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~~No. 675,582~~

(2)

No. 675,582.

Patented June 4, 1901.

C. R. ARNOLD.  
CLOCK TRAIN.

(Application filed Sept. 12, 1900.)

(No Model.)

Fig. 1

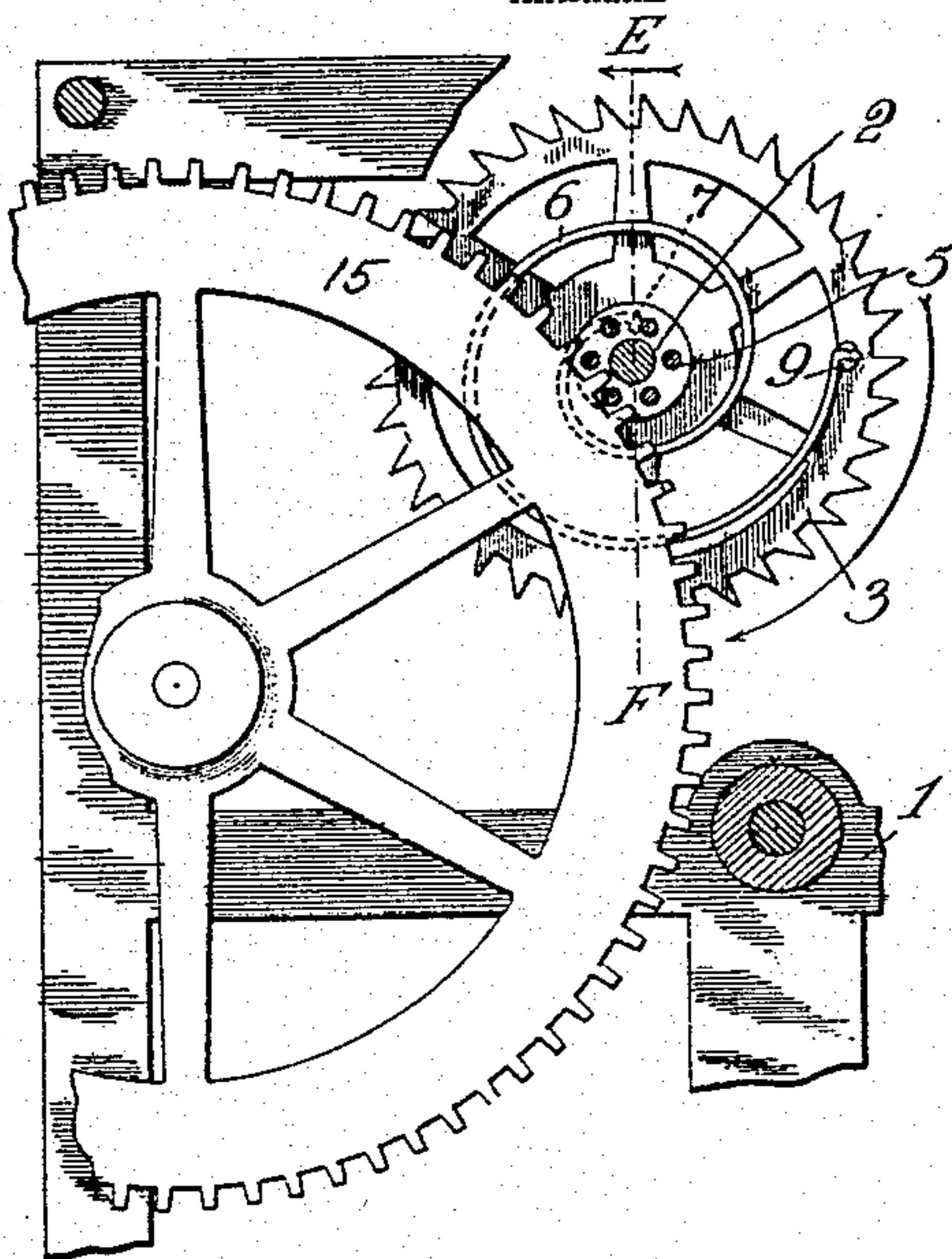


Fig. 2

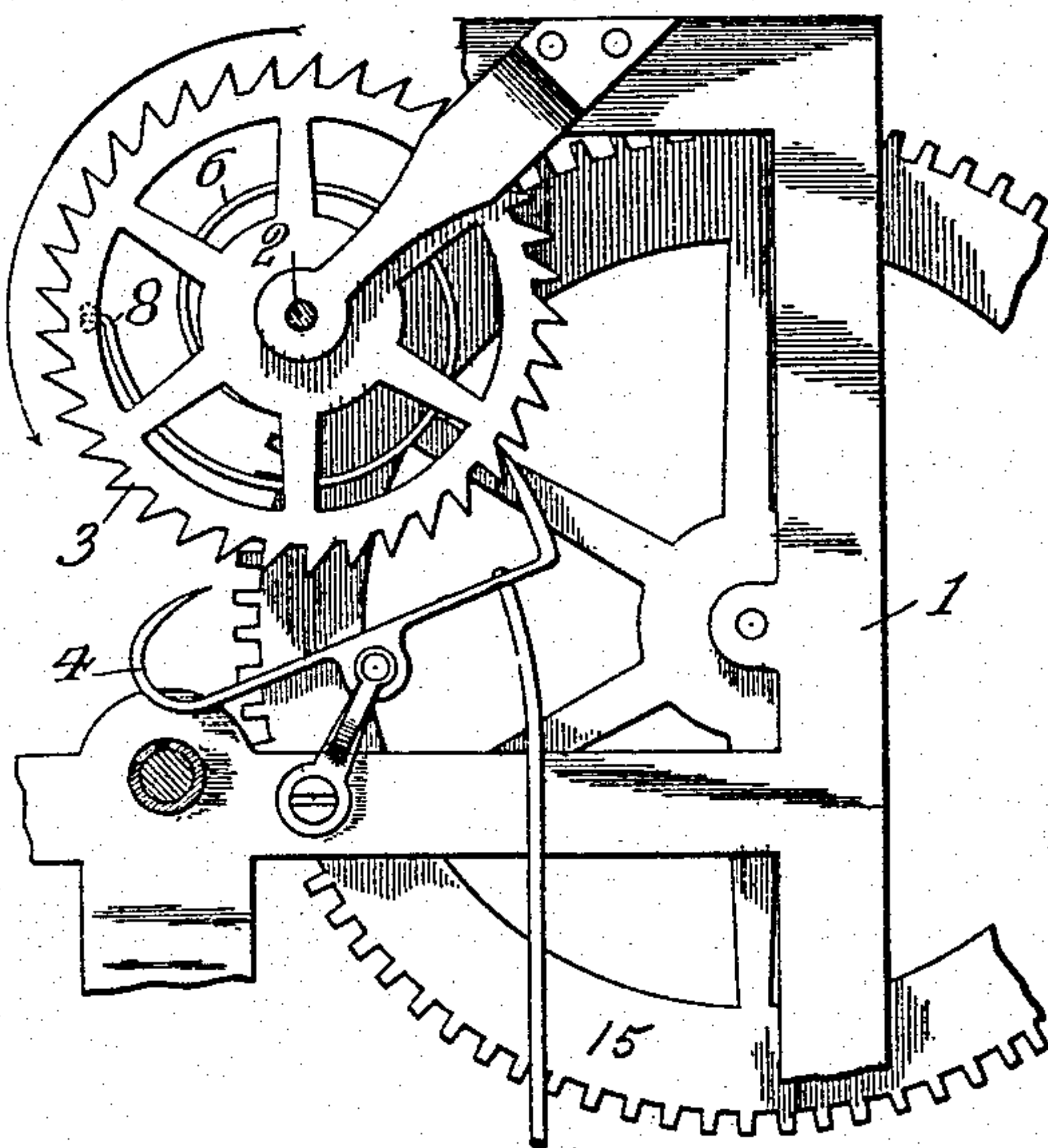


