

[54] **DRAWING HEAD FOR USE IN  
DRAWING DEVICES**

[72] Inventor: **Evgeny Mikhailovich Perminov**, ulitsa Angarskaya, 26, korpus 1, kv. 10, Minsk, U.S.S.R.

[22] Filed: **July 22, 1970**

[21] Appl. No.: **57,132**

[30] **Foreign Application Priority Data**

Aug. 14, 1969 U.S.S.R. .... 1358215

[52] U.S. Cl. .... 33/79 R

[51] Int. Cl. .... B43I 13/02

[58] Field of Search .... 33/79, 76

[56] **References Cited**

**FOREIGN PATENTS OR APPLICATIONS**

1,012,539 7/1957 Germany .... 33/79 R  
517,894 3/1955 Italy .... 33/79 A

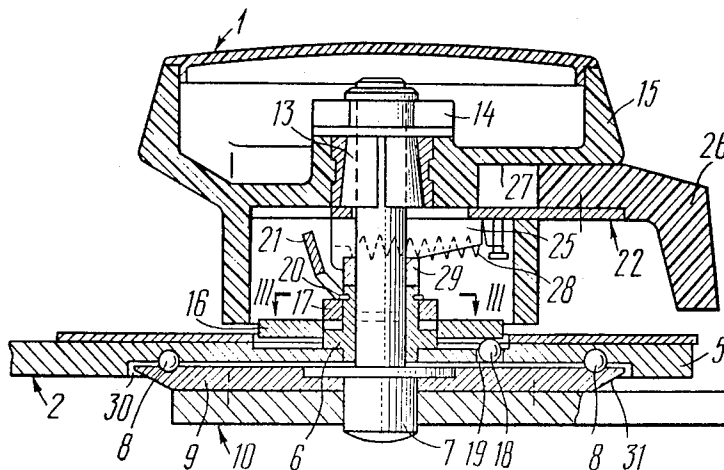
Primary Examiner—Harry N. Haroian  
Attorney—Holman & Stern

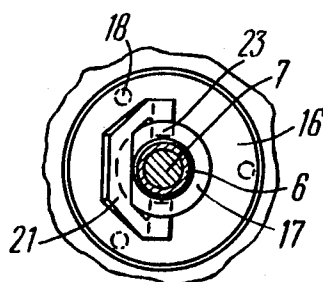
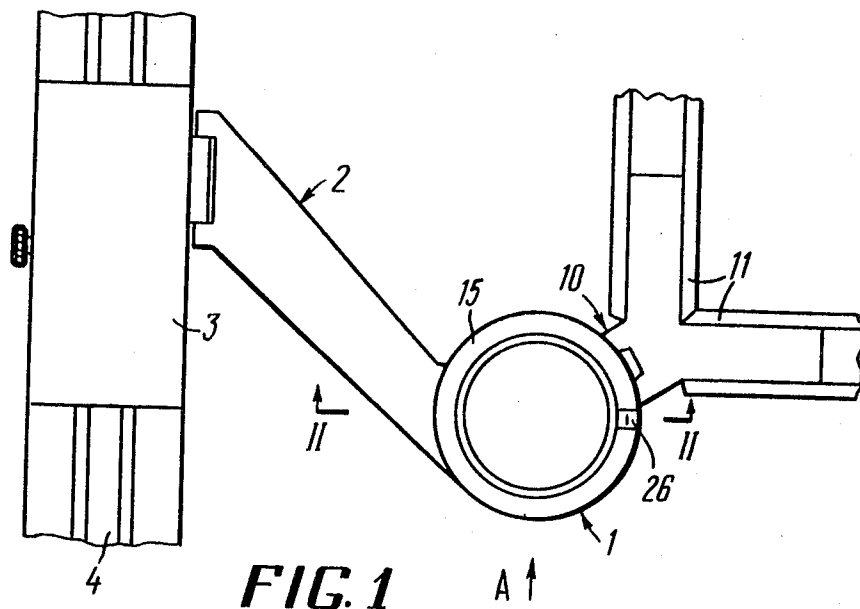
[57] **ABSTRACT**

A drawing head for use in dr00035in which a first flat member is, along with spherical bodies, integral with a bracket which connects the member with an arrangement used to move the head in the plane of a drafting board, and is rigidly fixed to a hub accommodating an axle. A second flat member is rigidly fixed to the axle and has cavities corresponding to the spherical bodies. The arrangement used to turn one flat member relative to the other member includes two washers mounted on the hub one above the other. With the first washer resting upon tappets disposed in openings in the first flat member, and resting upon the surface of the second flat member, and the second washer is mounted stationarily in the axial direction.

