

(No Model.)

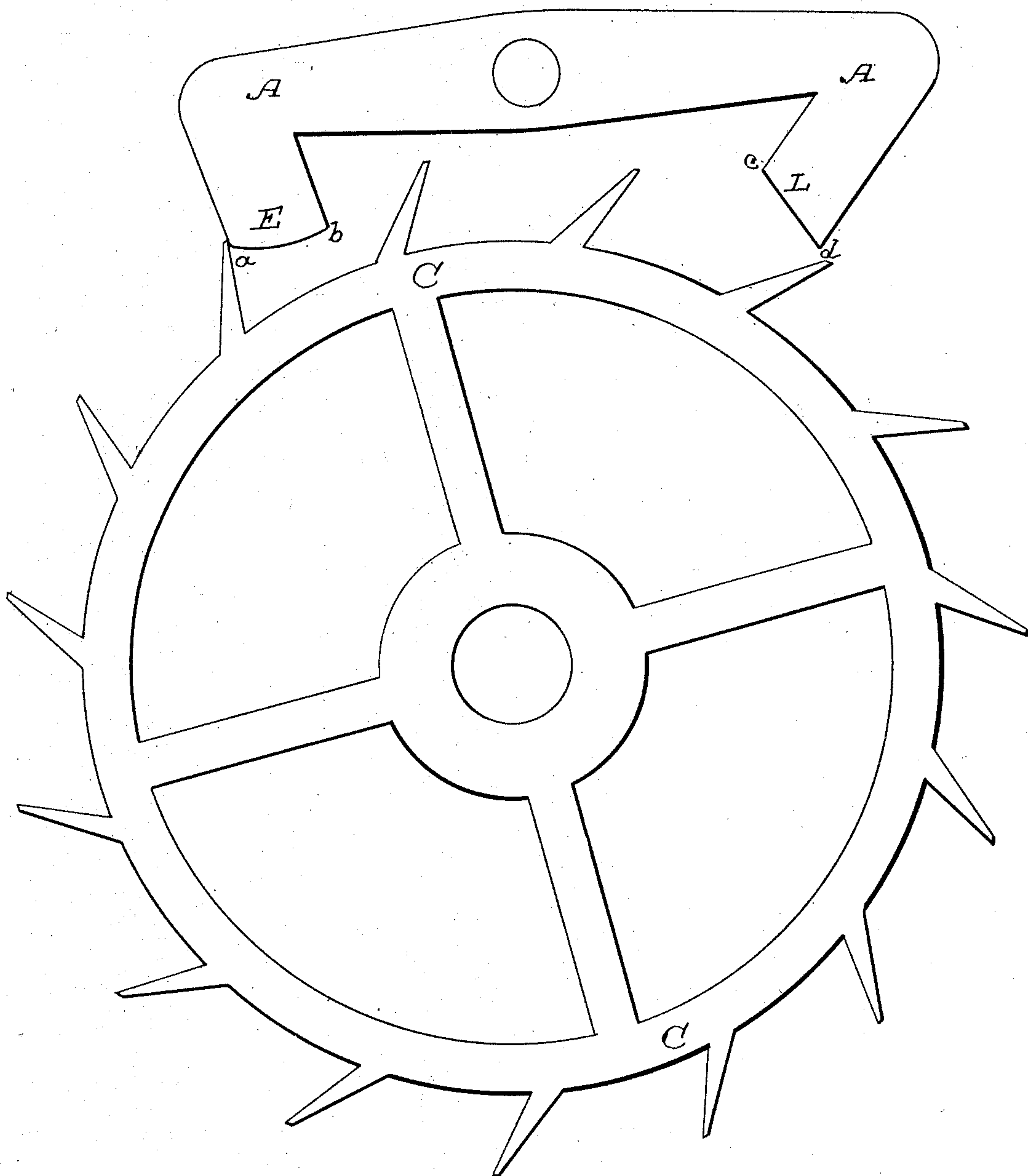
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J. H. LANGHORST.
TIMEPIECE ESCAPEMENT.

No. 504,223.

Patented Aug. 29, 1893.

Fig. 1.



