(Model.)

J. G. POWELL.

TOY WATCH.

No. 244,663. Patented **July 19, 1881.**

FIG. 2.

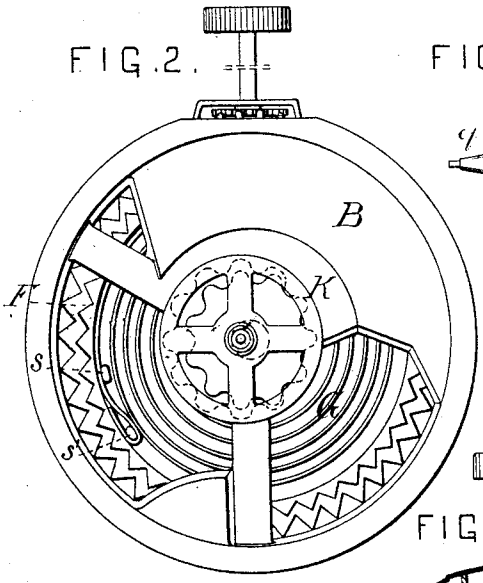


FIG. 6.

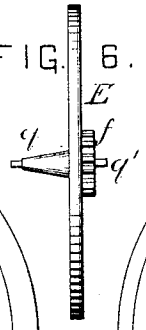


FIG. 1.

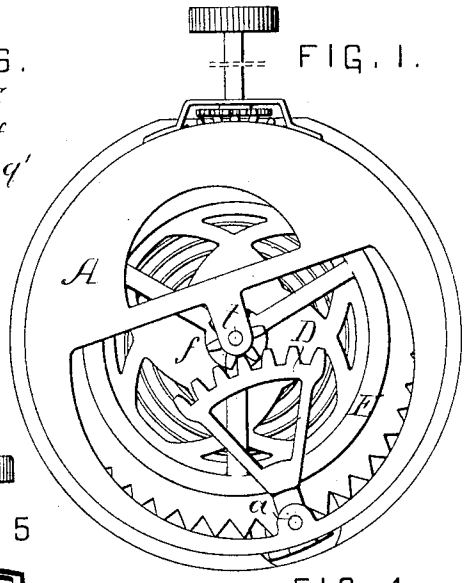


FIG. 5

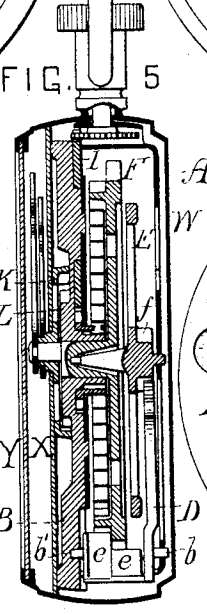


FIG. 3.

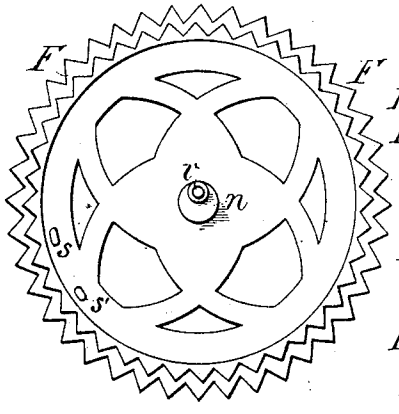


FIG. 4.

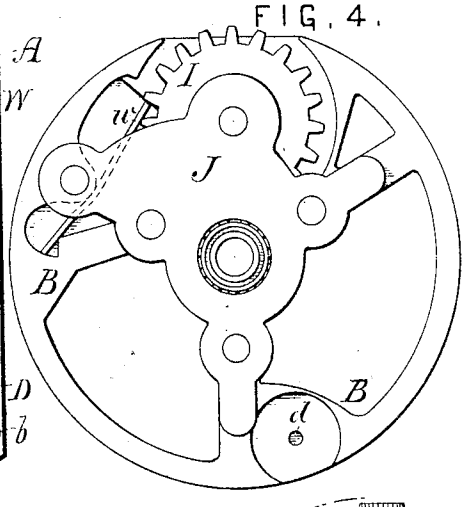
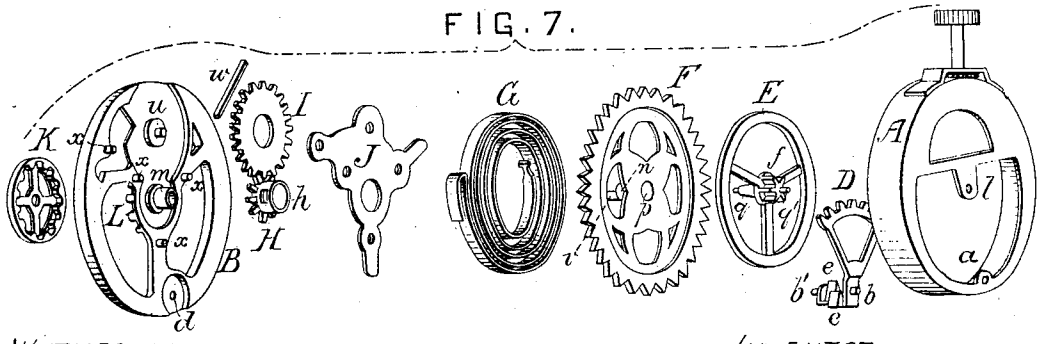


FIG. 7.