Arranged between the washers is a lever which acts upon the first washer in the course of its interaction with a spring-loaded clamp disposed in the casing of the head.

**2 Claims, 4 Drawing Figures**





INVENTOR  
 Evgeny Mikhailovich Perminov  
 By Holman & Stern  
 ATTORNEYS

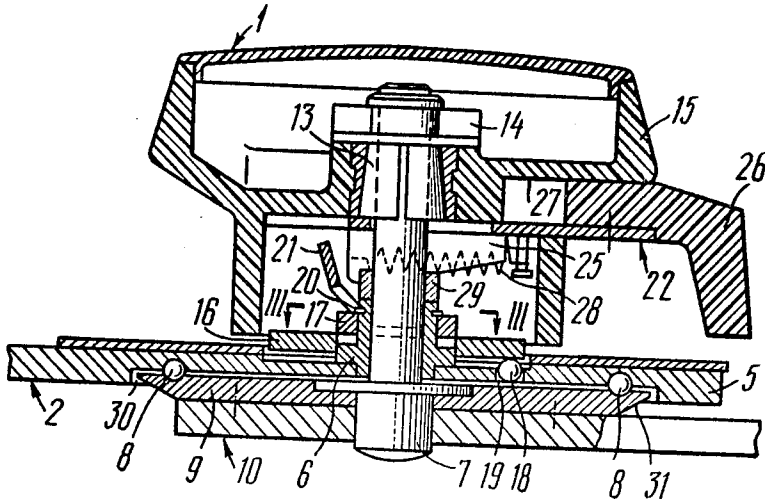


FIG. 2

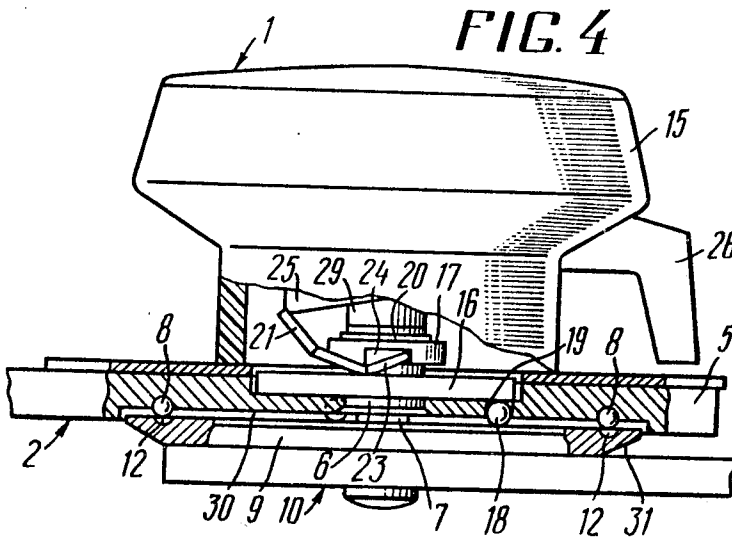


FIG. 4

INVENTOR  
 Evgeny Mikhailovich Perminov  
 By Holman & Stern

ATTORNEYS

## DRAWING HEAD FOR USE IN DRAWING DEVICES

The present invention relates to drawing devices and, more particularly, to drawing heads.

It is most expedient to use the present drawing heads in drawing devices in which, to be moved in the plane of the drafting board, the drawing heads are connected with carriages moving along guides, or in drawing devices in which the drawing heads are moved by means of a parallelogram system.

Known in the art are drawing heads for use in drawing devices, in which the first flat member having spherical cavities disposed on the surface thereof is connected through the intermediary of a bracket with an arrangement used to move them in the plane of the drafting board, for instance a carriage moving along guides. The other flat member is rigidly fixed to the drawing scales and to a hub accommodating an axle, with the hub being fixed in the casing of the head. Both the first and the second members are mounted on the axle.

The second flat member has through openings to receive spherical bodies interacting with the spherical cavities of the first flat member and the spherical bodies are essentially balls.

The axle has an arrangement disposed thereon and used to turn one flat member relative to the other.

The arrangement includes a spring-loaded push button and a pressure disc mounted on the axle in such a manner that the spring-loaded push button is disposed at one side of the axle, while the pressure disc is positioned at the opposite side of the axle under the second flat member.

