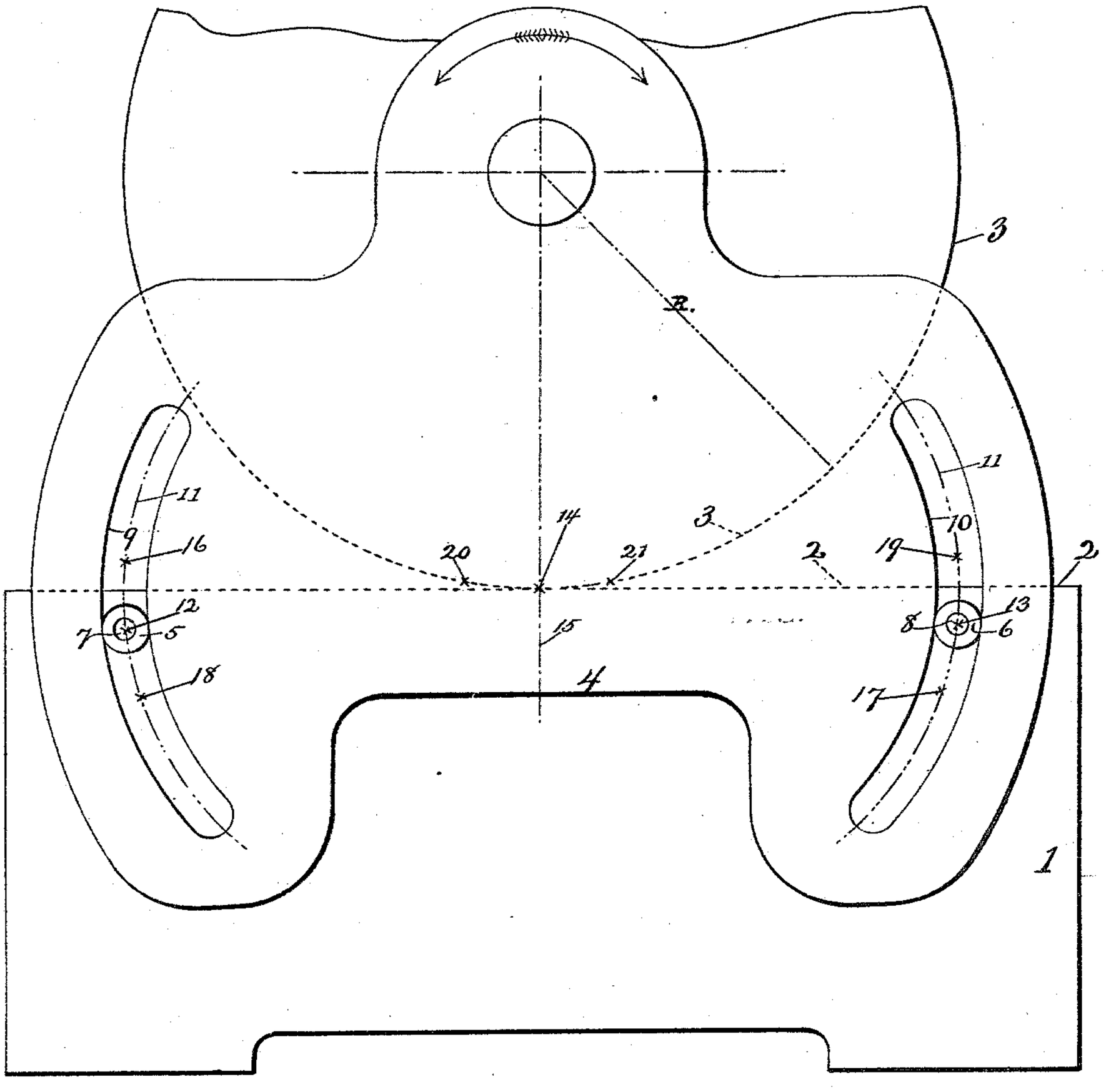
(No Model.)

J. THOMSON.

MECHANICAL MOVEMENT.

No. 331,845. Patented Dec. 8, 1885.



Witnesses:
F. L. Freeman
Wm. F. Sayers.

Inventor:
John Thomson.

