

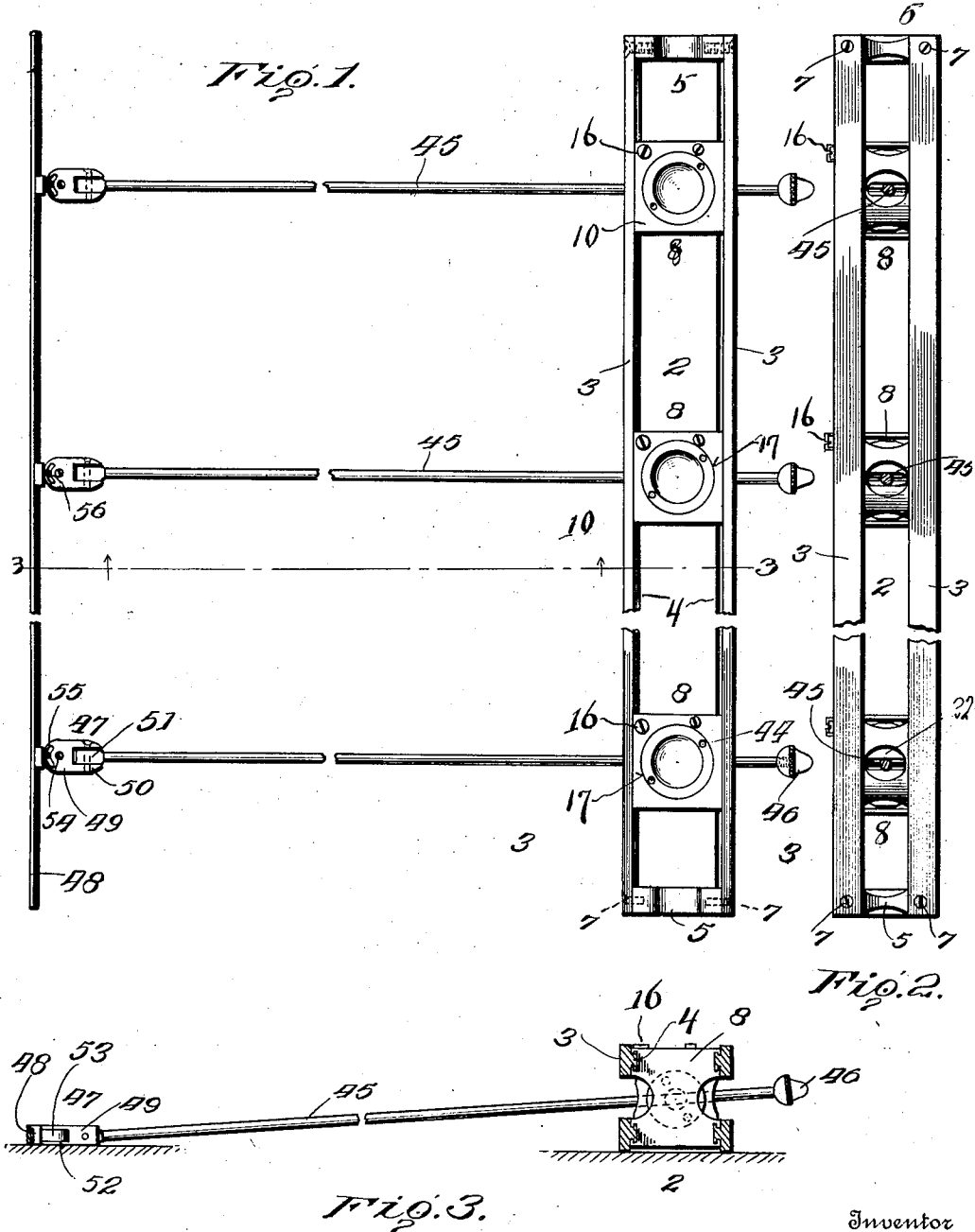
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INSTRUMENT FOR DRAFTING IRREGULAR CURVES.

