

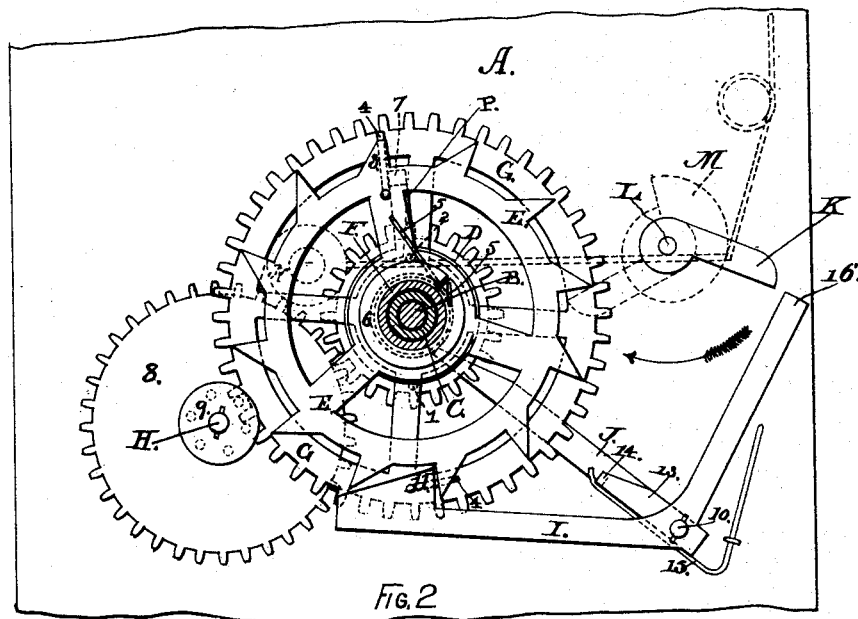
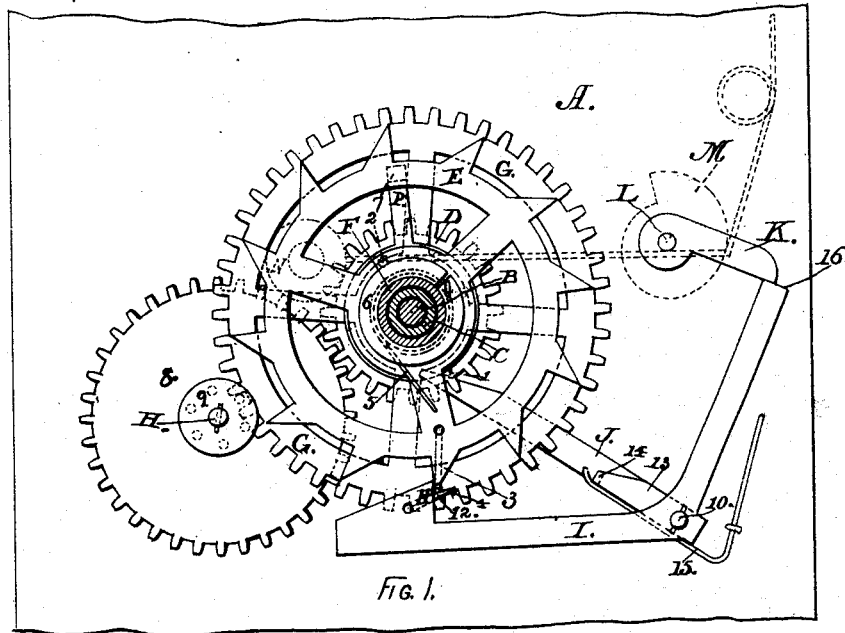
(Model.)

3 Sheets—Sheet 1.

C. BRAUN.
CLOCK STRIKING MECHANISM.

No. 420,006.

Patented Jan. 21, 1890.



WITNESSES:

S. B. Brewer.

John C. Altman.

INVENTOR:

CARL BRAUN

BY

William H. Low,
Attorney.

