

No. 672,193.

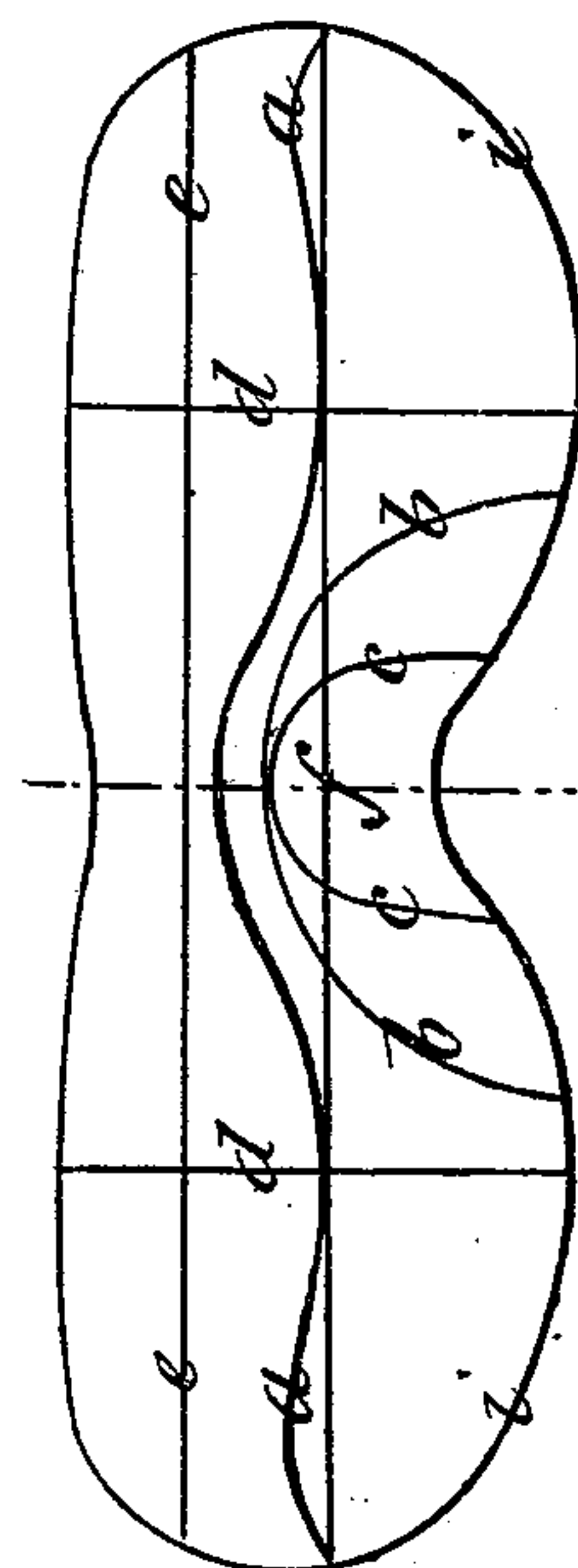
