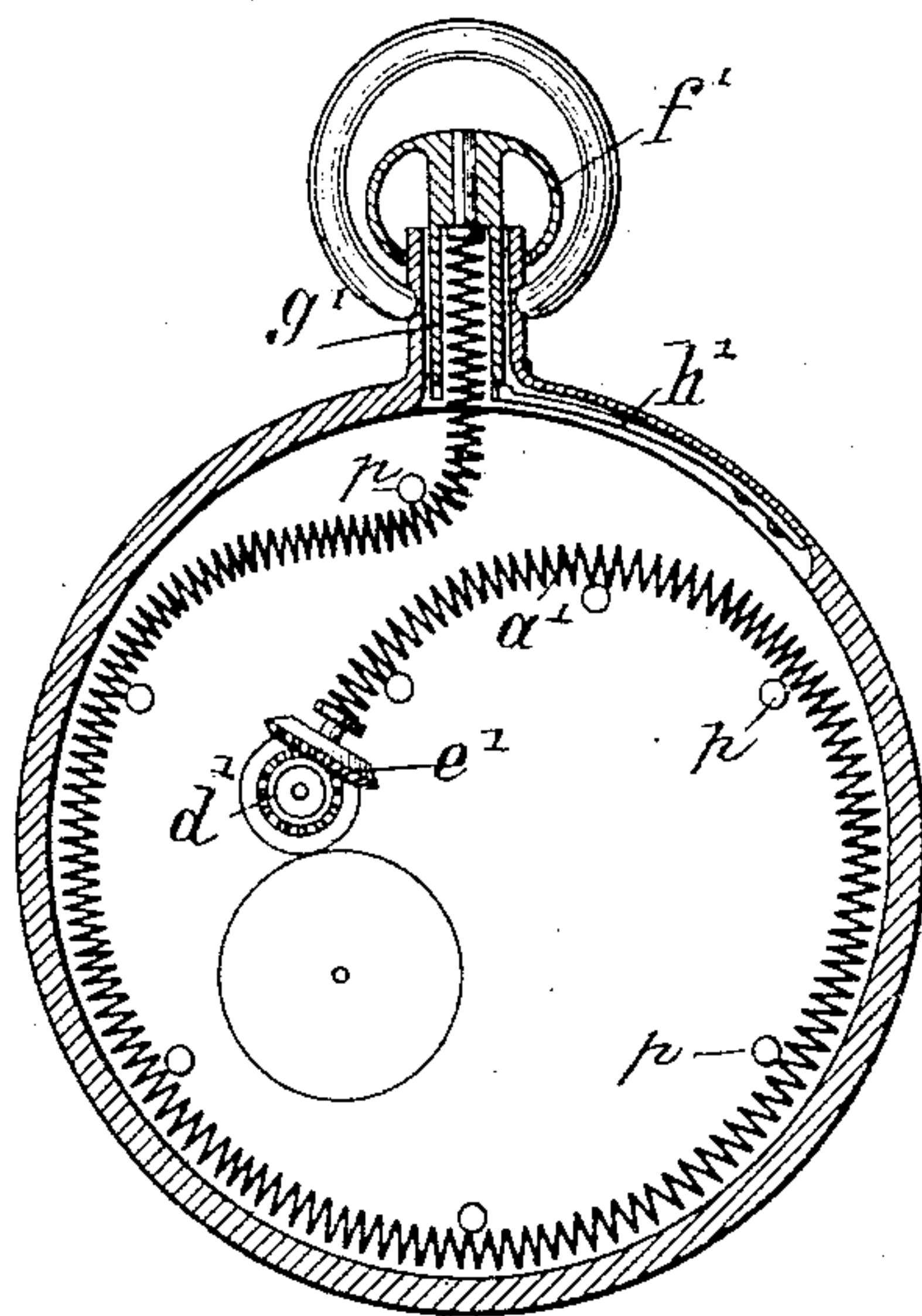


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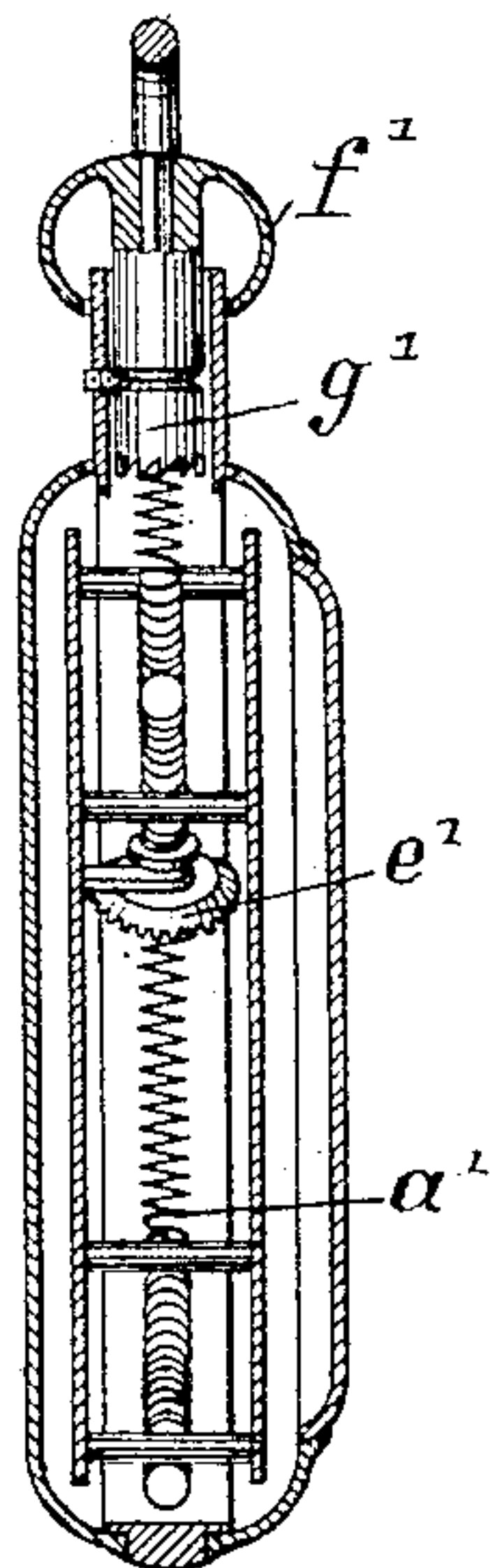
No. 345,231.

Patented July 6, 1886.

*Fig. 1.*



*Fig. 2.*



*Inventor,*