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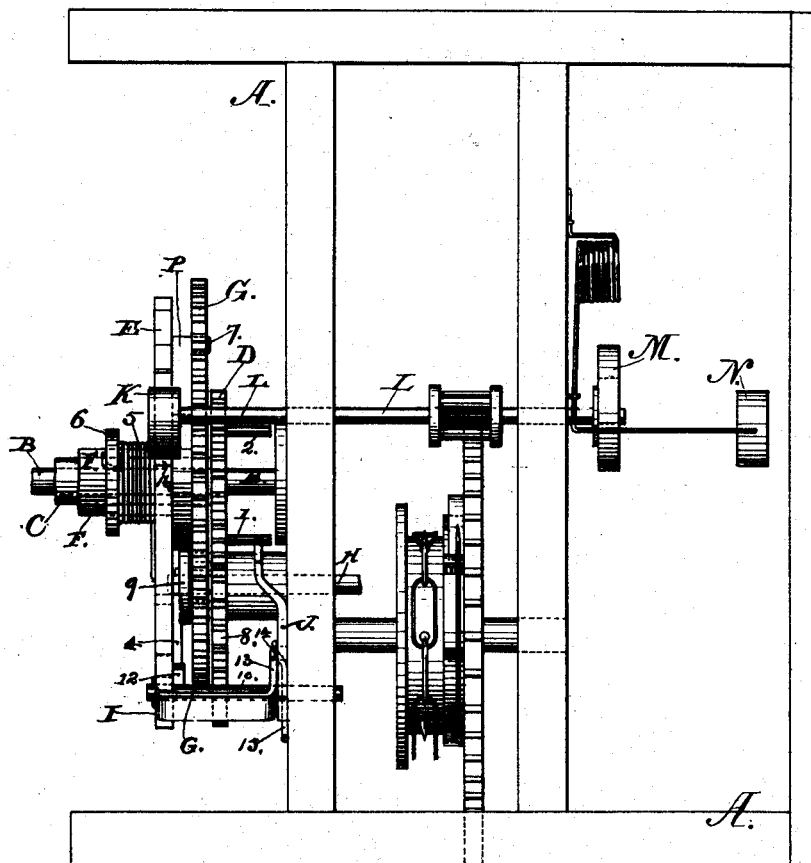


FIG. 3.

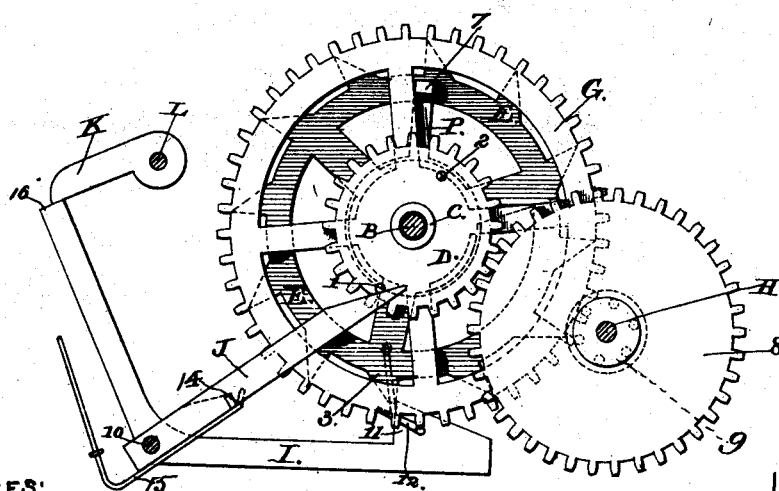


FIG. 4.