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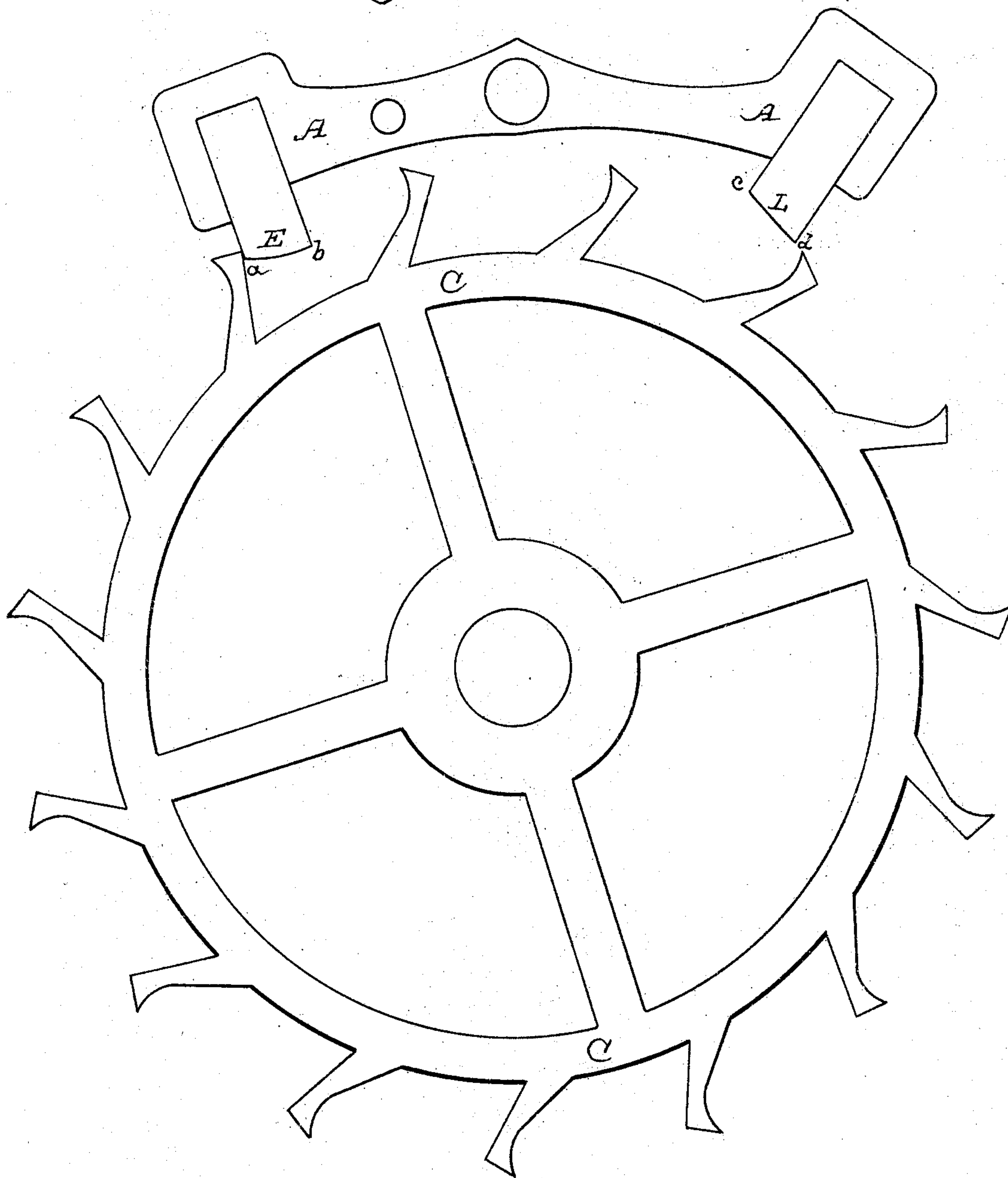
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Fig. 2



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UNITED STATES PATENT OFFICE.

JOHN HENRY LANGHORST, OF JACKSON, CALIFORNIA.

TIMEPIECE-ESCAPEMENT.

SPECIFICATION forming part of Letters Patent No. 504,223, dated August 29, 1893.

Application filed April 4, 1893. Serial No. 469,017. (No model.)

