ratio of 2, 4 and 6 inches from the pivot point be established, and if thereafter the
100 outer head be moved to the distance of 12 inches from the pivot point, the riders will automatically assume positions in the ratio of 4 and 8 inches from the pivot point without individual adjustment, and without the
105 necessity for making individual computations conformable to the newly established scale of operations.

The instrument can be readily used for drafting purposes, where concentric circles
110 are to be drawn in given ratio to one another, irrespective of the scale chosen, since after the space ratio of the parts is once established, the outer head can be adjusted to any radius desired, and the established ratio
115 of the smaller circles will be maintained. In like manner, the instrument can be used for producing a plurality of similar figures differing in scale from a master figure or pattern, or for like operations on the drafting
120 board, and can also be employed for like purposes on carving machinery, engraving machinery, or for other purposes of like character.

The principle of this invention is one
125 which lends itself readily for use in computing instruments in which visual indication rather than inscribed lines are adequate to give the desired data. If so used it is evident that the fixed portions of the device
130

should be suitably scaled or marked in conformity with the system of measurements chosen for purposes of computation as indicated on the top guide rail in Figs. 1 and 2.

Although the invention has been described with considerable particularity as to detail, it will be understood that the details of construction may be varied or modified without departing from the spirit of the invention.

I claim:

1. In an instrument of the class described, the combination of a frame, a longitudinally extensible and contractible elastic element, relatively adjustable members carried by the frame to each of which the elastic element is secured, an element intermediate the relatively adjustable members and secured to the elastic element, and working instruments one of which is attached to one of the adjustable elements, and one of which is attached to the intermediate element, for the purposes set forth.

2. In an instrument of the class described, the combination of a guide frame, an element fixed to the frame, an element slidably adjustable on the frame, an elastic element secured to the fixed and adjustable elements, an element intermediate the fixed adjustable elements and slidably mounted on the guide frame, and means operable from the side of the instrument for securing the intermediate element to the elastic element in a predetermined spacial ratio between the fixed and adjustable elements, for the purposes set forth.

3. In an instrument of the class described, the combination of a guideway, an element fixed on the guideway, a swiveled mounting for the fixed element, an element adjustable on the guideway, an elastic element secured to the fixed and adjustable elements, a rider intermediate the two elements and slidably mounted on the guideway, means for clamping the rider to the elastic element in any desired position of adjustment, and working instruments carried by the adjustable element and the rider respectively, for the purposes set forth.

4. In an instrument of the class described, the combination of a guideway, an element fixed on the guideway, an element adjustable on the guideway, an elastic element secured to the fixed and movable elements, a rider

intermediate the two elements and slidably mounted on the guideway, means for clamping the rider to the elastic element in any desired position of adjustment, and working elements carried by the adjustable element and the rider respectively, for the purposes set forth.

5. In an instrument of the class described, the combination of a head, guide rails carried by the head, a movable element slidably upon the guide rails and adjustable to any desired position, an elastic element connecting the head and movable element, means for clamping the movable element in adjusted position upon the guide rails, a rider slidably mounted upon the guide rails, means for clamping the rider to the elastic element in any desired position of adjustment, means for clamping the rider to the guide rails, and working tools carried by the movable element and rider, for the purposes set forth.

6. In an instrument of the class described, the combination of a head, a swiveled mounting therefor, parallel upper and lower guide rails carried by the head, a movable element slidably upon the guide rails, means for clamping the movable element upon the guide rails, a uniform elastic element connecting the head and movable element and lying within the space between the guide rails, a rider slidably mounted upon the guide rails, means for clamping the rider to the elastic element in any desired position of adjustment, means for clamping the rider to the guide rails, and working tools carried by the movable element and the rider, for the purposes set forth.

7. In an instrument of the class described, the combination of a head, a swiveled mounting therefor, parallel upper and lower guide rails carried by the head, a movable element slidably upon the guide rails, means for clamping the movable element upon the guide rails, a uniformly elastic element connecting the head and movable element and lying within the space between the guide rails, a rider slidably mounted upon the guide rails, means for clamping the rider to the elastic element in any desired position of adjustment, and working tools carried by the movable element and the rider, for the purposes set forth.

JAMES D. CARTER.