The known drawing head does not ensure sufficient rigidity of fixation of the flat member connected with drawing scales with the flat member connected with the arrangement used to move the drawing head in the plane of the drafting board, which has a substantially great adverse effect on the precision of operation. This non-reliable fixation is due to the fact that the balls are pressed in the respective cavities by the direct force of a resilient member, and in this particular head by a compression spring mounted on the axle. As the balls interact with the cavities only by a part of the sphere whose height is much smaller than its radius, the balls, by overcoming the force of the spring, can easily leave the cavities under the action of a radial force arising as a result of contact of the drawing tool of the designer with the working edges of the drawing scales.

In case the drawing head has a spring of a greater rigidity installed therein, it will be more difficult for the designer to effect control over the turning of the drawing head. In addition, with the push button disposed directly on the axle of the drawing head, it is more inconvenient for the designer to control the drawing head.

The abovementioned disadvantages considerably decrease the operating qualities of the drawing head.

It is an object of the present invention to eliminate the abovementioned disadvantages.

## SUMMARY OF THE INVENTION

The main object of the present invention is to provide a drawing head to be used in drafting machines, in which the arrangement used for turning one flat member relative to the other provides for a rigid fixation of one flat member with respect to the other, as well as for a high precision of the turning.

This object is accomplished in that in a drawing head for use in drawing devices, in which the first flat member connected through the intermediary of a bracket with an arrangement used to move it in the plane of the drafting board, and the second flat member connected with drawing scales, are mounted on an axle arranged in a hub and lodged in the head casing, with the position of the first flat member being fixed relative to the second member by spherical bodies positioned therebetween, and the axle having an arrangement disposed thereon and used to turn one of the members relative to the other member, characterized in that the first flat member along with the spherical bodies is integral with the bracket and

rigidly fixed to the hub accommodating the axle, and the second flat member is rigidly fixed to the axle and is provided with cavities corresponding to the spherical bodies, with the turning arrangement having two washers disposed on the hub one above the other, the first washer resting upon tappets lodged in the openings in the first flat member and the second washer being mounted stationarily in the axial direction, the washers having a lever disposed therebetween and acting upon the first washer in the course of its interaction with a spring-loaded clamp positioned in the casing of the head.

It is expedient to fashion the spring-loaded clamp as a wedge movable in a transverse direction relative to the axle and being slidable by its wedge-shaped surface along an insert positioned on the axle above the hub and interacting by its butt end face with the lever.

This embodiment of the spring-loaded clamp provides for a rigid connection of the second flat member with the first member, as well as for its convenient disposition on the drawing head.

Other objects and advantages of the drawing head will become apparent from the following description of a specific exemplary embodiment of the present invention given with reference to the accompanying drawings, in which:

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 shows a general view of the drawing head according to the present invention;

FIG. 2 is a view taken along line II—II of FIG. 1, the view looking in the direction of the arrows and being on scale;

FIG. 3 is a view taken along line III—III of FIG. 2, the view looking in the direction of the arrow, and

FIG. 4 is an enlarged view looking in the direction of arrow A of FIG. 1, and being partly in elevation and partly in section.

## DETAILED DESCRIPTION OF THE DRAWINGS

A drawing head 1 (FIG. 1) is mounted on a bracket 2 which is connected with an arrangement 3 used to move the head 1 in the plane of a drafting board (not shown in the drawings), with the arrangement being in this particular case, a carriage moving along a guide 4.

The bracket 2 is made integral with a first flat member 5 and this embodiment considerably simplifies the design of the head. An opening is provided in the member 5 and a hub 6 (FIG. 2) is inserted therein and rigidly fixed to the member. An axle 7 passes through the hub 6 and disposed in the member 5 over a preset radius from the axle 7 are spherical bodies which, in this particular case, are balls 8. The balls are securely embraced by the material of the bracket 2 along the whole surface thereof to a depth exceeding the radius of the balls 8.

Rigidly fixed to the lower end of the axle 7 are a second flat member 9 and a square 10 mounting drawing scales 11. The flat member 9 is essentially a dividing member of the drawing head 1. The disc 9 has an annular salient groove disposed on the surface thereof defined by a continuous row of spherical cavities 12 spaced from the center of the axle 7 over the same radius as the balls 8 of the flat member 5. The angle between two adjacent cavities 12 is equal to 5°, which increases the number of fixed positions of the drawing scales 11.

