June 7, 1955 A. HEIM 2,709,886

STRIKING ANNIVERSARY CLOCK

Filed Nov. 24, 1951 3 Sheets-Sheet 1

FIG. 2

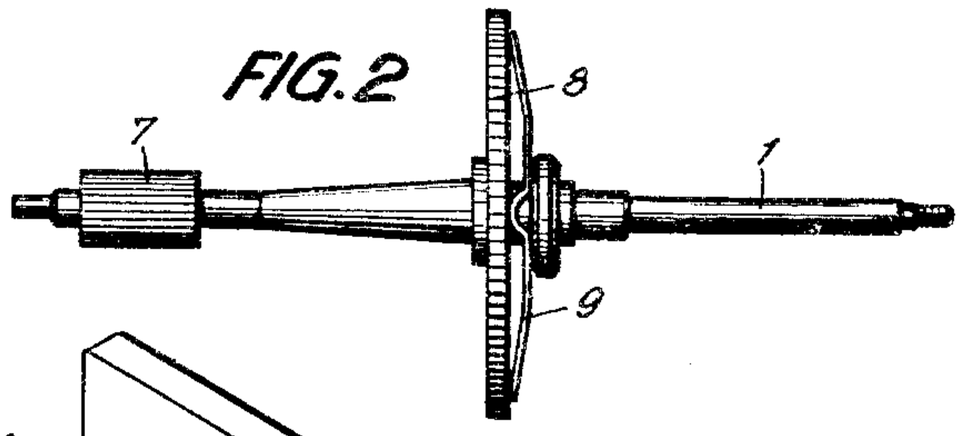
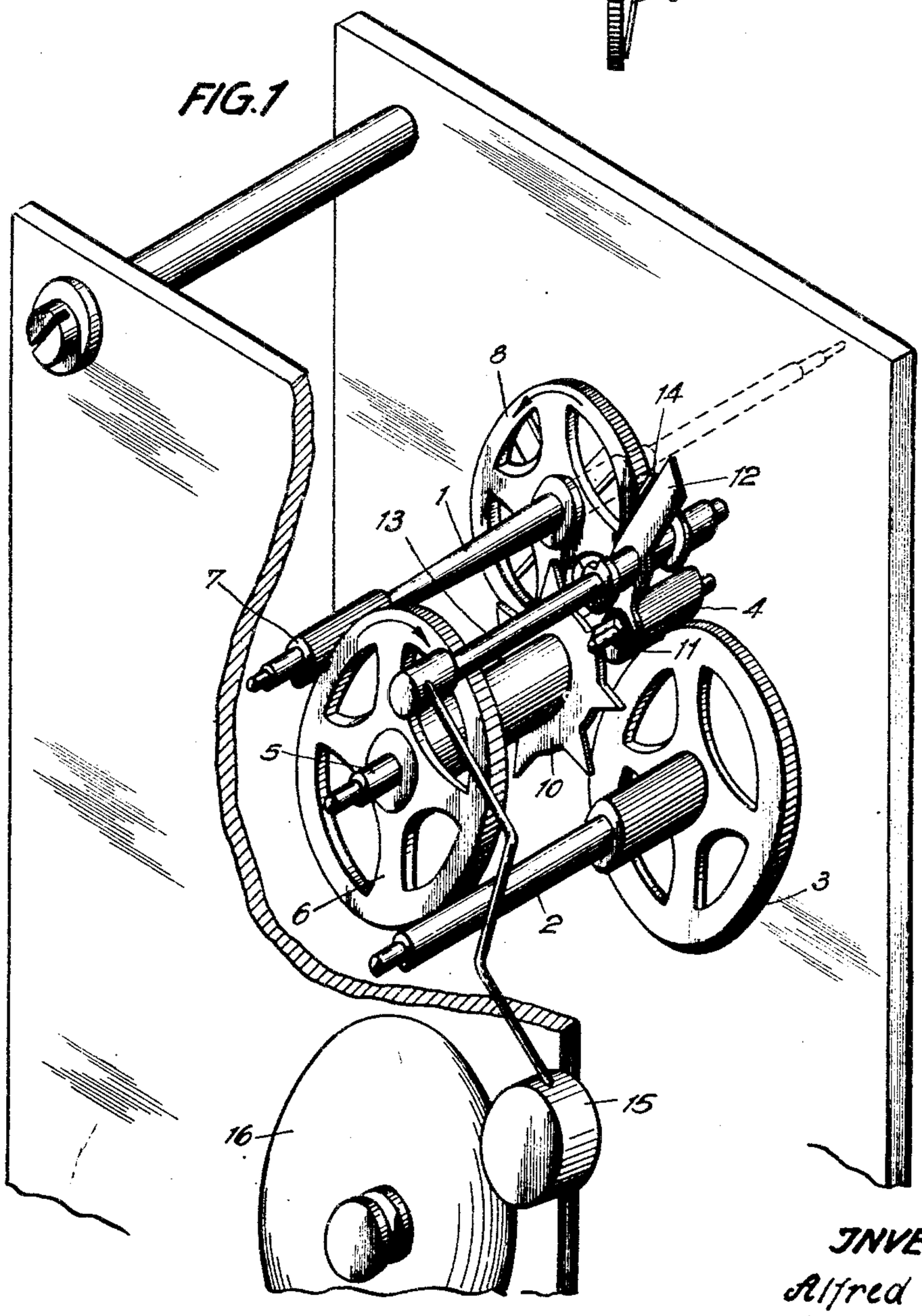