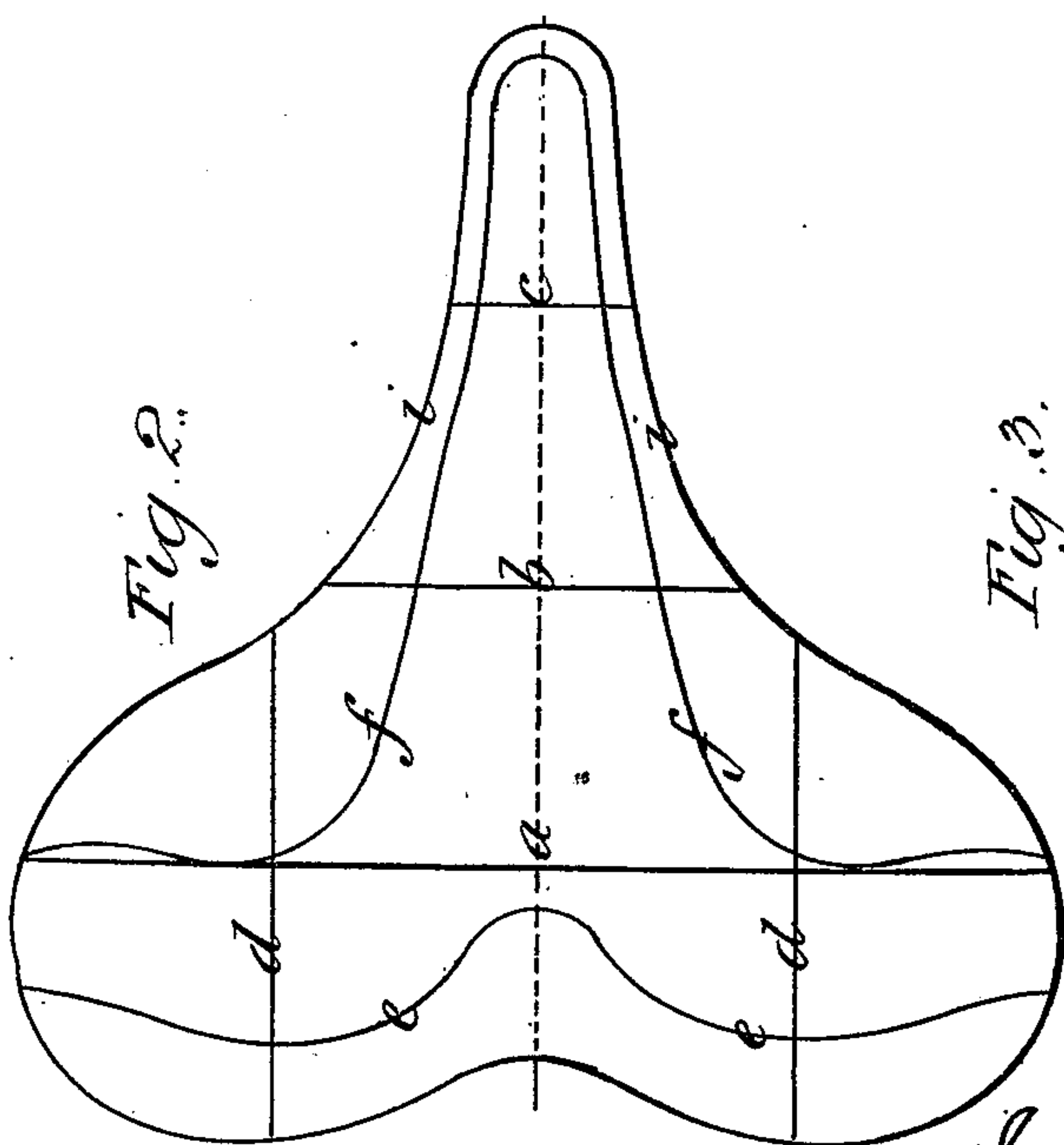
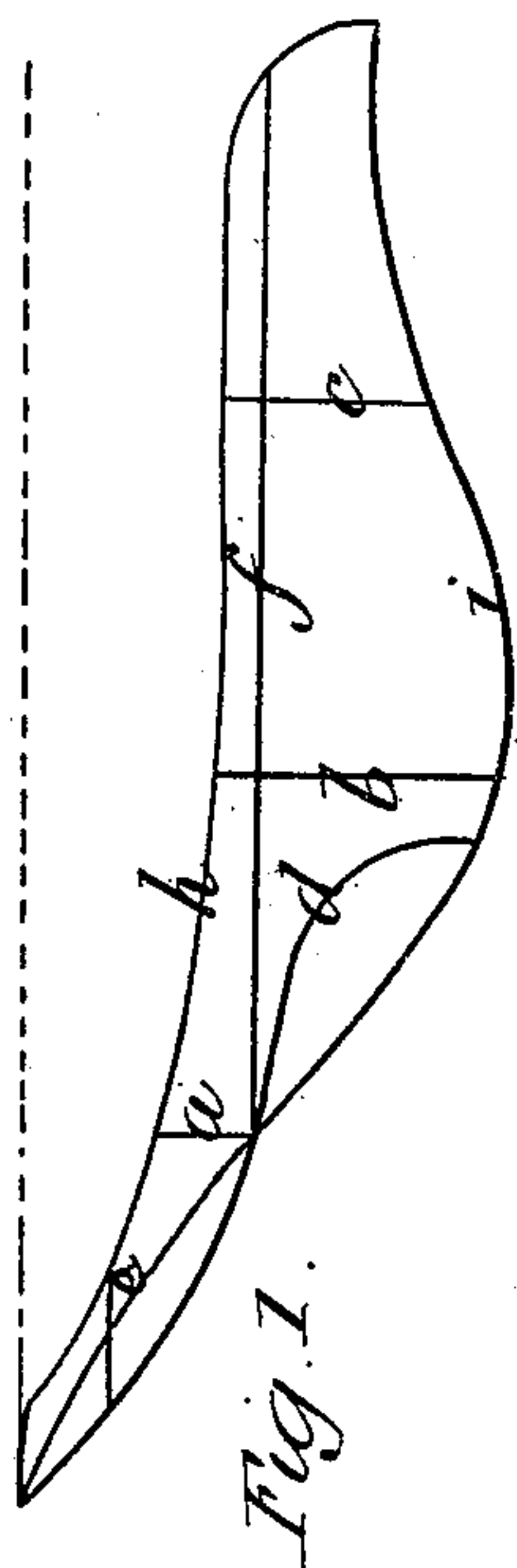