To all whom it may concern:

Be it known that I, JOHN HENRY LANGHORST, a citizen of the United States, residing at Jackson, Amador county, State of California, have invented an Improvement in Anchors for Lever-Escapements for Timepieces; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to the class of time pieces, and particularly to the class of anchors for detached lever escapements for watches, clocks and time pieces generally.

My invention consists in the novel construction of the acting faces of the receiving and leaving pallets of the anchor, as I shall hereinafter fully describe and specifically claim.

The object of my invention will hereinafter fully appear.

Referring to the accompanying drawings for a more complete explanation of my invention,—Figure 1 is a side elevation of a lever escapement in which the escape wheel is of the type known as "ratchet wheel." Fig. 2 is a side elevation in which the escape wheel is of the type known as "club wheel." In both figures my improved anchor is shown.

A is the anchor having a receiving or entering pallet E and a leaving pallet L. These pallets may be formed integral with the anchor, as shown in Fig. 1, or may be separate pieces inserted therein, as shown in Fig. 2, both of which constructions are usual.

The acting face of the receiving or entering pallet is represented by the line $a-b$, and it will be seen that this is a convex curve.

The acting face of the leaving pallet L is represented by $c-d$ and this, it will be seen, is a straight line.

C is the escape wheel.

It can be demonstrated that the allied impulse and resistance in anchor motion caused by the hair spring power is not equal on the entering and leaving pallet. The impulse of the hair spring acts during the first half of each impulse, and is greatest at the entering points a c , and is least at the middle of the acting faces of the pallets. The resistance of the hair spring acts during the latter half of each impulse, being greatest at the leaving

points b , d , and least at the middle of each pallet.

It can also be demonstrated that the force of momentum of the running power, transmitted by the escape wheel to the anchor pallets, is greatest at the point a of the entering pallet, and the point d of the leaving pallet, and is least at the point b of the entering pallet, and the point c of the leaving pallet, and this is on account of the different length of radii; that is the outer and inner radius of anchor pallet from center. It follows that at the point a on the entering pallet E, the greatest momentum of the running power is allied with the largest hair spring power, and that at the point b , the smallest momentum of force is allied to the larger hair-spring resistance, which causes an unfavorable, uneven impulse. On the other hand, on the leaving pallet at c , the smaller momentum of force of the running power is allied with the larger hair spring power, and at d the larger momentum of force of the running power is allied with the larger resistance of the hair spring power which causes a favorable and even impulse. I, therefore, change the incline of the pallet face on the entering pallet E to a convex curve, as shown, which permits more anchor motion during the first half of the impulse, and allows less anchor motion during the latter half of the impulse. The impulse power lost at the first half of the impulse is gained at the latter half, thereby approximately equalizing the impulse on the entering pallet E and on the leaving pallet L.

The construction which I have herein shown permits another advantage when the club wheel, as shown in Fig. 2, is used; that is the incline on the wheel tooth can be given the proper proportion, without the faces of the wheel teeth being chafed or gouged by the entering-pallet corner at a . On the leaving pallet corner at c , the wheel teeth have ample clearance. I, therefore, bring the convex pallet face $a-b$ approximately to the same condition as the straight pallet face $c-d$ of the leaving pallet, with respect to the angle of incline of pallet face with its respective tangents of the wheel circle. This improved construction of the anchor, when used with the

ratchet-wheel, permits no less transmission of impulse than any other, and has less resistance of force when in motion. It is, therefore, less liable to stoppage. With the club
5 wheel, it has the same advantage, and transmits decidedly more impulse. The particular anchor for either wheel can be accurately calculated.

Having thus described my invention, what
10 I claim as new, and desire to secure by Letters Patent, is—

An anchor for a lever escapement for time pieces in which the acting line for impulse on the lifting face of the receiving or entering

pallet is a convex curve, and the acting line 15 for impulse on the leaving pallet is a straight line, whereby the lifting power transmitted by the escape wheel is approximately the same on the entering or receiving pallet and on the leaving pallet, substantially as herein 20 described.

In witness whereof I have hereunto set my hand.

JOHN HENRY LANGHORST.

Witnesses:

I. B. GOLDNER,

G. A. WALTENSPIEL.