FIG. 1



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Filed Nov. 24, 1951 3 Sheets-Sheet 2

FIG. 3

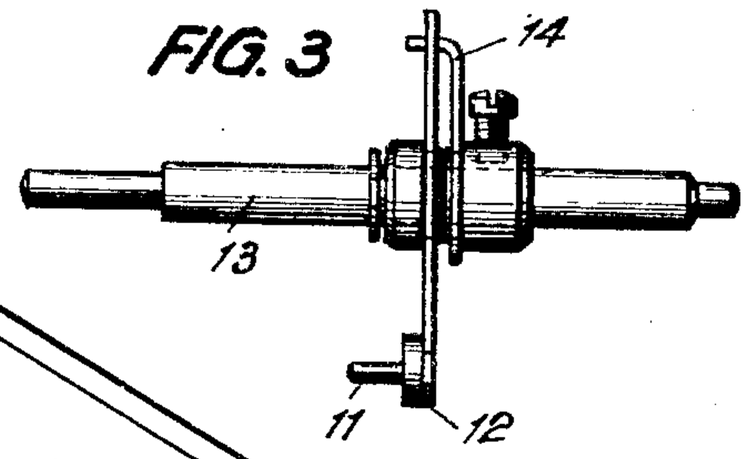
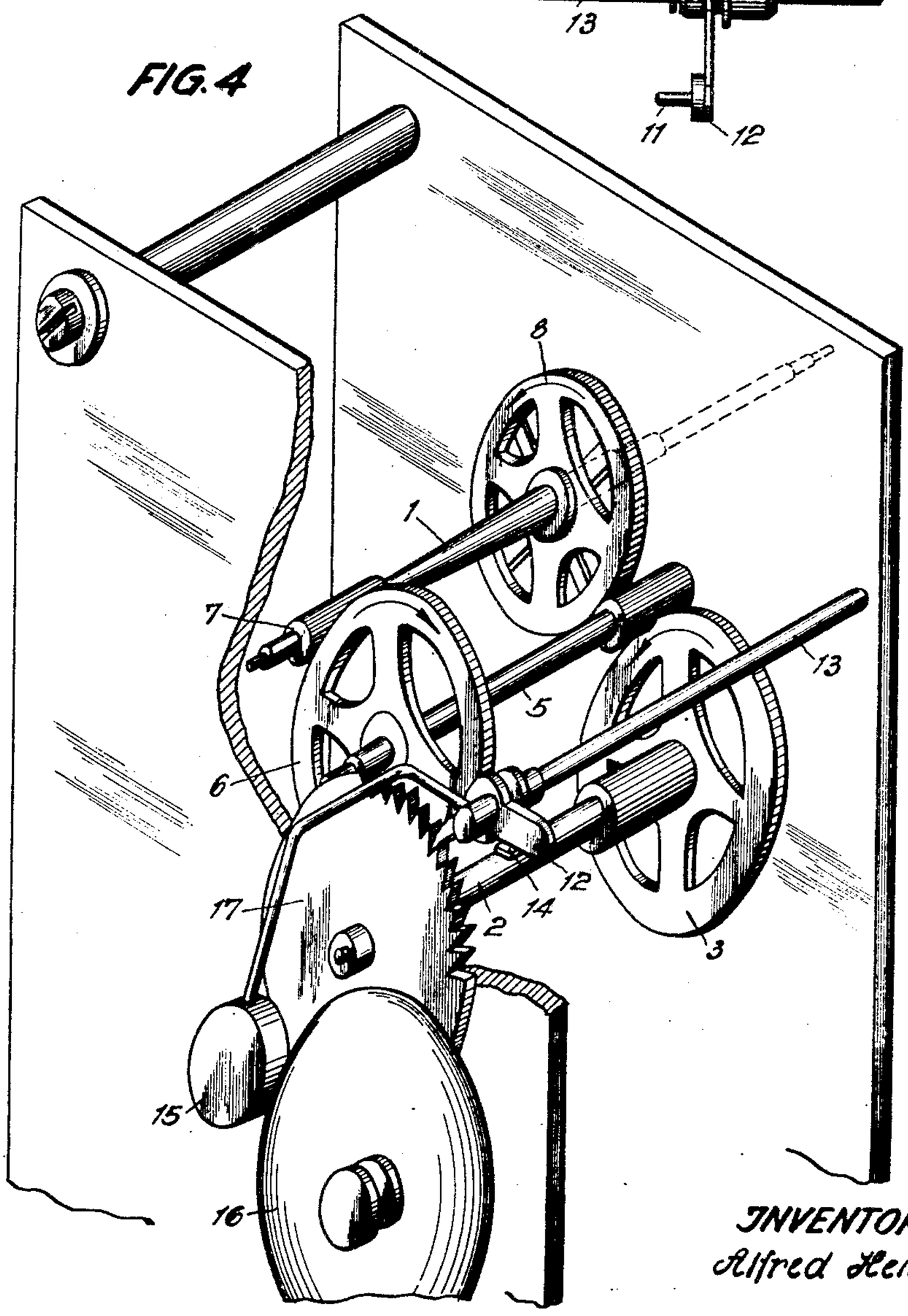