UNITED STATES PATENT OFFICE.

JOHN THOMSON, OF BROOKLYN, NEW YORK.

MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 331,845, dated December 8, 1885.

Application filed April 29, 1885. Serial No. 163,897. (No model.)

To all whom it may concern:

Be it known that I, JOHN THOMSON, of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Mechanical Movements, of which the following is a specification.

This invention refers to mechanical movements.

The object of my invention is to control and insure the proper action of a curved body rolling upon a plane, or vice versa, or the arc of a curve upon another arc—that is to say, the contact of the surfaces shall be "rolling contact" without abrasion, and without the possibility of being slipped one upon the other.

The drawing is a diagram elevation illustrating the principles involved whereby to obtain the object named, in which 1 is a base having a plane surface, 2; and 3, a curved portion resting upon the said plane surface. Attached to or formed as a part of the curved portion is a projecting lug or cheek, 4. The said curved portion is shown in the figure as the arc of a circle. In the side of the base, preferably as near as may be to its plane surface, are two friction-rollers, 5 6, which are journaled on studs or pins 7 8. These rollers operate in the cams 9 10, formed, as already stated, in the lug or cheek of the arc, which are thus in effect one part. It will now be apparent that if the arc be rolled back or forth upon the plane the character of the action—that is, whether rolling on the plane or a combination of rolling and sliding—will be governed entirely by the shape of the cams; but as the end here sought is to maintain a perfect rolling action, the mathematical condition necessary to effect this is, that only one point in the curvilinear planes 11 of the cams shall coincide with but a single point on the surfaces of the arc and the plane on which the arc rolls—that is, by demonstration, the points in the planes at 12 13 bisecting, if it may be so expressed, the center of the rolls can only be at that position when the point 14 of the arc is in the vertical line 15 of the plane. With the points 16 17 or 18 19 bisecting the centers of the rolls we should then find the points 20 21 of the arc in the vertical line, and so on. As there is but one system or class of curves known which meets this condition, the statement of the problem in effect answers it—namely, that the required form of the cam or cams shall be that of a cycloidal curve, in the projection of which the arc is the generating-circle, the plane surface is tangent of the generating-circle, and the fixed roller the describing-point. I have just referred to the required form of curve as a "system or class." This is correct, as in that the curve of the cams would only be a cycloid in its strictest interpretation when the center of the friction-rollers exactly coincided with the plane on which the arc rolls; but as the principle involved in the projection of the curve is the same in any instance, whether the describing-point be on the circumference of the generating-circle or within or without the said circumference, or be the point in the plane on which the generating-circle rolls or above or below it, or whether the plane were also a curved surface, in which instance the curve would be an epicycloid, the result produced would be one and the same in every instance. The plane may be rolled upon the curve, in which case the friction-rollers would traverse the cams.

The term "plane," as herein employed, is used in its broadest sense, without limitation as to rectilinear or curvilinear projection. The friction-rollers might also be a part of the curved portion, the cams being fixed; but the arrangement shown—namely, the cam or cams as a part of the curve and the rollers stationary—is the better, in that they remain fixed with respect to the plane and present a uniform point of resistance against abrasive action. One cam and one roller will effect the same result as the two shown in the figure.

This device is applicable to all vibrating rolling movements, and, besides insuring a perfect rolling contact, the parts are practically locked one to the other, as if geared, but without the abrasive friction of gearing.

The studs 7 or 8 may be used alone without the rollers, in which case they are of sufficient diameter to fit the cams 9 10.

I claim—

1. The method of controlling the rolling action of a curved surface upon a plane, which consists in connecting one to the other by a cam, and a roller or stud acting in the cam, the form of the said cam being that of a cycloidal curve, substantially as specified.

2. The method of controlling the rolling action of a plane upon a curved surface, which consists in connecting one to the other by a cam, and a roller or stud acting in the cam when the form of the said cam is that of a cycloidal curve, substantially as specified.

3. The method of maintaining rolling action between a curved surface and a plane, which consists in connecting one to the other by a cam and a roller, the form of the cam being such that the curve and the plane are prevented from slipping one upon the other, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN THOMSON.

Witnesses:
JAMES WHITFORD,
CHARLES E. FOSTER.