Fig. 3

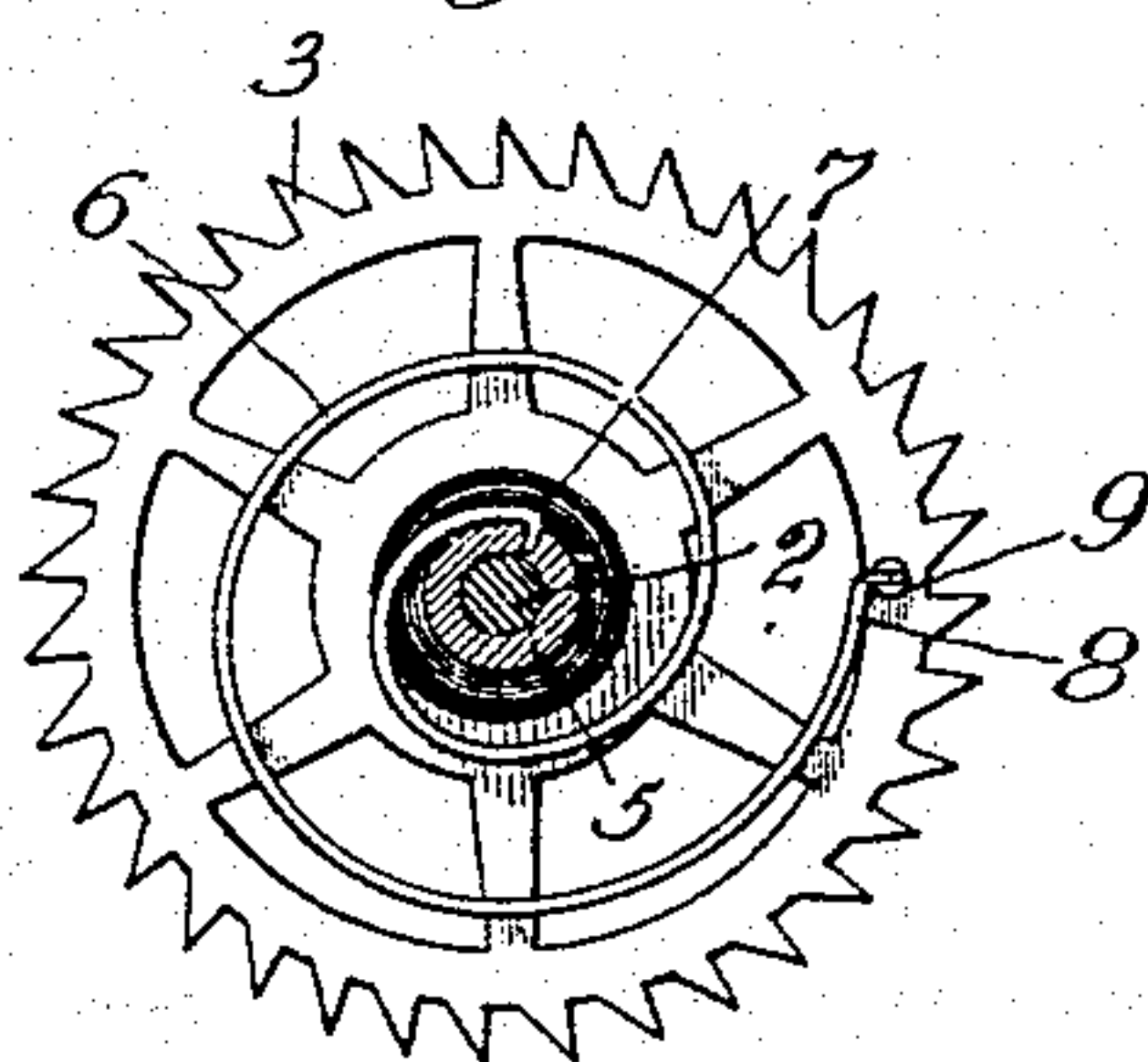


Fig. 5

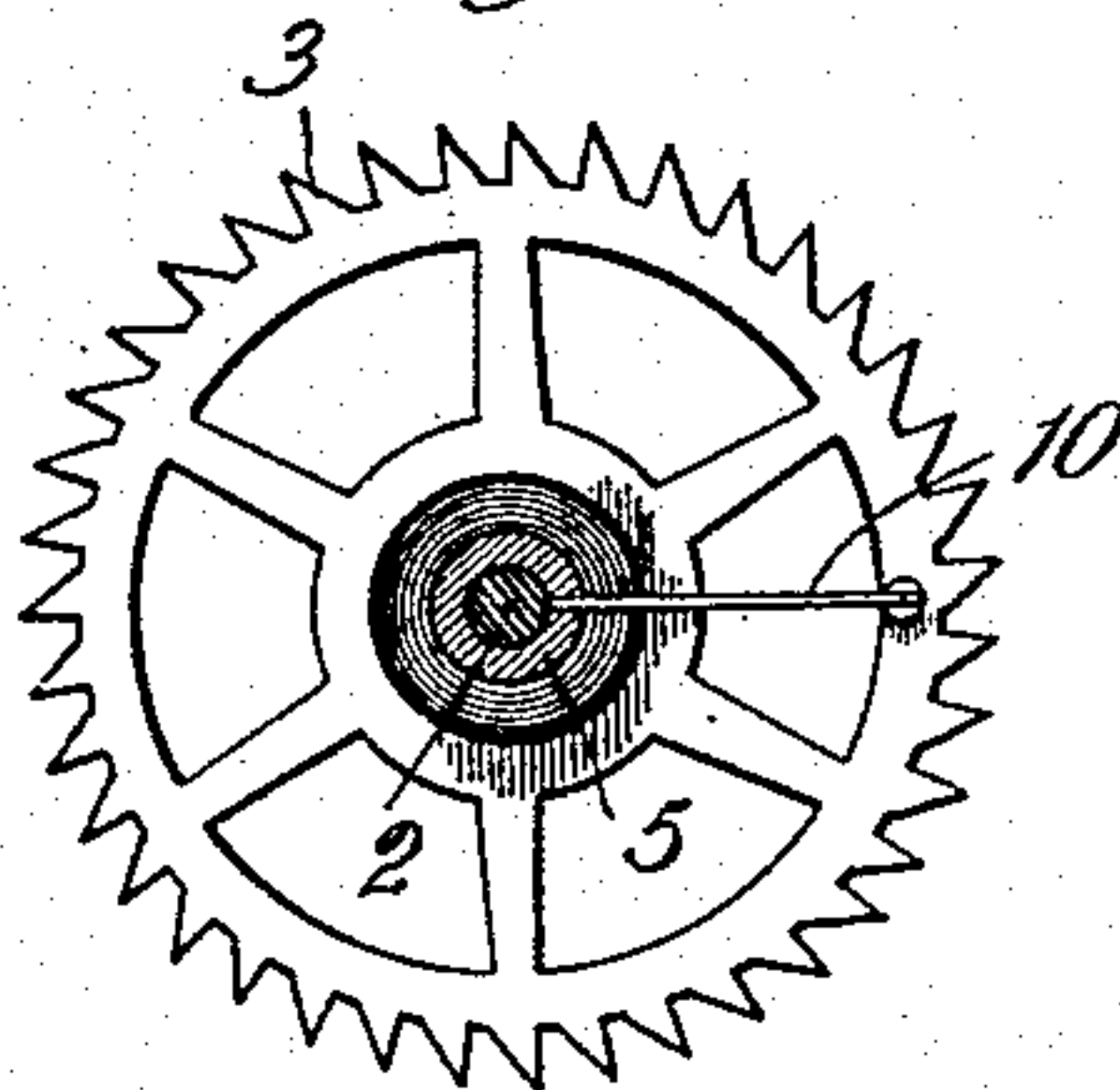