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UNITED STATES PATENT OFFICE.

JOHN G. POWELL, OF PHILADELPHIA, PENNSYLVANIA.

TOY WATCH.

SPECIFICATION forming part of Letters Patent No. 244,663, dated July 19, 1881.

Application filed June 9, 1881. (Model.)

To all whom it may concern:

Be it known that I, JOHN G. POWELL, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Toy Watches, of which the following is a specification.

My invention relates to certain improvements in that class of cheap toy watches which are provided with escapements and winding mechanism, and in which the larger pointer traverses faster than the small pointer, Letters Patent for watches of this general character having been granted to me June 4, 1878, Nos. 204,606 and 204,607.

The main object of my present improvements is to economize the manufacture of watches of this class by casting the greater portion of the works of type-metal or analogous alloy in metal molds, each part thus cast being so complete that it can be adjusted to its place without any preliminary fitting or other work and without resorting to detached pivot-pins. The casting of the parts not only facilitates the putting of them together, but insures greater accuracy of self-adjustment and the more free movement of the operating parts than in the toy watches described in my aforesaid patents.

In the accompanying drawings, Figure 1 is a back view of the works of the improved toy watch; Fig. 2, a front view without the pointers; Fig. 3, a face view of the duplex pallet-wheel; Fig. 4, a rear view of the front plate of the frame and appliances connected therewith; Fig. 5, a transverse section of the watch; Fig. 6, an edge of the balance-wheel, and Fig. 7 perspective views of the several parts composing the works of the watch.

As a preliminary explanation of my invention, I will first describe the works as illustrated in Fig. 7.

The frame of the works is composed of the flanged rear plate, A, and front plate, B, the two being secured together by soldering or otherwise, and thus forming a hollow frame, which contains the greater portion of the operating parts.

D is the toothed pallet-lever, having one journal, *b*, pivoted to a lip, *a*, on the rear plate, A, of the frame, the other journal, *b'*, being adapted to an orifice, *d*, in the plate B, the teeth on the segmental portion of the lever gearing into a pinion, *f*, on the balance-wheel E, and the pallets *e e* being adapted to the teeth of the duplex pallet-wheel F.

It may be remarked here that the escapement motion, including the duplex pallet-wheel, the balance-wheel, pallet-lever, and pallets, is substantially the same as that for which Letters Patent No. 204,606 were granted to me June 4, 1878, excepting in the mode of hanging the balance-wheel, to which special reference will be made hereinafter. While this duplex pallet-wheel and pallets made to accord therewith are to be preferred, it should be here understood that an ordinary pallet-wheel may be used in connection with my invention, the pallets being arranged to accord with the single wheel.

The coiled spring G is contained in a recess at the back of the pallet-wheel F, one end of the spring being bent to form a loop, which is passed over the projection *s*, Fig. 3, of the pallet-wheel, and arranged in respect to the other projection, *s'*, as shown in Fig. 2, the other or inner end of the spring being attached to the hub *h* of a pinion, H, which has its bearing on a central tubular projection, *m*, on the plate B, this projection forming the bearing, and the sole bearing, for the journal *n*, Fig. 3, of the pallet-wheel F and a central orifice, *p*, in this wheel, forming one bearing for the journal *q* of the balance-wheel, the other journal, *q'*, of the same having its bearing *t* in the plate A of the frame.

The pinion H and wheel I are retained in their proper positions on the plate B by the plate J, which also serves to keep in place a spring-pawl, *w*, adapted to the teeth of the wheel I, the latter gearing into the wheel of the stem-winding device, which may be similar to that described in my said Patent No. 204,606, and need not be described here, as it forms no part of my present invention.

It will be seen on reference to Fig. 3 that an eccentric-pin, *v*, projects from the end of the journal *n*, and this eccentric carries the loose wheel K, having internal teeth adapted to those of a fixed wheel, L, on the plate B. The wheel K carries the small pointer of the watch, and the larger pointer is attached to the end of the eccentric. As there are twelve teeth in the

wheel K and eleven teeth in the fixed wheel, the small pointer will make but one-twelfth of a revolution while the larger pointer makes one complete revolution. This differential gearing for effecting a differential movement of the pointers is fully described and claimed in my Letters Patent No. 204,607, granted June 4, 1878. The present device, however, is constructed in a manner differing from that described in the said patent, as will be seen hereinafter.

Having described the parts which compose the works of my improved watch, I will proceed to describe more minutely the mode of making the same and putting them together.

It will be understood that toy watches must be made to sell at a very low price, and hence that economy must be practiced in the construction of the several parts and their adaptation to each other. For this reason I have resorted to the plan of casting the greater portion of the works, in metal molds or dies, of an alloy composed of lead, tin, and antimony, which is sufficiently hard for all practical purposes, the molten metal being poured, under pressure, into the dies, as in the manufacture of type. The pallet D, for instance, its journals *b b'*, and pallets *e* are cast in one piece, and the lever can be at once adjusted to its place, the journal *b* entering the orifice *a* of the plate A and the journal *b'* entering the orifice *d* of the plate B.