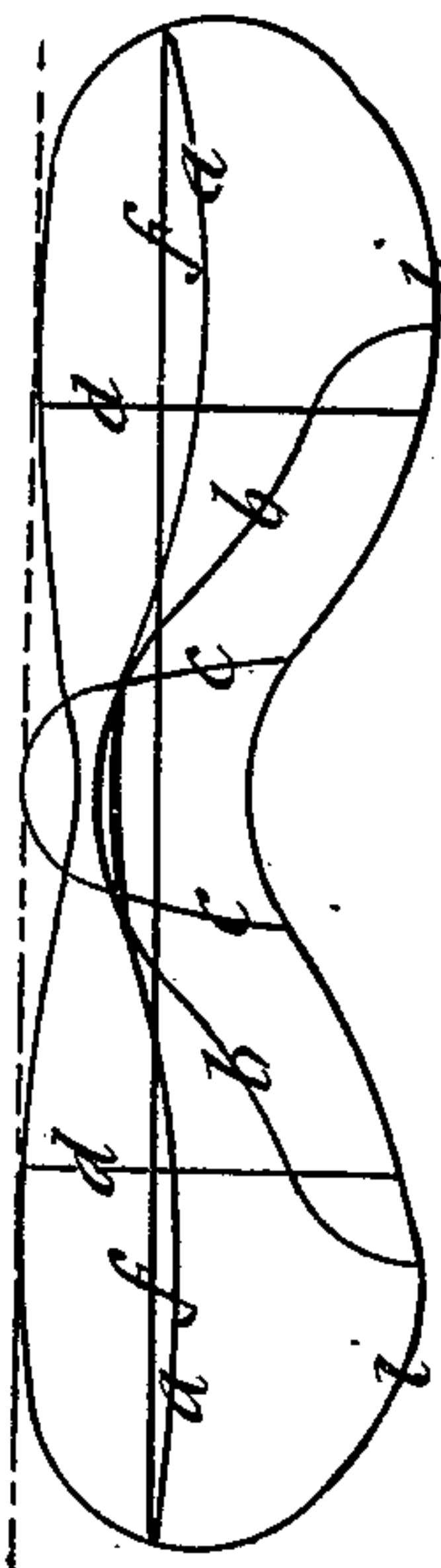
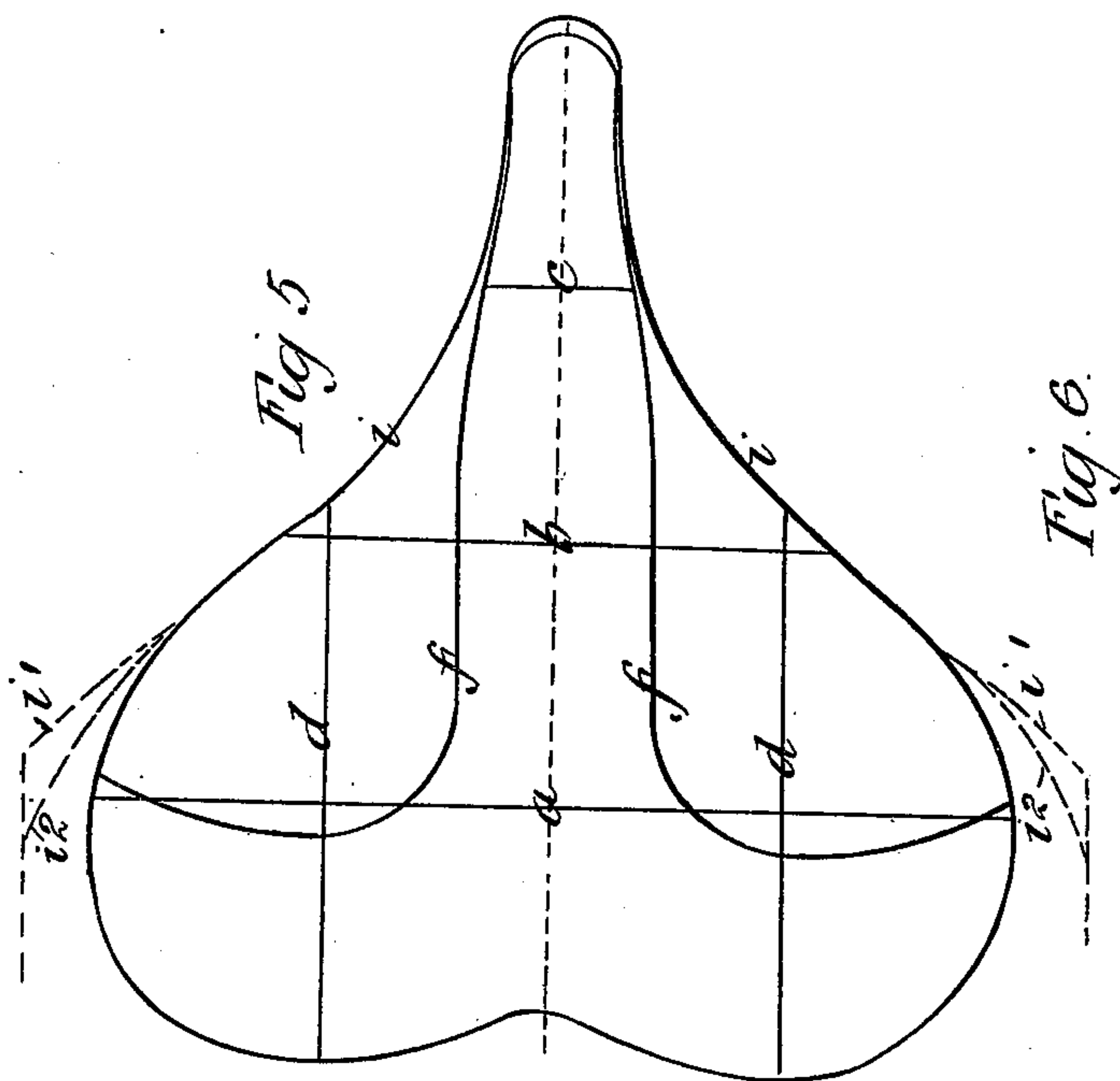