Fig. 6

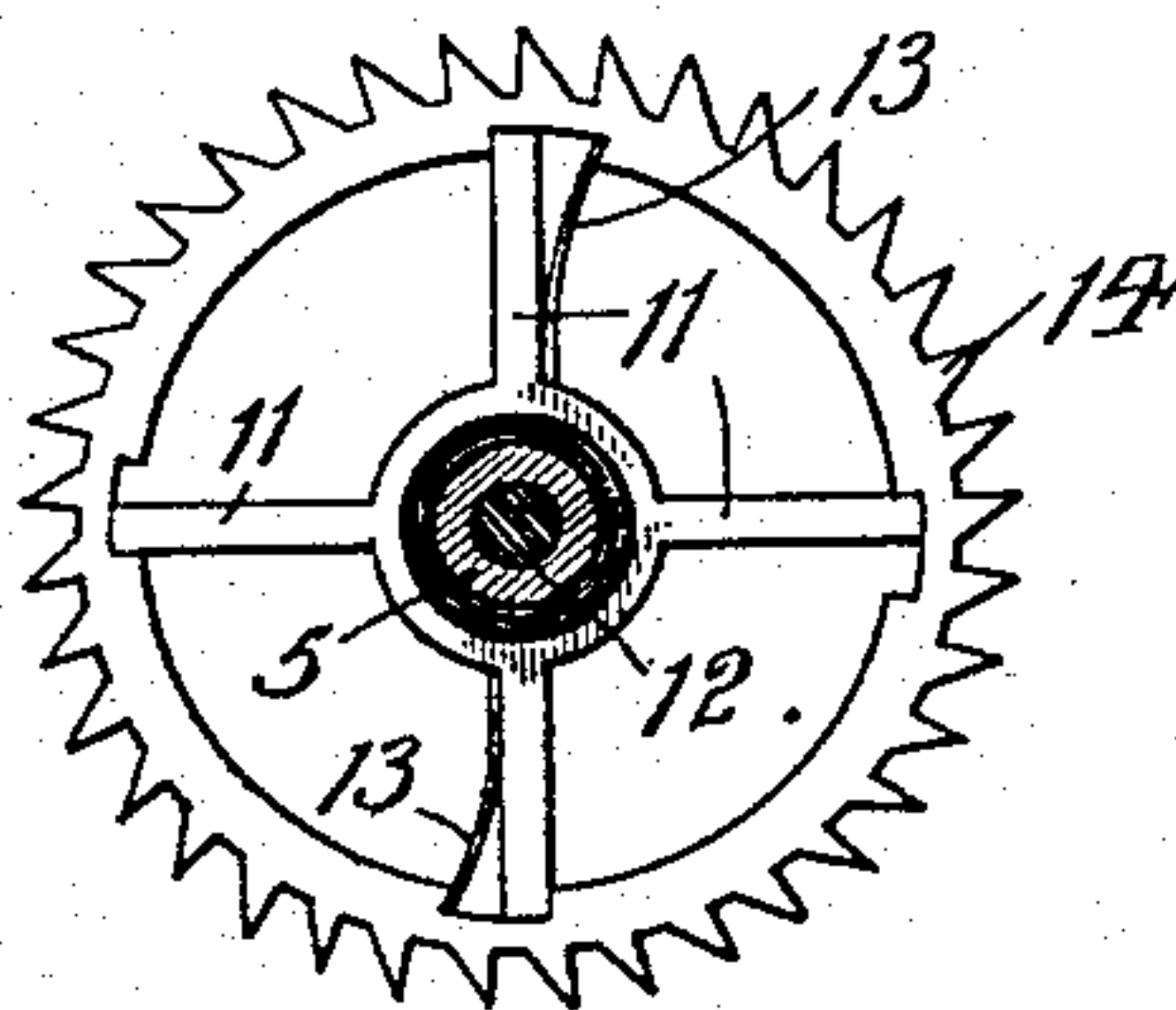
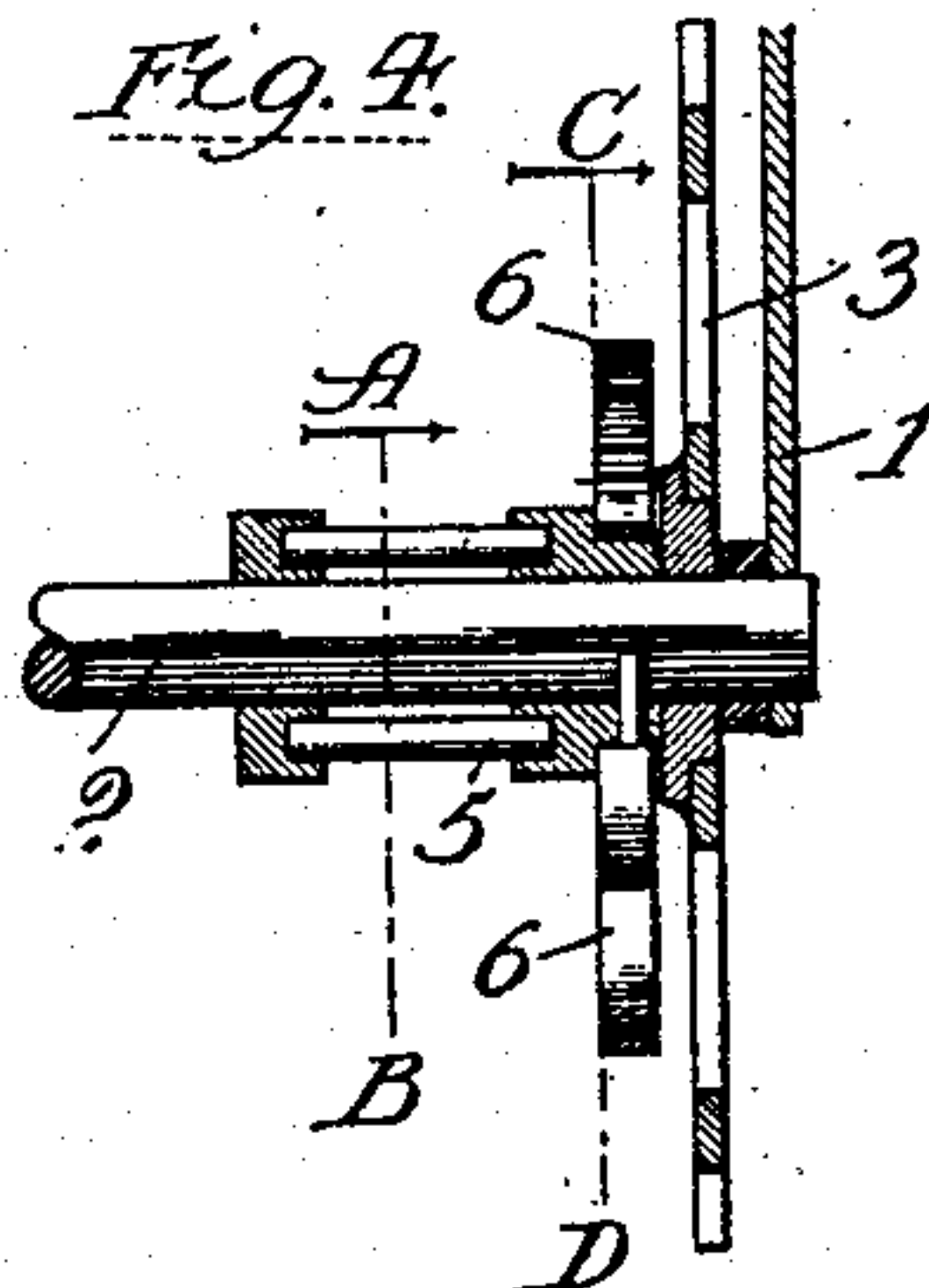