APPLICATION FILED NOV. 15, 1911.

1,054,109.

Patented Feb. 25, 1913.

2 SHEETS-SHEET 1.



Witnesses

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Inventor

A. Gasparich

By

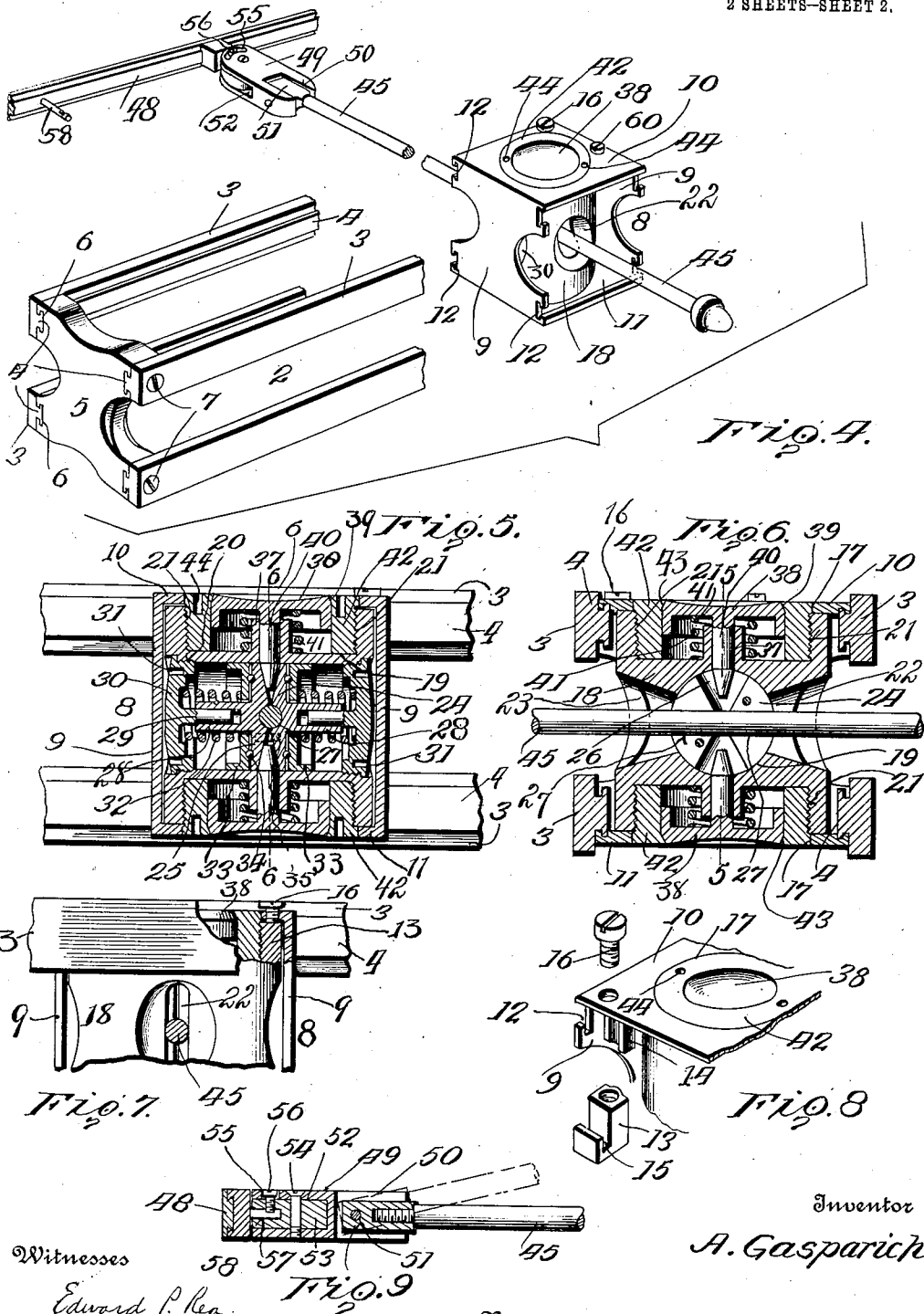
A. M. Racy, Attorney.