FIG. 4



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STRIKING ANNIVERSARY CLOCK

Filed Nov. 24, 1951

3 Sheets-Sheet 3

FIG. 5

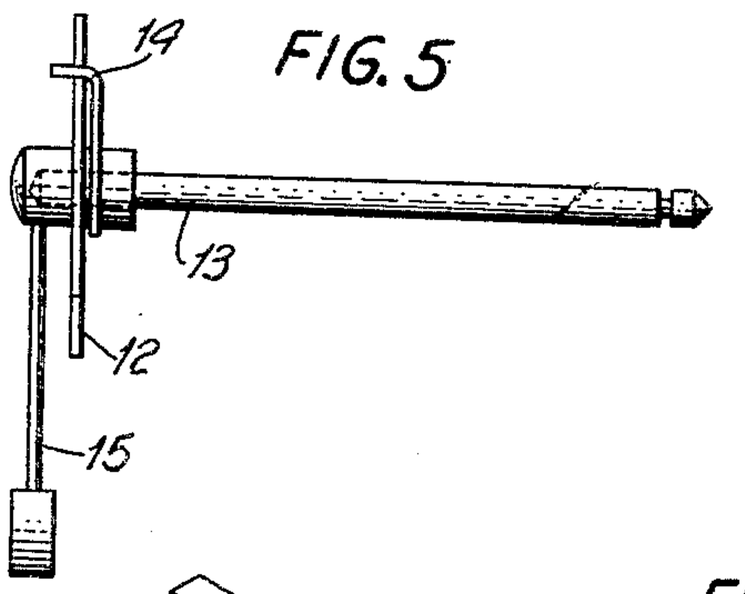


FIG. 6

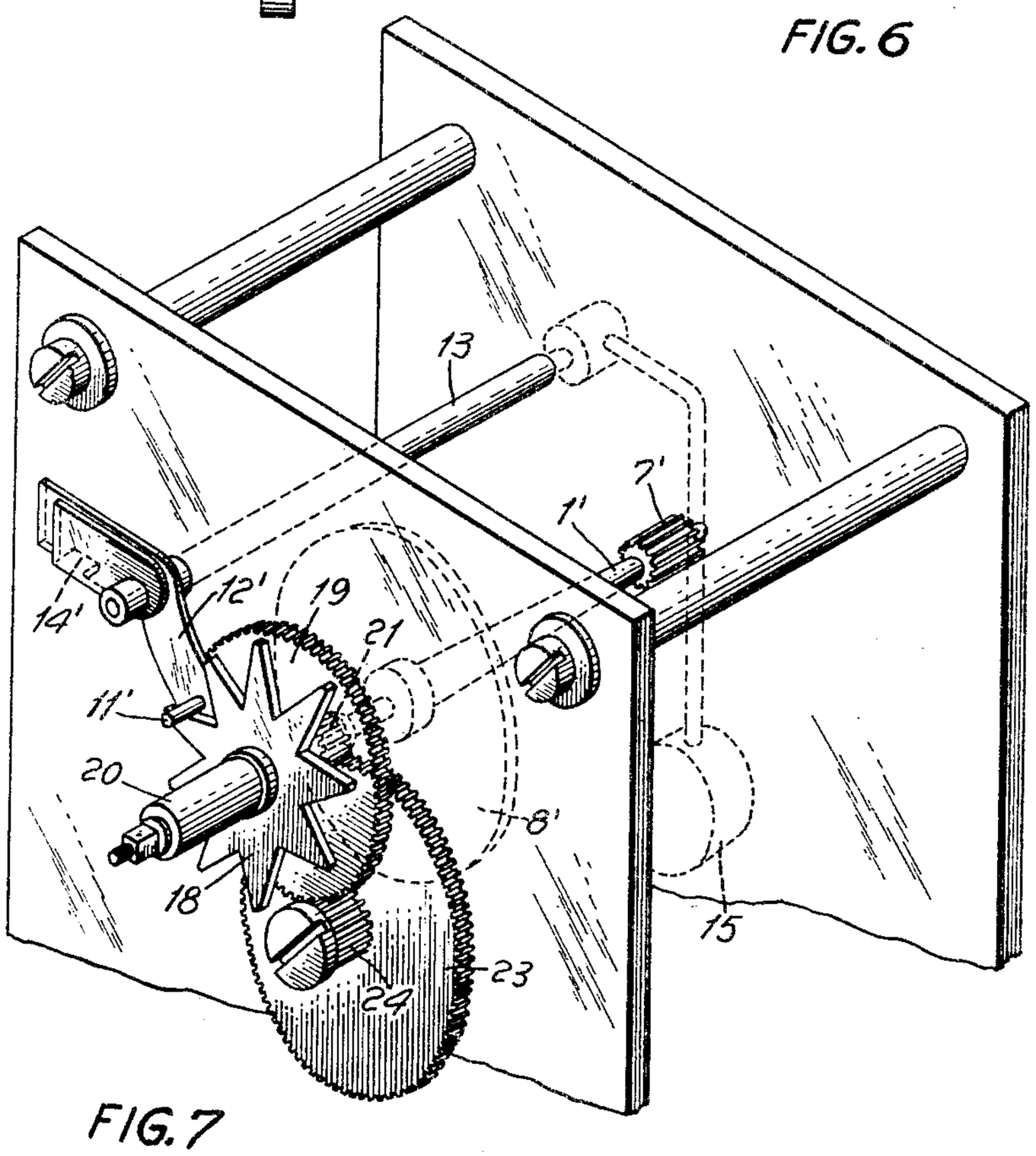
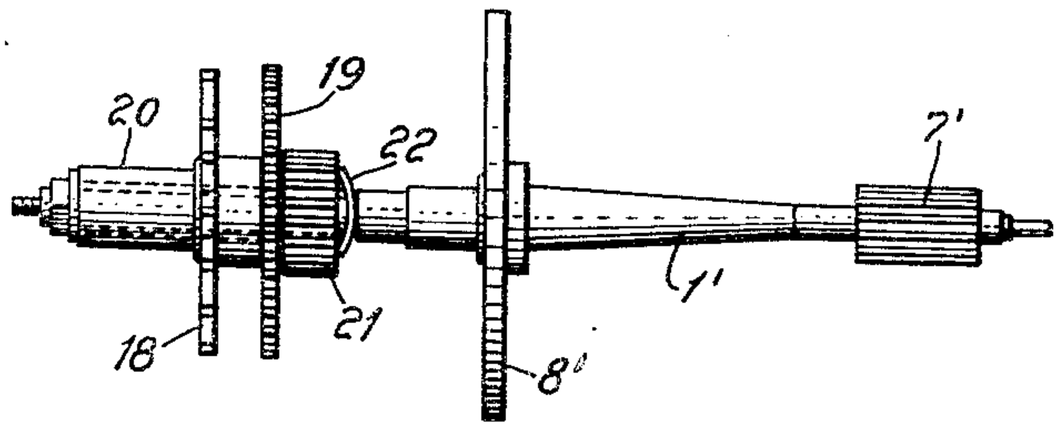