*Heinrich Friedrich Hambruch*

By Paine & Ladd

Attys.

(No Model.)

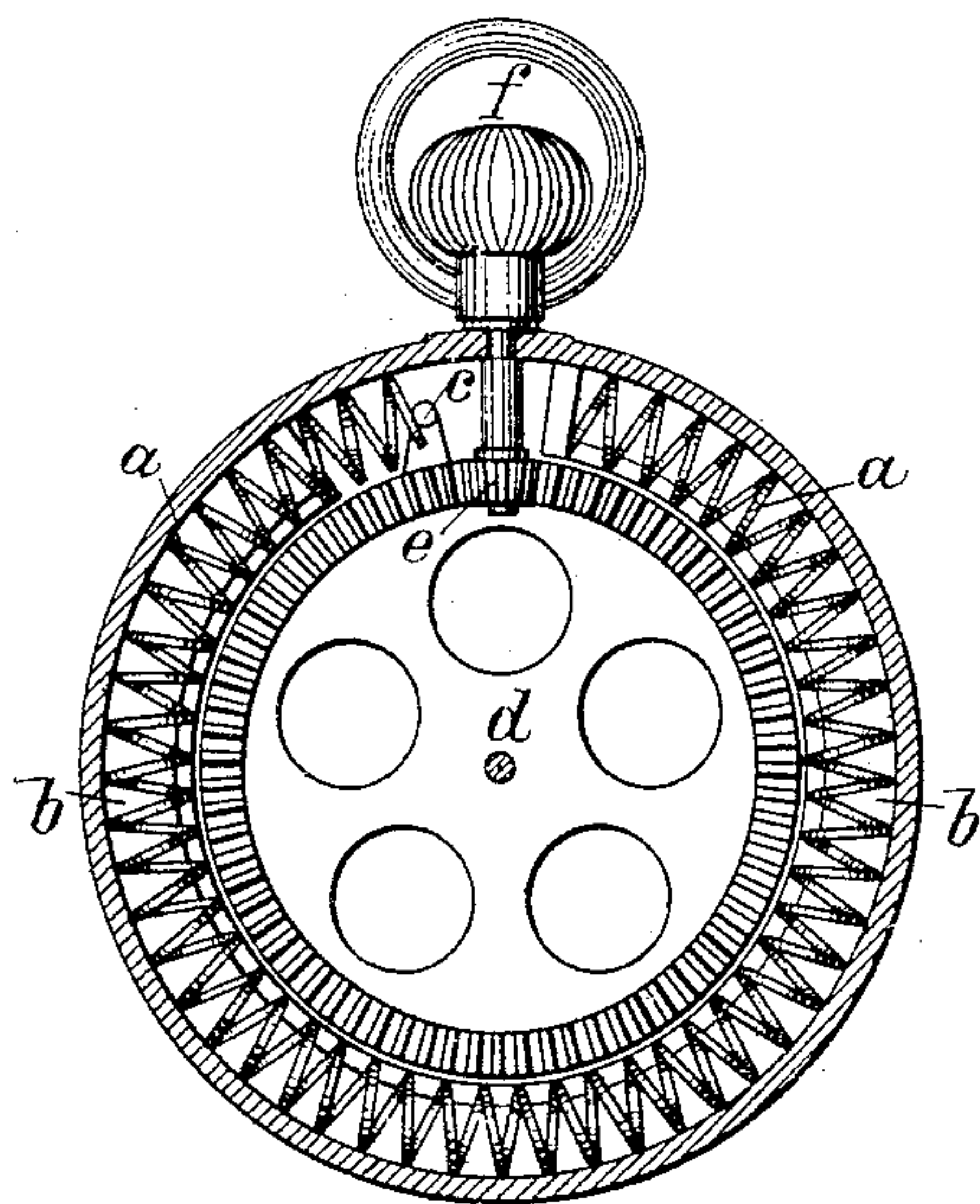
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H. F. HAMBRUCH.  
WATCH WINDING MECHANISM.