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A. H. Barry Attorney

UNITED STATES PATENT OFFICE.

ANTON GASPARICH, OF WEST OAKLAND, CALIFORNIA.

INSTRUMENT FOR DRAFTING IRREGULAR CURVES.

1,054,109.

Specification of Letters Patent.

Patented Feb. 25, 1913.

Application filed November 15, 1911. Serial No. 660,403.

To all whom it may concern:

Be it known that I, ANTON GASPARICH, citizen of the United States, residing at West Oakland, in the county of Alameda and State of California, have invented certain new and useful Improvements in Instruments for Drafting Irregular Curves, of which the following is a specification.

This invention relates to drawing instruments of the character shown in my Patent No. 962,896, patented June 28, 1910, and particularly to an instrument including a flexible rule having a plurality of independent adjustable connections with a base or support whereby the rule may be flexed to adapt it for use in connection with drawing curves and particularly irregular curves or other irregular lines not necessarily curvilinear.

One object of the present invention is to improve upon the construction described in my prior patent above referred to, and particularly to provide means whereby the supporting rods for the rule may be adjustable longitudinally upon the base instead of being placed at fixed intervals along the base.

A further object is to provide means whereby each rule carrying rod may be set in its adjusted position.

A further object is to provide a connection between each rule carrying rod and the rule whereby the rule may lie flat upon the paper, and in this connection to further provide for a pivotal joint between the rule and the rod.

Another object is to provide means whereby the rod carriers which are slidable upon the base support may be held in any desired adjusted position, or may be removed entirely from the base support to permit the carriers to be so arranged as to plot curves not otherwise possible.

An embodiment of my invention is illustrated in the accompanying drawings wherein:

Figure 1 is a plan view of my improved ruling apparatus. Fig. 2 is a side elevation thereof, the rule carrying rods being in section. Fig. 3 is a transverse section on the line 3—3 of Fig. 1. Fig. 4 is a perspective view of a portion of the base, one of the carriers, and a portion of the rule. Fig. 5 is a section on the line 5—5 of Fig. 6. Fig. 6 is a section on the line 6—6 of Fig. 5. Fig. 7 is a side elevation of a portion of the base and a portion of one of the carriers,

the carrier being broken and the clamping jaw 13 being shown in section. Fig. 8 is a fragmentary perspective view of a portion of one of the plates 10 of a carrier and the clamping jaw therefor, the clamping jaw being detached therefrom. Fig. 9 is a sectional view of the connection between one of the rods and the rule.

Corresponding and like parts are referred to in the following description and indicated in all the views of the accompanying drawings by the same reference characters.

Referring to these drawings, it will be seen that my instrument comprises a longitudinally extending base provided with a plurality of rod carriers, and through these rod carriers pass rule supporting rods connected each at one end to a rule, the supporting rods being longitudinally shiftable with relation to the carriers and rotatably mounted thereon.

2 designates the base before referred to which consists in its preferable form of a plurality of longitudinally extending parallel bars 3 connected at their ends, these bars being disposed at the four corners of a square. Each of these bars is provided on its inner face with the dovetailed tongue 4, the tongues of one pair of bars facing the tongues of the opposed pair of bars. The rails or bars 3 are supported at their ends upon the end pieces 5 which have dovetailed slots 6 to receive the ends of the dovetailed tongue 4. Preferably the rods 3 are attached to the end pieces by means of screws 7 so that the rods may be removed from the end pieces for a purpose to be hereafter stated.