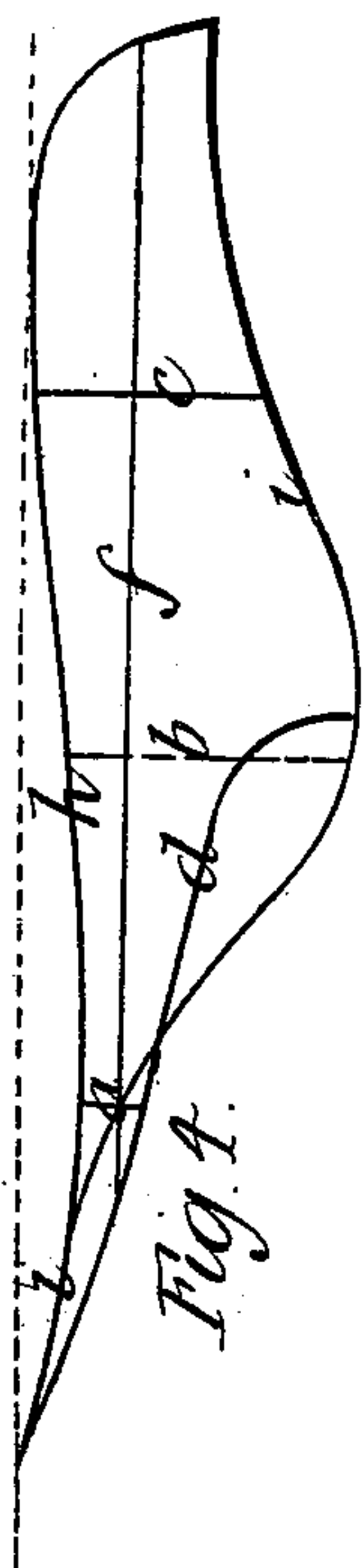
Patented Apr. 16, 1901.