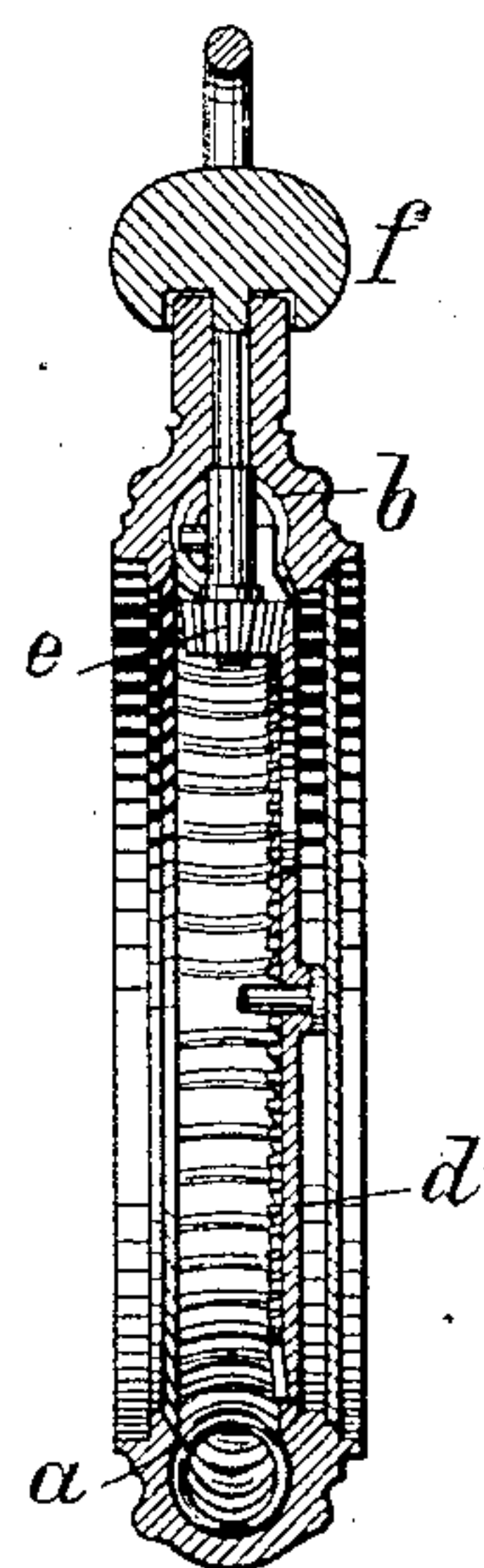
No. 345,231.