Slidably mounted within the base are a plurality of rod carriers designated generally 8, one of these rod carriers being illustrated in Fig. 4. Each rod carrier consists of the end plates 9 preferably formed of relatively thin sheet metal and the upper and lower plates 10 and 11 respectively which are also formed of thin metal. The end pieces 9 at their upper and lower ends are formed with dovetailed recesses 12 to receive the tongues 4 of the bars 3. It will be seen that when the bars are inserted through these recesses the carrier 8 is longitudinally movable along the base but can not be removed from the base except by removing one of the end pieces 9 and slipping the carrier out from the tracks or bars.

For the purpose of locking the carrier and

preventing its movement along the bars 3 of the base, I provide a locking jaw 13 disposed adjacent to one of the end plates 9 and supported between said end plate and a guide 14 extending parallel to the end plate. This jaw as shown in Fig. 8 is formed with a recess 15 constituting one-half of a dovetail, and through the upper plate 10 of the carrier passes an adjusting screw 16 which engages the upper end of the jaw. By turning this screw in one direction, the jaw 13 will be moved upward and clamped against the rail or bar 3, while when the screw is turned in the reverse direction, the jaw will be shifted away from the rail and releases it, permitting the carrier to be longitudinally shifted.

The upper and lower plates 10 and 11 are each provided with a central opening 17 for the reception of the end of a barrel 18, this barrel being cylindrical and being rotatably mounted in said openings 17. Each barrel 18 is formed with a diametrically extending, centrally disposed tubular passage 19 which extends transversely through the barrel and has its ends internally threaded as at 20. The barrel is also internally threaded at each of its ends as at 21 and is provided with oppositely disposed, inwardly tapering slots 22 and 23 which communicate with the central tubular opening 19. A pair of clamping jaws 24 and 25 are mounted in opposed relation in said tubular opening 19, the meeting faces of said jaws being provided with complementary wedge-shaped recesses 26, and with a central groove which forms a guide opening 27 through said jaws. Each jaw carries a centrally located outstanding socket 28 through which passes a pin 29 carried by a threaded cap 30. There are two of these caps, one at each end of the tubular passage 19 and these caps close said passage. Each cap is provided with wrench openings 31 whereby a wrench may be applied to the cap to remove it and permit the replacement of the internal mechanism if desired or the removal of the jaws.

Disposed in each end of the tubular passage 19 is a coil spring 32 which surrounds the corresponding socket, one end of each of said springs bearing against the corresponding end cap 30, the other ends of the springs being seated in flanged washers 33 loosely mounted in the tubular passage 6 and loosely surrounding the tubular sockets 28. Anti-friction members 34 are interposed between said washers and the clamping jaws to permit free movement of the jaws relative to the washers. One of the clamping jaws is provided with a guiding pin 35 which enters an opening in the opposed jaw to hold the two jaws in alinement with each other.

The cylindrical casing 18 is annularly recessed at its ends so as to provide an annular marginal flange or wall and a centrally lo-

cated outstanding tubular guide 37 which communicates with the wedge-shaped recesses 26 of the jaws 24 and 25. A cap 38 provided with a slightly beveled periphery 39 carries a tapered shank 40 which constitutes a wedge and which enters the corresponding guide 37 and is adapted to be forced into the recesses 26 of the jaws 24 and 25 to force them apart. A spring 41 is coiled about each guide 37 and normally exerts a pressure against the caps 38 to urge the caps away from the barrel and to withdraw the shanks 40 from between the jaws 24 and 25. The caps 38 are held within the ends of the barrel by means of annular rings 42 which engage with the threads of the barrel, each ring being provided with an inwardly projecting beveled flange 43 which engages with the beveled periphery of the said caps, as illustrated in Figs. 5 and 6. Said rings project flush with the face of the carrier and are provided with oppositely disposed openings 44 for the reception of a wrench whereby they may be rotated to disengage them from the barrel or adjust them therein.

Passing through the central guiding opening of the jaws 24 and 25 and through the tapering slots of the barrel, and through the space between the side bars of the base upon which the carrier is supported, is an adjusting rod 45, one end of said rod being formed with a removable stop 46 and the other end having a flexible connection 47 with a flexible rule or straight edge 48.