D. McK. McKINLAY.

METHOD OF FINDING SURFACE FORMS FOR CYCLE SADDLES.

(Application filed Dec. 30, 1897.)

(No Model.)



Witness:  
Herbert Bradley  
Edward K. Allen.

Inventor  
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Attys



# UNITED STATES PATENT OFFICE.

DUNCAN MCKENZIE MCKINLAY, OF GRANDSABLE, SCOTLAND.

## METHOD OF FINDING SURFACE FORMS FOR CYCLE-SADDLES.

SPECIFICATION forming part of Letters Patent No. 672,193, dated April 16, 1901.

Application filed December 30, 1897. Serial No. 664,723. (No model.)

*To all whom it may concern:*

Be it known that I, DUNCAN MCKENZIE MCKINLAY, artist, a subject of the Queen of Great Britain and Ireland, and a resident of Grandsable, Polmont, county of Stirling, Scotland, have invented certain new and useful Improvements in Methods of Finding Surface Forms for Cycle-Saddles, (for which I have obtained patents in Great Britain, No. 16,573, bearing date July 27, 1896, and No. 10,849, bearing date May 1, 1897,) of which the following is a specification.

My invention consists in the features of novelty hereinafter described and claimed.

In order that my invention may be fully understood, I will proceed to describe it with reference to the accompanying drawings, in which—

Figure 1 is a side view of a surface form for a male racing-saddle. Fig. 2 is a top view thereof. Fig. 3 is a front view of the same. Fig. 4 is a side view of a surface form for a male roadster-saddle. Fig. 5 is a top view thereof. Fig. 6 is a front view of the same.

In the various figures of the drawings the same reference-letters refer to similar parts throughout.

In carrying out my invention, to arrive at the form required I proceed as follows: Two pieces of wood about eleven inches long, ten inches broad, and one inch thick are fastened together, with the grain of one piece running across that of the other piece. A central line is drawn, and at one end the width of the peak of the saddle is marked off by two parallel lines. The width of the peak should not be guessed at, but measured from a person with well-formed legs, sitting in the position occupied when riding. The curve *i* in Fig. 5 corresponds with a horizontal section of a leg of the rider when the thigh occupies the position nearest to the perpendicular in the course of a revolution of the pedal. This curve is found with great care, either mechanically or geometrically. The curve joining this curve with the sides can only be found experimentally, in the following manner: Continue the curve *i* in the direction shown by the dotted line *i'*. Now saw the board to the shape described by these lines and place it in the position of the saddle on the bicycle. The bicycle should be suspended or supported off

the floor to facilitate the succeeding operations, being stayed to retain it in a fixed vertical position. The position of the saddle varies according to the purpose of the rider. The racing man likes the saddle so placed that the line *a* in Fig. 1 is plumb with the pedal when at the farthest-back point, the tourist so that the dotted line *b* in Fig. 4 is plumb with that point. Ladies have hitherto kept their saddles somewhat behind these lines; but they are now adopting them as the easiest and most comfortable positions. The position of the handles should be provided for, racing men using the handles four or five inches below the level of their saddles, male tourists one or two inches above, while ladies, owing to the relative shortness of their arms, require the handles three or four inches higher than their saddles. The stretch of leg, governing as it does the height of the saddle, should be provided for.

