



LIV. Account of improvements for diminishing friction in clocks

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LIV. *Account of Improvements for diminishing Friction in Clocks.* By Mr. EDWARD MASSEY, of Henley, in Staffordshire*.

HAVING for a considerable time considered a method of diminishing the friction in escapements of pendulum clocks, which I conceive may be of great service in making better time-keepers, by relieving the pendulum from obstructions occasioned by friction in the train of wheels, and on the acting part of the pallets, I beg leave to lay before the Society for the Encouragement of Arts, &c. two escapements, which I have no doubt will answer the purpose intended. The difficulties which I propose to diminish in clock escapements, by this invention, are as follow:—First, it is allowed, that when the pressure against the recoiling escapement is diminished, as it is liable to be, from increase of friction in the wheel-work, the vibrations of the pendulum will not be performed in so short an interval. This circumstance has the contrary effect on a dead beat; for, when the pressure against the locking is the greatest, the vibrations will occupy a longer interval of time; so that the vibrations of the pendulum are liable to be affected from two causes—from an increase of friction on the acting part of the pallets, and from an increase or variation of friction in the train of wheels. These are the objects which I have bestowed great pains and expense to remove.

I beg leave therefore to give a description of two models of my improved escapement, that accompany this letter. First, a swing wheel is made, in the usual way of making it for a dead beat, except that it is not necessary to make the teeth with fine points. The pallets, instead of being fixed on the verge in the usual way, are fixed on two light detents, one on each side of the swing wheel. The lockings are on the inclined planes of the pallets, which are pressed against the teeth of the swing wheel by remontoiring springs, which should be under the command of the weight or main spring, so that if an increase of friction should take place in the wheel-work, the vibrations of the pendulum will not be much affected so long as there remains a power to raise the inclined planes. A momentum is communi-

* From the *Transactions of the Society for the Encouragement of Arts, Manufactures, and Commerce*, vol. xxi.—The society voted a bounty of fifty pounds to the inventor. Models are preserved in the society's repository.

cated to the pendulum through these inclined planes by two arms fixed on the verge, which come into contact with them, and unlock one on each vibration of the pendulum. Thus, suppose a momentum to have been given by the inclined plane on the right; at the same time that this takes place, the wheel moves forward and raises the inclined plane on the left, and the pendulum, having performed its oscillation to the left, receives a momentum from the inclined plane to compensate for the loss of power which would take place during the ensuing vibration to the right, and so on alternately. The advantage in this model consists, I conceive, in diminishing the friction in the acting part of the pallets, in giving a regular certain momentum, independent of any variation which may occur in the wheel-work, or on the acting part of the pallets, except during the short time of unlocking.

The second description, being a free pendulum without a verge, is as follows:—The swing wheel must be on the outside of the back plate. The pallets are formed like a pair of tongs, and are a fixture to the clock. There is a spring fixed in the upper part of the tongs, which keeps them extended against the points of the adjusting screws. The points of the tongs are pallets with inclined planes, and have lockings as the one above described. The tongs are made to spring from the point by which the pendulum is suspended, and, by altering the adjusting screws, a proper tension may be given to the spring part of the pallets; but they must be sufficiently under the influence of the main power. I think the main power should be about one-third more than is necessary to raise the inclined plane, so as to allow for an increase of friction which may take place in the wheel-work. There must be a cross-piece fixed to the pendulum, which must come into contact with two pins that are fixed in the inclined planes of the pallets, so as to unlock one on each vibration of the pendulum. Suppose the pendulum to be put in motion, and to have unlocked the inclined plane on the right; the wheel moves forward, and raises the inclined plane on the left, at which time the pendulum receives a momentum from the spring-pallet on the right, and, after performing its excursion to the left, receives a momentum as on the right, and so on alternately. The advantage of this escapement over that above described is, that it avoids the friction of the verge and detent pivots, and during a part of the vibration the pendulum is disengaged, so that it is a free pendulum. I have no doubt that

the society will judge of this invention with their usual liberality and candour.

First Method. (See Plate VII. Fig. 1.)

A, the swing wheel.

BC, the two pallets.

DD, the detents on which the two pallets B and C are fixed.

E, one of the remontoire springs on the left side; another, similar to this, is on the right side of the frame, but is not shown in the plate.

F, the verge.

G, the arms fixed on the verge, which act on the pins HI of the pallets.

K, The pendulum, fixed in the usual way on the verge.

Second Method. (See Fig. 2.)

a, the free pendulum, without a verge.

b, the swing wheel on the outside of the back plate.

c, d, the pallets, formed like a pair of tongs.

e, a spring which keeps them extended against the points of the adjusting screws.

f, g, the points of the pallets.

h, i, the adjusting screws of the pallets.

k, The cross-piece fixed to the pendulum, which piece, as the pendulum moves backwards and forwards, comes in contact with the two pins on the points of the pallets fg, and relieves the wheel.

The pendulum is supposed to be in motion, and the dotted lines show those parts of the machine which are hid by others.

LV. *Observations on the Condition of the Inhabitants of the Cape of Good Hope.*

[Concluded from p. 137.]

3. **T**HE corn boors live chiefly in the Cape district, and those parts of Stellenbosch and Drakenstein that are not distant more than two or three days' journey from the Cape. Their farms are, some freehold property, some gratuity land, but most of them loan farms. Many of these people are in good circumstances, and are considered in rank next to the wine boor. The quantity of corn they bring to

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market