The provision of the salient grooves is not considered here as this constitutes the subject-matter of another application.

Secured in the upper portion of the axle 7 by means of a clutch 13 with a nut 14 is a casing 15 accommodating an arrangement used for turning the flat member 9 relative to the flat member 5. The arrangement includes two washers 16, 17 disposed on the hub 6 one above the other. The washer 16 is loosely fitted on the hub 6 and rests upon tappets 18 lodged in openings 19 in the first flat member 5, with the tappets in this particular case being balls.

The washer 17 is stationarily fixed in the axial direction, and for which purpose the hub 6 has a locking ring 20 mounted

thereon. A lever 21 is positioned between the washers 16 and 17 and acts upon the washer 16 in the course of its interaction with a spring-loaded clamp 22.

The lever 21 is defined by a clip having ends 23 (FIG. 3) disposed in slots 24 (FIG. 4) provided in the washer 17.

The spring-loaded clamp 22 is essentially a wedge 25 movable in a transverse direction relative to the axle 7. The wedge is rigidly fixed to a button or operating member 26 which extends through a slot 27 formed in side of the casing 15.

The wedge 25 has a U-shaped cross section and is spring-loaded by a spring 28. By its wedge-shaped surface, the wedge 25 rests upon an insert 29 having chamfers with the aid of which it interacts with the wedge-shaped surface of the wedge 25 and the insert is disposed on the axle 7 above the hub 6.

To prevent foreign particles, which may effect the precision of operation of the drawing head from entering between the flat members 5, 9, the surface of the first flat member 5 has a recess 30 which receives the second flat member 9 having a circular chamfer 31.

The drawing head for use in a drawing device operates as follows:

In the initial position, the button 26 and the wedge 25 rigidly fixed thereto by the spring 28 are held in the extreme right position, whereby the axle 7 is disposed in the extreme upper position and the balls 8 interacting with the cavities 12 prevent the dividing disc 9 and the members connected thereto from turning relative to the bracket 2.

The turning of the drawing scales through a preset angle is effected in the following manner:

By moving the button 26 inwardly the wedge 25 is moved to the left and as a result, a gap is formed between the wedge 25 and the insert 29 until the butt end of the wedge 25 starts to coact with the lever 21. With the lever 21 being acted upon by the wedge 25, the lever, while turning in the slots 24 of the washer 17, presses upon the washer 16 and via the tappets 18 moves aside the dividing disc 9 until the balls 8 completely leave the cavities 12.

With the casing 15 rigidly fixed through the intermediary of the axle 7 with the drawing scales 11 turned through a preset angle equal to 5°, the button 26 is released.

Under the action of the spring 28, the wedge 25 is returned to its initial position and, while resting on the insert 29 moves the axle 7 upwardly relative to the hub 6 until the balls 8 completely enter the cavities 12.

The button 26 can be positioned at any angle relative to the drawing scales 11, by loosening the nut 14, turning the casing 15 of the head about the axle 7 through such an angle when the button 21 occupies the most convenient position for the designer, and tighten the nut 14 on the clutch 13.

Experimental samples of drawing heads made in accordance with the present invention, when used in drawing devices, reliably fix the position of one flat member relative to the other, ensure a high precision of turning of the latter, and are very convenient in use.

I claim:

1. A drawing head for use in drawing devices, comprising means to move the head in the plane of a drafting board, a bracket connecting the drawing head to said means; a first flat member having spherical bodies; said member being integral with said bracket; a hub rigidly fixed to said first flat member; an axle extending through said hub; a casing for the head having said axle mounted therein; a second flat member rigidly fixed to said axle and having cavities corresponding to said spherical bodies; a second arrangement to turn the second flat member relative to the first one, said second arrangement being disposed on said axle and comprising a first washer positioned on said hub, a second washer positioned above said first washer on said hub stationarily relative to the latter in an axial direction, tappets disposed in openings in said first flat member upon which said first washer rests; said tappets resting upon said second flat member, a spring-loaded clamp accommodated in said casing, and a lever positioned between said washers and acting on said first washer in the course of its interaction with said spring-loaded clamp.

2. The drawing head as claimed in claim 1, in which the spring-loaded clamp is essentially a wedge movable in a transverse direction relative to the axle, and an insert disposed on the axle above the hub along which the wedge-shaped surface of the wedge is slidable, and interacting with its butt end face with the lever.

\* \* \* \* \*

45

50

55

60

65

70

75