The connection between the adjusting rod 45 and the straight edge 48 is to a certain extent a universal connection, that is, it permits a movement of the straight edge in two planes. To this end I provide for each of the rods 45 a head 49 which is bifurcated as at 50, each rod 45 having a flat sided terminal end 51 fitting in the bifurcated portion of the head 49 and being pivoted thereto so that the head 49 will have a certain pivotal movement upon the end of the rod 51.

It will be noted that the terminal end 51 is flat at its extremity and that the end wall of the bifurcation within which the terminal end is received is also flat. Ordinarily these two flat faces contacting would prevent any pivotal movement of the head, but the flat end face of the wall of the bifurcation does not fit closely against the end face of the terminal 51 but it is spaced therefrom and thus the head is permitted to have a rotative movement through a relatively small arc. The outer end of each head 49 is also bifurcated as at 52, this bifurcation extending at right angles to the bifurcation which fits over the terminal 51. Disposed in this bifurcation is a rotatable disk 53 which is pivotally mounted upon a pivot pin 54. One side wall of the bifurcation 52 is formed with an arcuate slot 55 and the mem-

ber 53 is provided with a limiting stop 56 which projects into this slot. This limiting stop is preferably in the form of a screw. It will be seen that this stop 56 prevents any complete rotation of the member 53 but permits the member to have a movement through an arc of about 40°. The member 53 is formed with a pin receiving recess 57 and the limiting stop 56 is so disposed that it acts as a set screw for a pin received in said recess 57. The rule or straight edge 48 is formed with a pin 58 adapted to be inserted in the recess 57 and to be engaged by the set screw 56 which forms the stop as before described. The reason for this flexible joint is as follows: The outer end of each rod 45 is supported at a height above the table or other surface upon which the curve is to be drawn, and as a consequence, all of the rods extend downward from their butt ends. As a consequence, the head 49 must be pivoted so that it may lie flat upon or parallel with the surface of the table so that the rule or straight edge 48 may be held at right angles to the surface of the table. It will be obvious that the angle taken by the head 49 will change as the rod is drawn inward or outward, but that by means of the pivotal joint between the head and the end of the rod, the head can lie flat upon the face of the paper, no matter how far in or how far out from the base the corresponding rod may be disposed. Inasmuch as the rods 45 are intended to be turned at various angles and to be adjusted in or out to describe irregular curves by means of the straight edge 48, it is necessary that the straight edge be not rigidly carried upon the end of the head but that it may be so mounted that the straight edge may take any desired angle with regard to the line of any one rod 45, and it is to this end that I have provided the rotatable socket member 53 with its angular movement through an arc of about 40°. The operation of my device is as follows: It will be plain from the foregoing description that the rods 45 have four movements relative to the base. Thus they may be rotated with the barrel 18 in a horizontal plane; the rods may be also rotated in a vertical plane; they may be shifted longitudinally relative to the barrel and the base, and any rod or all of the rods may be shifted along the base to any desired position relative to each other. The rods are set in any longitudinal adjustment by means of the spring jaws or clamps 24 and 25 and may be held in any desired rotated adjustment by means of the screw 60 which passes down through the upper plate 10 of the carrier 8 adjacent to the aperture receiving barrel 18. By setting the screw inward, the barrel may be locked from any rotation, while by loosening the screw, the barrel may be easily rotated. The ver-

tical movement of the rod is entirely free and requires no adjusting means as it is simply intended to permit the headed end of the rod to drop downward so that it will lie upon the paper or other object upon which the curve is to be drawn. It will be obvious that this object or surface might be higher than the base or lower than the base, and that the rule carried upon the headed ends of the rods would still be properly applied to the surface and would lie at right angles thereto. By adjusting the rods in or out with relation to the carriers upon which the rods are mounted, it will be seen that any desired curve may be given to the rule and that this curve may be a simple curve or a compound curve.