Fig. 4



Witnesses:

*Lute J. Altus*  
*George R. Harbaugh*

Inventor:

*Charles R. Arnold*  
By *Coburn, Hittin & M. Eng. Attys.*



# UNITED STATES PATENT OFFICE.

CHARLES R. ARNOLD, OF MARSEILLES, ILLINOIS, ASSIGNOR OF ONE-HALF  
TO IRVING H. TROWBRIDGE, OF SAME PLACE.

## CLOCK-TRAIN.

SPECIFICATION forming part of Letters Patent No. 675,582, dated June 4, 1901.

Application filed September 12, 1900. Serial No. 29,772. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES R. ARNOLD, a resident of Marseilles, in the county of La-salle and State of Illinois, have invented certain new and useful Improvements in Time-keepers, of which the following is a specification.

My invention relates to watches or clocks; and its object is to interpose in the train at any suitable point an elastic connection for the purpose of relieving the parts from the strain due to the sudden stoppage and momentary slight reversal of motion effected by the escapement, and thereby also lessening the amount of power required to run the mechanism.

In the drawings, Figure 1 is a rear sectional elevation of a part of a clock mechanism, taken on line A B of Fig. 4, showing the usual escapement and one wheel of the train; Fig. 2, a front elevation of the same parts; Fig. 3, a sectional elevation on line C D of Fig. 4; Fig. 4, a section on line E F of Fig. 1, and Figs. 5 and 6 views of modified forms of construction.

With the understanding that I prefer to use the elastic connection in more or less direct connection with the escapement-wheel and that such location thereof is not essential in the broad interpretation of the invention I will proceed to describe the construction and operation of my improvement.

In the usual clock-frame 1 is journaled a rod or arbor 2, on which is mounted the escapement-wheel 3, whose movements are controlled by the verge 4. The pinion 5 is mounted on this arbor; but the same is not, however, attached to or integral with the escapement, as is the usual way. So far as my invention is concerned either the escapement-wheel or the pinion may be secured to this arbor to rotate with it or both the wheel and pinion may be loosely mounted on the arbor, which would in such case become a mere stud.