FIG. 7



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United States Patent Office

2,709,886

Patented June 7, 1955

2,709,886

STRIKING ANNIVERSARY CLOCK

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Application November 24, 1951, Serial No. 258,001

Claims priority, application Germany July 23, 1951

6 Claims. (Cl. 58—8)

This invention relates to so-called anniversary clocks, i. e., clocks for a running time of about 400 days.

The primary object of my invention is to generally improve such clocks, and a more specific object is to provide such clocks with a striking device which will announce at least every full hour and which is actuated from the clock movement itself without the use of an additional striking movement.

With conventional anniversary clocks, it is not possible to have the striking device unlocked in the usual way from the center (minute) axle. Owing to the very high gear ratio for a 400 day run, the force available at the center wheel axle is extremely small so that the clock would be slowed down or completely stopped by an additional load. One object of my invention is to provide a mechanism which is well suited for the actuation of a striking device in anniversary clocks.

To the accomplishment of the foregoing and other objects which will hereinafter appear, my invention consists in the anniversary clock and elements thereof and the relation of the latter one to the other, as hereinafter are more particularly described in the specification and sought to be defined in the claims. The specification is accompanied by drawings in which:

Fig. 1 is a perspective view of a mechanism, embodying features of my invention, to actuate the striking device in anniversary clocks;

Fig. 2 is the center wheel axle of the clock;

Fig. 3 is the hammer axle;

Fig. 4 is a perspective view of a modified mechanism;

Fig. 5 is the hammer axle as used in the mechanism of Fig. 4;

Fig. 6 is a perspective view of another modified mechanism; and

Fig. 7 is the center wheel axle of the mechanism of Fig. 6.

Referring to the drawings, in the embodiments selected for illustration, the center wheel axle is driven as in the usual anniversary clocks from the mainspring barrel over three intermediate shafts. Both in Fig. 1 and Fig. 4, only the second and third of these shafts and the corresponding gearing are shown. The second shaft **2** carries a wheel **3** which meshes with a pinion **4** carried by the third shaft **5**. The opposite end of the shaft **5** carries a gear **6** meshing with a pinion **7** on the center wheel axle **1**. The pinion **7** is rigidly mounted on the axle **1**. The center (minute) wheel **8** is rotatably mounted on the axle **1** and is frictionally held thereon by a spring **9** (see Fig. 2) so that, with the clock running, the escapement axle (not shown) will be driven. This friction clutch, however, is not strong enough to transmit the torque, which is applied when the hand and, at the same time, the center wheel axle are turned manually, so that in the present case the center wheel **8** will not move. Due to the rigid connection between the center wheel axle **1** and its pinion **7**, the intermediate gears are turned when the minute hand is set. So far, the embodiments shown in Figs. 1 and 4 are identical.