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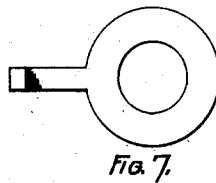
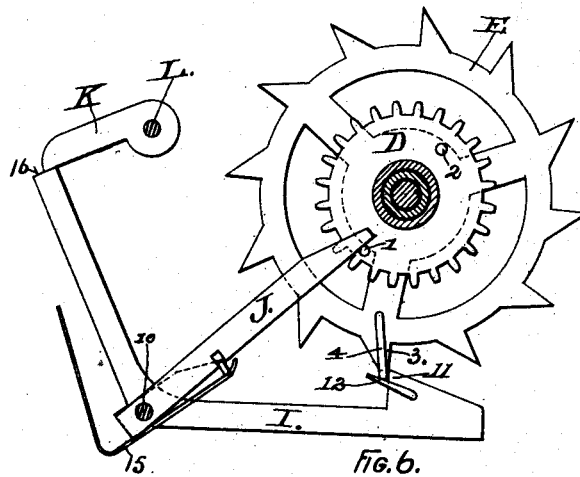
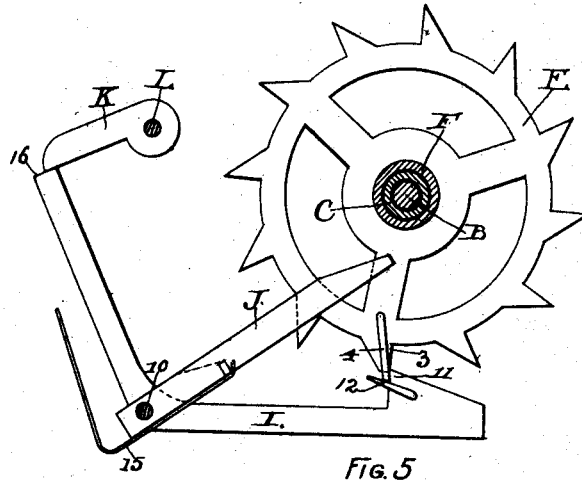
(Model.)

3 Sheets—Sheet 3.

C. BRAUN.
CLOCK STRIKING MECHANISM.

No. 420,006.

Patented Jan. 21, 1890.



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UNITED STATES PATENT OFFICE.

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CLOCK STRIKING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 420,006, dated January 21, 1890.

Application filed February 13, 1889. Serial No. 299,700. (Model.)

To all whom it may concern:

Be it known that I, CARL BRAUN, a subject of the King of Prussia, residing at Königsberg, in the Province of Prussia and Kingdom of Prussia, Germany, have invented new and useful Improvements in Striking Apparatus for Clocks, of which the following is a specification.

My invention relates to improvements in the striking apparatus for clocks; and it consists of a novel combination of parts constructed and arranged as hereinafter set forth and described.

In the accompanying drawings, which are herein referred to and form part of this specification, Figure 1 is a front elevation of a clock provided with my improvements, the dial being removed to expose underlying parts with the striking apparatus shown in its locked position. Fig. 2 is a like elevation with the striking apparatus released, as when ready to begin striking. Fig. 3 is a side elevation of Fig. 1. Fig. 4 is a detached rear elevation of my striking apparatus. Fig. 5 is a detached and enlarged rear elevation of the star-wheel, detent-lever, releasing-arm, and gathering-pallet of my striking apparatus. Fig. 6 is a detached and enlarged rear elevation of the star-wheel, detent-lever, releasing-arm, gathering-pallet, and minute-wheel of my striking apparatus; and Fig. 7 is an enlarged and detached rear elevation of the vibratile stop-arm of my striking apparatus.

As represented in the drawings, A is the frame-work of the clock, which may be made in any suitable form that may be preferred; and it should be understood that my invention has no relation to said frame-work, to the time-work, nor to the motive power by which either the time-work or striking apparatus is operated, either of which may be constructed in any preferred form.

B is a stationary stud or pivot, which forms an axis on which the hands of the clock revolve, said stud being secured to the frame-work of the clock.

C is the sleeve to which the minute-hand of the clock and a minute-wheel D are secured. Said sleeve is fitted to revolve on the stud B,

and said minute-wheel is provided on its rear-most face with releasing-pins 1 and 2, the first of which is fixed farther from the center of the wheel than the other; but the two should be diametrically opposite to each other, said pins being for a purpose hereinafter explained.