The balance-wheel E, pinion *f*, and its journals *q q'* are all cast in a die in one piece, and thus save expensive work which would be demanded if this feature of the invention should be made in separate parts; and it should be here understood that the casting is perfectly clean and smooth, no finishing or machine-work being required, and the casting being ready for immediate application to the works after the runner or gate (left in pouring the metal into the die) has been clipped off. The journals, moreover, are perfectly true, and exactitude in the relation of the several parts of the casting to each other is assured. The same remarks will apply to the pallet-lever, also to the pallet-wheel F, which is cast in one piece with its journal *n*, the orifice *p*, forming the bearing for the journal *q* of the balance-wheel, being also formed during the casting of the said pallet-wheel.

The relation of the balance-wheel to the escapement-wheel constitutes an important feature of my invention.

It is essential to the proper working of the balance-wheel that it should be steady in its bearings, and this steadiness cannot be assured unless the bearings are at a reasonable distance apart. Hence I extend the orifice *p* of the pallet-wheel far into the journal *n* of the said wheel, as best observed in Fig. 5, and the journal *q* of the balance-wheel extends to the end of this orifice and has its bearing there, so that the said bearing can be at a reasonable distance from the bearing *t* of the journal *q'*, and this arrangement permits me to bring the balance-wheel close to the pallet-wheel. Hence this feature of my invention, while it produces the best results, does not add to the thickness and bulk of the works.

The plate B is cast in one piece, ready to take its place as part of the works, the central tubular projection *m* being cast on the plate, also the bearing *u* for the wheel I, and the pins *x* adapted to orifices in the plate J, which may be made of tinned plate, said pins serving as rivets to secure the said plate. On the opposite or outer side of the plate B is cast the wheel L.

Owing to the character of the metal used, it is essential that the plate B should be substantial, but it is lightened by openings made at different points; and in order that the thickness of the plate shall not materially add to the thickness of the works, I recess the plate at different points. It is recessed, for instance, at one side for the pinion H and wheel I, and also adjacent to the bearing *d* for receiving part of the pallet, and on the opposite side the plate is recessed for the wheels L and K.

As remarked before, the wheel L is cast on the plate B, and this simplifies the carrying into effect of the differential motion for the two pointers for which Letters Patent No. 204,607 were granted to me June 4, 1878. The wheel K is also cast in a metal die, and has a tubular projection on which the eye of the small pointer is fitted sufficiently tight to be carried round by the wheel, but not too tight to prevent any desired adjustment of the said pointer.

After the pallet-wheel, spring, pinion H, wheel I, plate J, plate B, and wheel K have been adjusted to their relative positions, the larger pointer is fitted to the end of the eccentric-pin on the journal *n* of the pallet-wheel, the said pin is riveted, and all the above-mentioned parts are thus connected together and in working order, and all that is necessary to complete the works is to adjust the journals of the pallet-wheel and pallet-lever to their bearings, and secure the back plate, A, of the frame to the front plate, B, by solder or otherwise, after which the works can be fitted into the case W, Fig. 5, which is made in imitation of an ordinary watch, and which contains the dial-plate X, and is provided in front with a glass, Y.

As any one skilled in the art will readily understand the operation of the several parts described, it will not be necessary to explain the movements of the said parts.

I claim as my invention—

1. The pallet-lever D, having the journals *b b'* cast in one piece therewith, as set forth.

2. The balance-wheel E, its pinion *f*, and journals *q q'*, all cast in one piece, as specified.

3. The pallet-wheel having a single or double set of teeth, and having a journal, *n*, cast in one piece with the wheel, as described.

4. The combination of the balance-wheel

and its journal *q* with the pallet-wheel, provided with a journal, *n*, and having an orifice, *p*, extending into the said journal for the reception of the journal of the balance-wheel, all substantially as set forth.

5. The combination of the plate B and its central tubular projection, *m*, with the pallet-wheel, having a single journal, *n*, adapted to the said projection, as set forth.

6. The combination of the plate B, its central tubular projection, *m*, the pallet-wheel and its bearing *n* and orifice *p*, and the balance-wheel and its journal *q*, all substantially as set forth.

7. The pallet-wheel F, having a lug or lugs cast on the same for the attachment of the end of the spring G, all substantially as described.

8. The combination of the plate B, having bearings *u* and *m* cast thereon, with the pinion H, wheel I, and plate J, substantially as specified.

9. The plate B, having a tubular projection, *m*, cast on one side and wheel L on the opposite side, as set forth.

10. The combination of the plate B, the wheel L, cast on the same, the eccentric-pin *v* on the journal of the pallet-wheel, and the wheel K, adapted to be carried by the said pin *v*, all substantially as described.

11. The wheel K, having a shouldered projection cast thereon and forming seats for the face and hands of the watch, as set forth.

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

JOHN G. POWELL.

Witnesses:
JAMES F. TOBIN,
HARRY SMITH.