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Mr. W. Hardy

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XXXI. *A new and most accurate Method of Banking the Balance of a Time-keeper.* By Mr. W. HARDY, of Islington*.

SIR,
THIS letter is accompanied with a drawing, a description, and a model, of a more perfect mode of banking the balance of a time-keeper, than any that has yet appeared; and its application to a time-keeper is a matter of such real importance, that the most accurate, without this most necessary appendage, is liable to such derangement, that from the most trivial cause it is in one moment rendered useless.

To preserve the good qualities of the time-keeper, on which often the strength, the wealth, the grandeur, and safety of this great empire depend, I deem it necessary that my invention should be laid before the Society of Arts, as the means of its being more generally known; and I hope that I show proper respect to the society, when I assure you that I do not offer any crude idea, neither could I think of giving you any trouble until I had fully verified the utility of my contrivance by several years' trial. As I can produce the testimony of some of the most eminent watchmakers in favour of my invention, I look forward with some degree of confidence, in expectation of obtaining the approbation of the society.

It was at first imagined that a banking to a watch with a free escapement was quite unnecessary, as the limits of banking were so great as to admit of almost twice 360, or 720 degrees; but on trial the balance was frequently found to exceed this quantity, and that a very slight motion given to the time-keeper (particularly when the axis of the balance became the axis of that motion) was sufficient to alter the strength and figure of the pendulum spring, and position of the pieces in respect of the balance wheel, so as to change the rate of the time-keeper; and, what was worse, require a new adjustment of the balance, to accommodate itself to the changes made in the spring, and other parts connected with it. Hence it became necessary that some means should be used to stop the balance at certain limits beyond its natural arch of vibration; and various attempts have been made to effect it. One way is, by a moveable piece on the axis of the balance, which banks against a pin, yet so as to suffer

* From *Transactions of the Society of Arts, &c.* for 1804.—A bounty of thirty guineas was voted to Mr. Hardy by the Society for this communication.

the balance to vibrate more than 360 degrees. Another method is to have a piece moveable on a centre in one of the arms of the balance, and applying itself as a tangent to the pendulum spring, which passes through a hole in the piece. It has also a knee, which almost touches the plate, and just passes free of a pin placed in it. But when the balance vibrates so as to approach its utmost limits, the action of the spring, while in a state of unwinding, throws the piece outward, so as to fall in the way of the pin, and stop the balance from proceeding further. Another mode is by a straight spring, screwed upon the plate, having a hook at the end of it, into which a pin placed in the balance strikes, when, as before, the pendulum spring, in unwinding, touches the straight spring, and moves it a little outwards. There is also a way of banking by means of a bolt, which is thrown back by the pendulum spring, and made to fall in the way of a pin placed in the rim of the balance. These are the principal modes of banking now in use, and they do not differ materially from one another in principle. But the weight and friction of so many pieces on so delicate an organ as that of a pendulum spring, are perhaps nearly as hurtful to the time-keeper as the injury it may sustain when it is left without any banking whatever.

I am, sir, your most obedient servant,

WILLIAM HARDY.

Charles Taylor, Esq.

IN figures 1 and 2 (Plate III.) the same letters are placed, to signify the same things. AA is the balance to which the pendulum spring is fastened in the usual way. In one of the crosses of the balance is placed a pin P, which stands a little way above its surface; and when the balance is caused to vibrate a complete circle, the pin in its motion will describe the dotted circle POQ, and just pass clear of the inside of a projection formed on a cock B, which is fastened on the plate by means of a screw. At about one-fourth of a turn of the pendulum spring, reckoned from its stud E, is placed a very delicate tapering piece of steel S, having a small hole in it, through which the pendulum spring passes; and it is fastened to it by means of a pin, and stands perpendicular to the curve of the spring. Let the balance be at rest, as represented in fig. 1, the banking-pin at P, and the banking-piece at s. Suppose the balance is made to vibrate from P towards O, when P arrives at the banking-piece s, it will pass it without touching, because its extremity s lies wholly within the circle traced out by the

Fig. 1.