Tourists, male and female, should be able to touch the pedal with the hollow of the sole when the same is at the most distant point. Racing men ride with one or two inches less stretch, the reason being that tourists ride with the flat of the toes on the pedal and racing men with the foot a little farther forward. All these points having been provided for and the saddle (represented by the board) placed accordingly, the rider seats thereon and drives the pedals. The rider will feel at once that the legs are caught all along the dotted line *i'*, as marked in Fig. 5. The rider comes off and the corner is rounded off. The form arrived at will be found to be that shown by the dotted line *i''* in Fig. 5. The back of the board may be left square. Upon the board a layer of modeling-clay or other suitable plastic material is now built up, taking care that the clay is of equal density throughout and neither too stiff or too soft, a condition which only experience can determine. The rider now seats on the clay and drives the pedals. Sooner or later, according to the condition of the clay, the whole surface will be in contact with the rider. The boundary of the back is now defined with the point of the finger and on the rider coming off a perfect mold of the surface form of the saddle required for the position adopted will be the result, requiring only the correc-



tion hereinafter described. Should the clay not have been of the right consistency, the operation will require to be repeated. To test the correctness of the mold, the clay should be slightly furrowed all over and the rider repeat the driving of the pedals. If on again coming off these furrows are equally obliterated all over, the shape may be assumed to be right. A mold is thus produced in contact with every part of the hips and perineum; but it is not desirable that the apex of the central ridge should touch the body. A slice is therefore taken off here. In Fig. 1 the part taken off started about the point *a* and gradually deepened as it approached the peak. It is not easy to describe all the differences in the molds illustrated; but the more important differences are apparent at a glance. Referring to the two male molds, the racing-saddle differs from the roadster-saddle very strikingly in the outline of the central ridge, as seen in elevation. In Fig. 1 the dotted line represents the horizontal line ascertained by a spirit-level. It will be seen that the ridge *h*, starting from this line, descends in a concave line and after passing the line *b* continues parallel with the horizontal line. In Fig. 4 the ridge *h*, starting below the horizontal line, gradually rises to that line. When it is borne in mind that the slice taken off has had the effect of modifying these differences, it is apparent that the original difference was very great. In Fig. 2 the line *d* is considerably shorter than the same line in Fig. 5, showing that the area for supporting the hips is less. The differences in the width of the ridges are well shown by the line *f* in these figures. The line *d* in Fig. 1 is more concave than the same line in Fig. 4. The principal difference between the male and female forms lies in the ridge, which is wider and flatter in the female. The features common to all are the concavities for receiving the hips, the concave lines for receiving the inner and posterior borders of the thighs, the contours at the sides and back as defined by the natural contours of the hips, and the concavity in the back border carrying the outline clear of the os coccyx. This last feature is of importance in a roadster-saddle if the rider is deficient in fat. From the clay molds obtained as described replicas are made in plaster-of-paris and being sup-

ported on a wooden base are attached to a bicycle and tested on the road. Though made of such inelastic material, they are found to be more comfortable than many a saddle. If any point catches the rider, it is reduced with a modeler's tool. In riding uphill the flexor muscles at the back of the thigh may touch the cast, as my molds have been made without them coming much into action. If so, the mold should be reduced. As hereinbefore stated, two pieces of wood about eleven inches long, ten inches broad, and one inch thick are fastened together, with the grain of one piece extending across the grain of the other piece. The object of this is to prevent the wood from warping from being in contact with the clay. The sizes of the boards are greater than the resulting shape of the saddle, as room must be allowed for a margin of clay at the back and sides. If then three sizes of riders—say of one hundred and twelve, one hundred and forty, and one hundred and sixty-eight pounds weight for females and one hundred and forty, one hundred and sixty-eight, and one hundred and ninety-six pounds weight for males—be chosen and molds be made from each, I shall have a series of molds which will fit all normally-formed persons, and, further, I have the means of finding the shape for any individual rider.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

The herein-described method of finding the surface form of a cycle-saddle for any rider in any attitude which consists in having the rider sit on a prepared base of plastic material and move the legs as the rider would act in working a bicycle to bring the whole surface of the material into contact with the rider, having the rider come off, and testing the correctness of the mold by slightly furrowing the mold all over, and having the rider sit upon the base again and then come off again; substantially as described.

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

DUNCAN MCKENZIE MCKINLAY.

Witnesses:

JOHN LIDDLE,

EDITH MARY EDMONDSTONE.