E is the star-wheel, which is loosely fitted on the sleeve F, to which the hour-hand of the clock and the hour-wheel G are secured. Said star-wheel has on its periphery twelve teeth of an angular form, as shown in the drawings. One of said teeth (marked 3 in Figs. 1, 2, and 5) is cut off on its outer end, and a rib 4 is secured to its inner side, so as to extend outwardly to correspond to the length of the other teeth of the star-wheel, but not upon the same vertical plane of said teeth, said shortened tooth and offset-rib being for purposes hereinafter explained.

A delicate helical spring 5, which surrounds the hour-sleeve F, has one end secured to the star-wheel E and its opposite end secured to a collar 6, which is attached to the sleeve F, and for that purpose said collar is preferably made with a radial cut through it, so as to allow of its being held by frictional contact on said sleeve. A vibratile arm P, loosely fitted upon the sleeve F, is placed between the star-wheel E and hour-wheel G, and is provided at its outer end with a side lug or hook 7, which is left free to move in the space between that arm of the hour-wheel that corresponds in position with the shortened tooth 3 when the clock strikes twelve and the next succeeding arm.

H is a driving-shaft to which the motive power for the time part is applied, and to which is secured a wheel 8, that engages in the minute-wheel D, and a pinion 9, that engages in the hour-wheel G for the purpose of imparting motion at the proper rates of speed to said minute-wheel and hour-wheel.

I is a detent-lever that is fitted to oscillate on a fixed pivot 10, and is provided with a hook 11, which is adapted to engage step by step with the teeth of the star-wheel E to prevent the latter from flying backward at improper times under the strain of the spring 5. Said hook has on its inner side a longitudinal

rib 12, which is fitted to engage with the outer end of the rib 4, so as to allow the hook 11 to slightly engage with the shortened tooth 3, and thereby retain the star-wheel E in a state of rest. Said detent-lever has an arm 13 or an equivalent device, which is provided with a stud 14, which is fitted to engage with a releasing-lever J, said arm and lever being held in position to move as one piece by means of a spring 15, while said lever is being depressed by the releasing-pins either 1 or 2, to release the hook 11 from its engagement with the tooth 3 of the star-wheel E. By reason of the releasing-lever J being fitted to vibrate on the pivot 10 and having a yielding connection with the arm 13, it is left free to be moved in an upward direction, as when the minute-wheel D is rotated in a reversed direction, without producing any movement of the detent-lever I. The arm of said lever that is oppositely located to the hook 11 is bent upwardly to form on its outer end a seat 16, which retains the gathering-pallet K in position to suspend the operation of the striking apparatus when it has completed any phase of its function.

L is a shaft, which has at its outer end the gathering-pallet K secured thereto and at its opposite end a volute-shaped cam M, (shown by dotted lines in Figs. 1 and 2,) said cam being adapted to bear against the arm of a spring-actuated hammer N, so as to cause the latter to be brought into contact with the bell of the clock to produce a proper response from said bell.

The releasing-pin 2, the one nearest the center of the minute-wheel, will, as it is approaching the lowest phase of its movement, depress the releasing-lever J, thereby effecting the releasement of the detent-lever I from the gathering-pallet K, leaving the latter free to make a single rotative movement and effect the striking of one blow on the bell at each half-hourly indication of the clock. In like manner the releasing-pin 1, which is farthest from the center of the minute-wheel D, will depress said releasing-lever at the end of each hour to set free the striking mechanism to strike the number of blows on the bell to correspond to the hour indicated by the clock.

My striking apparatus operates in the following manner: When the minute-hand is near its position to indicate any hourly indication on the clock, the releasing-pin 1 of the minute-wheel will begin to depress the releasing-lever J, thereby tilting the detent-lever I so as to relieve the rib 4 from the pressure of the rib 12. This primary movement of the detent-lever sets free the star-wheel E, which, under the resilient action of the spring 5, then flies backward on its axis until the rib 12 strikes the vibratile arm P, which should always under this condition stand diametrically opposite to the direction in which the hour-hand points at the completion of any hour. By the continued rotation of the min-