In my former Patent, No. 962,896, before referred to and upon which this is an improvement, I illustrated a base within which the rods were mounted, the rods, however, not being adjustable along the base but held at spaced intervals. While this was a proper arrangement for many curves, there were a number of curves which could not be made with the construction disclosed in said patent. With my present construction it is possible to shift the rod carriers nearer together so that a curve of relatively short radius may be drawn. Furthermore, the construction illustrated in this present application not only permits the rod carriers to be shifted to any desired position relative to each other, but also permits the rod carriers to be entirely removed from the base frame so that the carriers may be placed upon a drawing board or other surface without reference to the frame and held in position thereon in any suitable manner with the rods adjusted so as to provide for the drawing of curves or forms not possible where the carriers are fixed in a base so that sine curves, zigzag and other irregular outlines may be formed by the rule. It is not believed to be necessary to enumerate all the curve or other outlines to which the flexible rule may be made to conform by means of my invention as these will be obvious to any draftsman. It is, of course, obvious that a number of different flexible rules will be provided with each instrument, these rules being of different thicknesses and lengths so that they will have more or less flexibility and be adapted for various work.

While the device is adapted for ordinary drafting, laying out working drawings, etc., it may be also made of such size as to be used in drawing large plans or plots, as for instance the working drawings of ship construction, to which the device is peculiarly applicable.

What I claim is:

1. A plotting instrument including a plurality of rod carriers, rods, each mounted for independent rotation in a plurality of planes

in a corresponding carrier, said rods being independently adjustable longitudinally in the carriers, and a flexible rule having a universal joint connection with said rods.

5 2. A plotting instrument including a plurality of rod carriers, rods, each mounted for independent rotation in a plurality of planes in a corresponding carrier, said rods being
10 therein, a flexible rule, and a head pivotally mounted on the terminal end of each rod for movement in a vertical plane and connected to said rule.

3. A plotting instrument including a plurality of rod carriers, rods, each mounted for independent rotation in a plurality of planes in a corresponding carrier, said rods being
15 independently adjustable longitudinally therein, a flexible rule, and a head pivotally mounted on the terminal end of each rod for movement in a vertical plane and hingedly connected to said rule.

4. A plotting instrument including a plurality of rod carriers, rods, each mounted for independent rotation in a plurality of planes in a corresponding carrier and said rods being
25 each independently adjustable longitudinally therein, and a flexible rule detachably connected at a plurality of points to said rods.

5. A plotting instrument including a plurality of rod carriers, rods, each mounted for independent rotation in a plurality of planes in a corresponding carrier, said rods being
35 independently adjustable longitudinally therein, a flexible rule having a plurality of pins projecting therefrom, and a head pivotally mounted on the terminal end of each rod and having a socket for the reception of the corresponding pin.

6. A plotting instrument including a plurality of rod carriers, rods, each mounted for independent rotation in a plurality of planes in a corresponding carrier, said rods being
45 independently adjustable longitudinally therein, a flexible rule having a plurality of pins projecting therefrom, a head pivotally mounted on the terminal end of each rod and having a socket for the reception of the corresponding pin, and a set screw passing through the head and into said socket for engaging said pin.

7. A plotting instrument including a plurality of rod carriers, rods, each mounted for independent rotation in a plurality of planes in a corresponding carrier, said rods being
55 independently adjustable longitudinally therein, a head pivotally mounted on each rod for movement in a vertical plane, a member rotatably mounted in each head for movement in a plane at right angles to the pivotal movement of the head, a flexible rule, and a detachable connection between the rule and each of said rotatable members.

8. A plotting instrument including a plu-

70 rality of rod carriers, rods, each mounted for independent rotation in a plurality of planes in a corresponding carrier, said rods being independently adjustable longitudinally therein, a head pivotally mounted on the terminal end of each rod for movement in a vertical plane, one side of the head being formed with an arcuate slot, a member rotatably mounted in each head and having a radially disposed socket, a limiting screw
75 passing through the slot in each head and into said socket, and a flexible rule having a plurality of pins adapted to be received in said sockets and to be engaged by said screws.