Patented July 6, 1886.

*Fig. 3.*



*Fig. 4.*



*Witnesses,*  
*C. J. Bell,*  
*O. A. Clark*

*Inventor,*  
*Heinrich Friedrich Hambruch*  
*By Paine & Ladd,*  
*Attys.*



# UNITED STATES PATENT OFFICE.

HEINRICH FRIEDRICH HAMBRUCH, OF HAMBURG, GERMANY.

## WATCH WINDING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 345,231, dated July 6, 1886.

Application filed December 31, 1885. Serial No. 187,196. (No model.) Patented in Germany April 9, 1885, No. 33,738; in France April 20, 1885, No. 168,383, and in Belgium November 14, 1885, No. 70,848.

*To all whom it may concern:*

Be it known that I, HEINRICH FRIEDRICH HAMBRUCH, a subject of the German Emperor, and a resident of Hamburg, in the German Empire, have invented certain new and useful Improvements in Watches and Clocks, of which the following is a specification.

My invention relates to improvements in the mainsprings of watches and clocks; and the object of my improvement is to obtain a more constant and increased driving-power. I attain this object by employing a helical spring, which I locate circumferentially within the case and around the works, which are encompassed by it. I am thus able to use a very long helical spring, which will store up a considerable amount of power. To wind up such a spring in order to store up the power for driving the train, it may be either compressed longitudinally or excessively twisted. When a suitable escapement is inserted in the wheel-work, the spring in both cases, either of the compressed or twisted form, will drive the works with a very regular and uniform force until it has expanded or unwound itself.

In order to make my invention more clearly understood, I will describe it with reference to the accompanying drawings, which show the invention applied to watches, and in which—

Figures 1 and 2 illustrate the application of a twisted helical spring, and Figs. 3 and 4 the application of a compressed spiral spring. Similar letters refer to similar parts throughout the several views.

In the construction shown in Figs. 1 and 2 the helical spring *a'* is attached at one end to the stem *f'* and at the other end to the beveled wheel *e'*. At the lower part of the stem there is a ratchet, *g'*, which is arrested by the click *h'*. *d'* is a second beveled wheel, with which the wheel *e'* engages, and which transmits the force of the spring *a'*, twisted by winding up the wheel-work. The spring can be coiled within the clock or watch case in any way that least interferes with the watch mechanism, and I preferably arrange the

spring so that it encompasses the works, passing clear around the watch. In this way a very long helical spring can be used. In the present case the spring is held in its proper place by means of the guide-pins *p*, the spring, commencing with the stem end, passing under the first guide-pin, so as not to give it too great a bend, and then outside of the other pins close against the case.

In the form shown in Figs. 3 and 4 the spring is also wound up by turning the stem *f*. To effect this a pinion, *e*, fixed to the inner end of the stem *f*, engages with a gear-wheel, *d*, which has a projection or finger, *c*. The helical spring *a* is placed inside an annular channel, *b*, through a slit of which passes the finger *c*, thus abutting against one end of the spring *a*, the other end bearing against the bottom plate of the annular channel. As the wheel *d* is connected with the main shaft of the wheel-work by a suitable ratchet device, the wheel-work will be moved by the compressed spring *a*.

Having thus described my invention and the best modes of constructing and operating the same, what I claim as new, and desire to secure by Letters Patent, is—

1. In a time-piece, a mainspring consisting of a helical spring coiled circumferentially within the case, substantially as set forth.
2. In a time-piece, the combination, with a helical mainspring coiled circumferentially within the case, of mechanism for twisting the same, substantially as set forth.
3. In a time-piece, the combination, with a helical mainspring coiled circumferentially within the case and operatively connected with the time-indicating mechanism, of a revoluble stem projecting from the said case and connected with the said spring, for storing up the power, substantially as and for the purpose set forth.
4. In a time-piece, the combination, with a helical mainspring coiled circumferentially within the case and operatively connected with the time-indicating mechanism, of a winding-stem attached to one end of the said spring, and having a ratchet or similar re-

taining device, substantially as and for the purpose set forth.

5. In a time-piece, the combination, with a helical mainspring, of the guide-pins *p*, substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my invention I have signed my name, in pres-

ence of two witnesses, this 16th day of December, 1885.

HEINRICH FRIEDRICH HAMBRUCH.

Witnesses:

DIEDRICH PETERSEN,  
ALEXANDER SPECHT.