A spiral spring 6 is secured at its inner end 7 in the perimeter of the pinion and at its other end 8 to the rim of the escapement-wheel. This spring forms an elastic connection between the escapement-wheel and its pinion, either the pinion or wheel, or both, being loosely mounted on the arbor.

Instead of a spiral spring it is obvious that a straight spring may be used, and in Fig. 5 I have shown such a modification where a straight spring 10 is secured in the hub of the pinion and extends radially, where its outer end is secured to the rim of the escapement-wheel or may play between pegs thereon.

In Fig. 6 is illustrated a modification in the construction of the escapement-wheel in which the spokes or arms 11 are rigidly secured to the arbor 12. A spring 13 forms the connection between one or more of the arms, the inner edge of the rim 14 of the wheel being cut away in the four places shown to accommodate the relative movement of arms and rim or wheel.

Inasmuch as the train of a clock mechanism is so well known and as my invention may be employed in connection with the varied forms, I have not considered it necessary to show more than the escapement, the pinion on the escapement-wheel, and the next wheel 15 of the train.

It is well known that at each beat or movement of the verge the entire train of the mechanism is stopped and slightly reversed. When my elastic connection is employed, it is evident that the movement of the train will not be reversed nor will it be stopped, inasmuch as such elastic connection will yield, in fact, permitting the power to be stored in itself and utilized as soon as the escapement-wheel is released by the pallet of the verge. In case the mechanism should be stopped, as is possible in a slow movement, the stoppage would be gradual and modified. The movement of the train will thus be practically continuously forward without strain on the parts or any movement against the power, owing to the reversal of the escapement-wheel. On account of this fact less power is required to drive the train.

In the specific form shown as to the elastic connection the power is communicated to the escapement-wheel only through the spring, whether spiral or straight, so that all reverse movement and the strain incident to the momentary stoppage of the escapement-wheel are absorbed by the spring and the train relieved therefrom. By locating the spring as shown only the escapement-wheel is subject to stop-



page or reversal, all the wheels of the train back of the escapement-wheel being relieved.

I do not intend to limit myself to any particular form or character of elastic connection except where specifically claimed so long as the desired result is obtained.

While the elastic connection above referred to may be introduced anywhere in the train, yet in order to get the full benefit of my invention I prefer to introduce the same therein in connection with the escapement-wheel and have so illustrated the same. Consequently my invention in its broad sense is not limited to any particular location of that elastic connection and is also applicable to other escapements, such as the lever-escapement, cylinder-escapement, &c.

Although I have described more or less precise forms and details of construction, I do not intend to be understood as limiting myself thereto, as I contemplate changes in form, the proportion of parts, and the substitution of equivalents as circumstances may suggest or render expedient and without departing from the spirit of my invention.

I claim—

1. In a time-keeping mechanism, the combination with the continuously-moving time-train to which power is applied, of the escapement-wheel controlling the rate of movement of said time-train, and yielding connections between said escapement-wheel and time-train whereby the continuous forward movement of the time-train is permitted notwithstanding the intermittent stoppage and

reversal of the escapement-wheel; substantially as described.

2. In a time-keeping mechanism, the combination with the continuously-moving time-train to which power is applied, of the escapement-wheel controlling the rate of movement of said time-train, and yielding connections between said escapement-wheel and time-train consisting of a spring connected at one end with the escapement-wheel and at the other end to the portion of the time-train concentric therewith, said yielding connection operating to permit the continuous forward movement of the time-train notwithstanding the intermittent stoppage and reversal of the escapement-wheel.

3. In a time-keeping mechanism, the combination with the continuously-moving time-train to which power is applied, of the escapement-wheel controlling the rate of movement of said time-train, and yielding connections between said escapement-wheel and time-train consisting of a spiral spring connected at one end to the pinion concentric with the escapement-wheel and connected at its other end to the escapement-wheel which is otherwise independent of the pinion, said connections operating to permit the continuous forward movement of the time-train notwithstanding the intermittent stoppage and reversal of the escapement-wheel.

CHARLES R. ARNOLD.

Witnesses:

MICHAEL G. MINAGHAN,  
IRENE TROWBRIDGE.