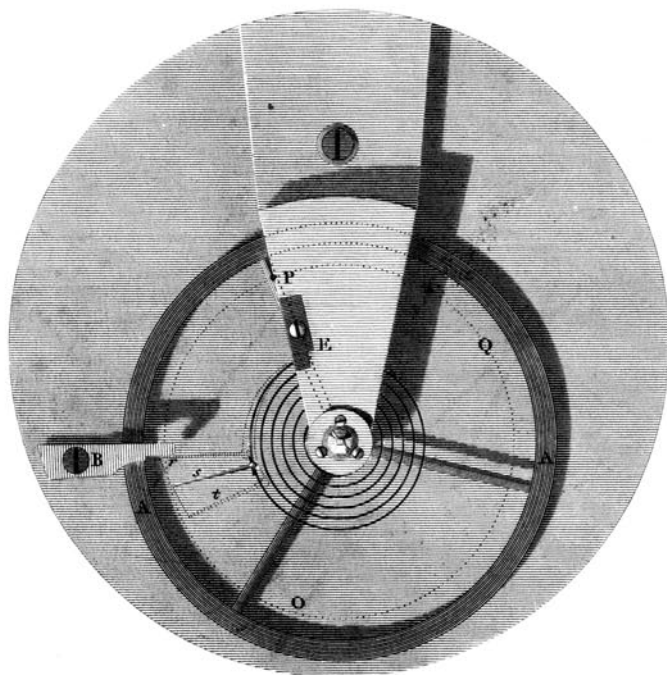
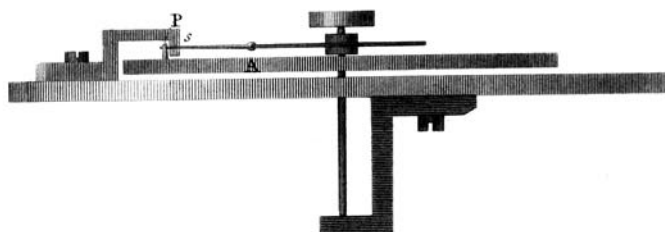


Fig. 2.



the banking-pin. But when the banking-pin P has arrived at Q, the banking-piece s will have advanced to t, by the pendulum spring winding itself up into the figure represented by the dotted curve; and when the banking-pin P (now at Q) returns back to P, and passes on from P towards Q, to approach B, and so complete the other half-arch of its vibration, before P can arrive at the banking-cock B, the pendulum spring will have unwound itself into the figure described by the dotted curve, and the banking-piece s will have advanced into the position at r, just touching the banking-cock. Its extremity r, however, being thrown beyond the dotted circle, must necessarily fall in the way of the banking-pin, which arrives there almost at the same moment, and is opposed by it, without the slightest shock to the pendulum spring. The model renders any further explanation unnecessary.

WILLIAM HARDY.

XXXII. *Proceedings of Learned Societies.*

ECONOMICAL SOCIETY OF LEIPSIK AT DRESDEN.

ON a request by Count von Reisch, this society has proposed the two following prize questions :

1st, To determine the means, established by experiment, of extirpating from fields of oats and barley the wild radish (*Raphanus Raphanistrum*), with instances of these means proving successful. The prize is 5 Fredericks of gold.

2d, To invent a handmill of a simple construction, easy to be moved, and which will not cost more than forty rix-dollars. The inventor must send a model and scale. The prize is 8 Fredericks of gold. The papers, written in the German language, must be transmitted with a sealed device to the secretary of the society at Dresden, before the end of April 1805.

XXXIII. *Intelligence and Miscellaneous Articles,*

ORIGINAL VACCINE POCK INSTITUTION, No. 44, Broad-street, Golden-square,

Quarterly Court.

THE following Resolutions, on the authority of a public institution, must serve to tranquillize many families disturbed by prevailing ill-founded reports ; and the notice of