In the embodiment of Fig. 1, a star wheel **10** is mounted on the intermediate shaft **5** and is rigidly connected with the intermediate wheel **6**. If the clock is to strike once an hour, the number of teeth of the star wheel **10** is equal to the reduction gear ratio between the pinion **7** and the intermediate wheel **6**. If half hours also are to be struck, the number of teeth has to be doubled. The teeth of the star wheel **10** cooperate with a pallet **11** of a rocker **12** which is loosely and rotatably carried by the hammer axle **13**. The rocker **12** engages a dog **14** which is rigidly mounted on the hammer axle (see also Fig. 3). The hammer axle **13** carries a hammer **15** which strikes a bell **16** or a similar device.

For hourly striking, the star wheel **10** is arranged so that the pallet **11** of the rocker **12** glides over the tip of a tooth of the star wheel when the minute hand reaches the position **12** on the dial. At that moment, the dog **14** and with it the hammer axle **13** will be turned so far as to enable the hammer **15** to fall down with a sufficiently long stroke.

When the minute hand is manually set in clockwise direction, the star wheel **10** moves as if the clock would be working, i. e., the rocker **12** is moved against the dog **14** and the clock will strike when a striking position is passed across. When the minute hand is turned counterclockwise, the rocker **12** will be turned by the teeth of the star wheel **10** in opposite direction and will not engage the dog **14** so that the hammer will not be lifted from the bell **16**. With the pallet **11** sliding over the tip of a tooth of the star wheel, the rocker **12** will fall back to its starting position.

In the embodiment shown in Fig. 4, a star wheel **17** is mounted on the second intermediate shaft **2** from which the third shaft **5** is driven. The number of teeth of the star wheel **17** is again in accordance with the gear ratio relative to the center wheel axle **1** which in this case is high. Otherwise, the arrangement corresponds to the one shown in Fig. 1. The teeth of the star wheel **17** affect a rocker **12** which is freely and rotatably carried by the hammer axle **13**. The rocker **12** cooperates with a dog **14** which is rigidly mounted on the hammer axle.

The star wheel may also be mounted on the hour wheel hub (see Fig. 6) which is driven from the center wheel axle **1**, instead of being mounted on the axle **5** or **2**, either of which is provided between the center wheel **8** and the main-spring barrel. It then will have twelve teeth if the clock is to strike once on the hour. The operative engagement between the star wheel and the hammer axle is the same as has already been described. The arrangement of the pinion **7'** and of the center wheel **8'** on the center wheel axle **1'** may also be the same. However, since the hour wheel hub remains rigidly coupled with the center wheel axle when the minute hand is moved, the pinion **7'** may be rigidly connected with the center wheel **8'** in the usual way and may be loosely held on the center wheel axle **1'** by friction so that the movement of the center wheel **8'** is not transmitted to the intermediate gears when the minute hand is set manually. Mounted on the center wheel axle is, besides the pinion **7'** and the center wheel **8'**, the pinion **21** rotatably carried by the center wheel axle. The pinion **21**, under the action of the spring **22** (see Fig. 7), is frictionally taken along by the center wheel axle **1'** to act upon the intermediate wheel **23** and the pinion **24** which is connected with the wheel **23**. The pinion **24** meshes with the hour wheel **19**. The latter and the star wheel **18** are mounted on the hub **20** which is freely rotatable on the center wheel axle.

It is believed that my invention as well as the construction and operation of the forms shown, and the many advantages thereof, will be understood from the foregoing detailed description thereof. Some of the con-

structional features are reviewed hereinafter. I provide a star wheel on a shaft driven at a rotative speed that is smaller than that of the center wheel axle. The number of teeth of the star wheel corresponds to the reduction gear ratio between the center wheel axle and the star wheel shaft. The teeth of the star wheel actuate a lever which is connected to the hammer axle. The star wheel shaft may be provided between the mainspring barrel and the center wheel axle. Preferably, the star wheel is connected with the intermediary wheel which meshes with the pinion on the center wheel axle. It is, however, also possible to move the star wheel further away from the center wheel axle towards the mainspring barrel and to connect it, for example, with the gear which drives an intermediary shaft. Still another possibility is to mount the star wheel on the hour wheel hub, i. e., in rigid connection with the hour wheel which is driven from the center wheel axle.