9. A plotting instrument including a flexible rule, a plurality of rods, each connected by a universal joint with said rule, and a plurality of carriers, one for each rod in which the rods are slidingly mounted for
85 rotation in a plurality of planes.

10. A plotting instrument including a flexible rule, a plurality of rods, each connected to said rule by a universal joint, a plurality of carriers, one for each rod, a rotatable barrel mounted in each carrier for rotation in a horizontal plane, each rod passing through a corresponding barrel and being longitudinally adjustable therethrough and rotatably mounted therein for move-
95 ment in a vertical plane.

11. A plotting instrument including a base, a plurality of independent rod carriers slidingly mounted in the base, a flexible rule, and a plurality of rods jointed to the flexible rule and each passing through a corresponding carrier, said rods being independently rotatable in the carriers in an approximately horizontal plane.

12. A plotting instrument including a base, a plurality of rod carriers slidingly mounted therein, a barrel in each carrier rotatable in a horizontal plane, a flexible rule, and a plurality of rods extending from the rule and passing one from each of the barrels and longitudinally adjustable therein.

13. A plotting instrument including a base, a plurality of rod carriers slidingly mounted therein, rotatable barrels in each carrier rotatable in a horizontal plane, a flexible rule, and a plurality of rods extending from the rule and passing one through each of the barrels and longitudinally adjustable therein, each of said rods being mounted for vertical rotative movement in the corresponding barrel.

14. A plotting instrument including a flexible rule, a plurality of rule supporting rods extending from the rule, and a base in which said rods are rotatably supported for movement in an approximately horizontal plane, the rods being each independently adjustable along the base and each longitudinally adjustable with reference thereto.

15. A plotting instrument including a

flexible rule, a plurality of rule supporting rods extending from the rule, and a base in which said rods are rotatably supported, the rods being each independently adjustable along the base, each longitudinally adjustable with reference thereto, and each rotatably adjustable in an approximately horizontal plane, means for holding each rod in any rotatably adjustable position, means for holding each rod in any longitudinally adjusted position, and means for holding the rods in any adjusted position along the base.

16. A plotting instrument of the character described including a base composed of a plurality of parallel bars, said bars being arranged to define a prismoidal space, and a cubical carrier having sliding movement along said bars of the base, a clamp mounted on the carrier, a flexible rule, and a rule carrying rod adjustably mounted in said carrier.

17. A plotting instrument including a base composed of a plurality of spaced bars, a carrier slidably mounted on said bars, the carrier and bars having tongue and groove engagement with each other, a rod slidably mounted in said carrier, rotatably mounted therein for movement in either a vertical or a horizontal plane, a flexible rule attached to said rod, and means for holding the rod in any adjusted position relative to the carrier.

18. A plotting instrument of the character described including a base compris-

ing a plurality of longitudinally extending spaced bars, end pieces detachably connected to the bars and holding them spaced apart, a plurality of shiftable carriers mounted between said bars and engaging the same, a rotatable barrel in each carrier, rod clamping devices mounted within each barrel, a flexible rule, and a plurality of rods having sliding engagement with each barrel and pivotally connected to the flexible rule.

19. A plotting instrument of the character described including a base composed of a plurality of spaced bars, a plurality of carriers, each independently mounted for sliding movement on said bars, a rotatable rod clamp vertically disposed in each carrier and comprising oppositely disposed clamping members, means mounted on each carrier for wedging said clamping members apart, springs in each carrier acting to force the clamping members toward each other, rods extending one through each carrier and disposed between the clamping members and engaged thereby, each of said rods having rotary movement in a vertical plane in its corresponding carrier, and a flexible rule carried upon the ends of the rod.

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

ANTON GASPARICH. [L. s.]

Witnesses:

T. C. TILLMAN,
WM. H. KRONING.