ute-wheel the depression of the releasing-lever J and the tilting movement of the detent-lever I is carried forward until the seat 16 of said detent-lever is released from its engagement with the gathering-pallet K. Simultaneously with this releasement the hook 11 is thrown by the spring 15 into engagement with the radial side of that tooth of the star-wheel which corresponds to the first unit of the hour that is then to be struck. At the instant the gathering-pallet K is released from the detent-lever I the motive power that imparts motion to the shaft L causes the latter to rotate, and said gathering-pallet is brought successively into contact with the teeth of the star-wheel, which at the time of beginning an operation of striking intervene between the point of starting the strokes and the shortened tooth 3; and it must be understood that each revolution of the shaft L will cause its cam M to move the hammer N to produce a single stroke on the bell of the clock. As soon as the number of strokes at the completion of any hour has been produced, the star-wheel E will reach a position where its rib 4 will re-engage with the rib 12 and retain the detent-lever I in position to stop the further movement of the gathering-pallet K, and thereby lock the striking apparatus until it is again released in the manner just described.

It will be seen that as the number of the step-by-step movements of the star-wheel E increases there will be produced a corresponding increase in the winding up of the spring 5, and consequently a corresponding increase in the resilient power of said spring, thereby giving the latter sufficient control over the star-wheel E to effect a proper backward movement of said wheel when the higher number of hours have been reached. After the twelfth hour has been struck, but before the gathering-pallet K is fully released from the detent-lever I to strike the first hour, the star-wheel E will be thrown backward a complete revolution, and thereby the vibratile arm P will be moved back into the position required for allowing the successive hours to be struck in their order.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a clock striking apparatus, the combination of a stationary or non-revoluble stud, a minute-hand sleeve fitted to revolve on said stud and having a minute-wheel secured thereto, an hour-hand sleeve fitted to revolve on said minute-hand sleeve and having an hour-wheel secured thereto, a star-wheel loosely fitted on said hour-hand sleeve, and a spring by which said star-wheel is connected to said hour-hand sleeve, said spring being fitted to permit a step-by-step rotative movement of said star-wheel without affecting the movement of said hour-hand sleeve, and to produce a fly-back movement of said star-wheel when the latter is freed from restraint, as and for the purpose herein specified.

2. In a clock striking apparatus, the combination of a star-wheel having the point of one of its teeth cut off and having a radial rib secured to the side of the shortened tooth
5 to extend to the circumferential line of the points of the other teeth, and a detent-lever provided with a hook having a longitudinal rib attached to one of its sides, the said longitudinal rib being fitted to engage with the
10 outer end of the radial rib on the star-wheel, and thereby preventing the hook of said detent-lever from engaging with the shortened tooth of said star-wheel, as and for the purpose herein specified.

15 3. In a clock striking apparatus, the combination of a star-wheel provided with a radial rib on the side of one of its teeth, and a vibratile arm loosely fitted on the hour-hand sleeve between the hour-wheel and star-wheel
20 and having at its outer end a hook which engages with an arm of the hour-wheel, and thereby forms a stop to limit the fly-back movement of the star-wheel at the completion of each hour, as and for the purpose herein
25 specified.

4. In a clock striking apparatus, the combination of a star-wheel that is loosely fitted on the hour-hand sleeve and is connected

thereto by means of a spring, said star-wheel being adapted to receive a step-by-step rotative movement which will effect the winding
30 up of said spring without affecting the proper movement of said sleeve, and the resilience of said spring effecting a fly-back movement of said star-wheel when the latter is free from
35 restraint, a gathering-pallet which is adapted to successively engage with the teeth of said star-wheel to effect a step-by-step rotative movement of the latter, a detent-lever having
40 at one end a hook and at the opposite end a seat for arresting the movement of the gathering-pallet, said hook being adapted to successively engage with the teeth of said star-wheel and prevent a fly-back movement of the
45 latter at improper times, and a releasing-lever which is flexibly connected to said detent-lever and is operated by the minute-wheel of the clock, as and for the purpose herein specified.

In testimony whereof I hereunto subscribe
50 my name in the presence of two subscribing witnesses.

CARL BRAUN.

Witnesses:

CARL KNOPP,
ROBT. SUTKUS.