To prevent displacement of the star wheel with respect to the position of the hands when the minute hand is moved (setting of the clock), an arrangement has to be provided to cause the star wheel to follow the movement of the hand. With conventional clocks with striking movement, this requirement is met by mounting the cam which controls the striking movement directly on the center wheel axle. Where the star wheel is mounted on the hour wheel hub, the permanent rigid connection between hands and star wheel is provided at all times. However, in the case of the star wheel being mounted on a shaft between the center wheel axle and the mainspring barrel, it is not possible to use the usual arrangement of the center wheel and its pinion being rigidly connected and rotatably mounted with friction on the center wheel axle. If with such an arrangement the hands are set, the shaft carrying the star wheel does not move along. According to my invention, the pinion is rigidly mounted on the center wheel axle, thereby providing a rigid connection between the hour wheel and the star wheel. The center wheel is rotatably mounted on its axle under sufficient friction to drive the escapement axle when the clock is running, but which prevents a backward movement of the escapement axle when the hands are moved manually with a relatively high torque.

To prevent damage to the movement when the hands are set counterclockwise, the rocker which is actuated by the teeth of the star wheel is loosely mounted on the hammer axle and cooperates with a dog rigidly mounted on the hammer axle. When the hands are turned counterclockwise, the rocker will turn ineffectively and, on passing over the tip of a tooth of star wheel, it will fall under its own weight back into its original position. When the clock is set clockwise, the rocker will be moved against the dog in the same way as if the clock would work so that the clock will strike every time the hands are passed through a striking position of the dial.

It will be apparent that while I have shown and described my invention in a number of forms, many changes and modifications may be made without departing from the spirit of the invention defined in the following claims.

I claim:

1. Anniversary clock comprising a clock movement, and a striking device which strikes at least on every hour, the clock movement including a minute axle, a shaft, and a reduction gearing between said axle and shaft, the said shaft being one of the shafts of the clock train, the striking device including a star wheel mounted on said shaft and being thus operative from the clock movement, a hammer axle, and means carried by the hammer axle to be responsive to the star wheel and to transmit motion to the hammer axle.

2. In the clock according to claim 1, said means including a rocking lever and a dog, the rocking lever being freely and rotatably carried by the hammer axle for actuation by the star wheel and to actuate the dog, the dog being rigidly mounted on the hammer axle.

3. In the clock according to claim 1, said shaft carrying besides said star wheel an intermediate gear, the minute wheel axle having a pinion mounted thereon, the star wheel being connected with said intermediate gear, the intermediate gear meshing with the pinion and forming said reduction gearing therewith.

4. In the clock according to claim 1, another shaft being arranged between the minute wheel axle and the star wheel-carrying shaft, the star wheel-carrying shaft carrying besides the star wheel an intermediate gear, said intermediate gear being connected with the star wheel and driving said other shaft.

5. In the clock according to claim 1, said star wheel-carrying shaft carrying besides the star wheel the hour wheel, the hour wheel being connected with the star wheel and being driven from the minute wheel axle.

6. In the clock according to claim 1, a pinion being rigidly mounted on the minute wheel axle, the minute wheel being, independently from the pinion, rotatably and frictionally carried by the minute wheel axle.

References Cited in the file of this patent

UNITED STATES PATENTS

213,999	Ostrom	Apr. 8, 1879
240,013	Estell	Apr. 12, 1881
1,966,002	Carlson	July 10, 1934
2,145,018	Tweedale	Jan. 24, 1939
2,348,120	Frostling	May 2, 1944

FOREIGN PATENTS

373,431	Germany	Apr. 12, 1923
135,293	Switzerland	Nov. 16, 1929
813,314	France	Feb. 22, 1937