

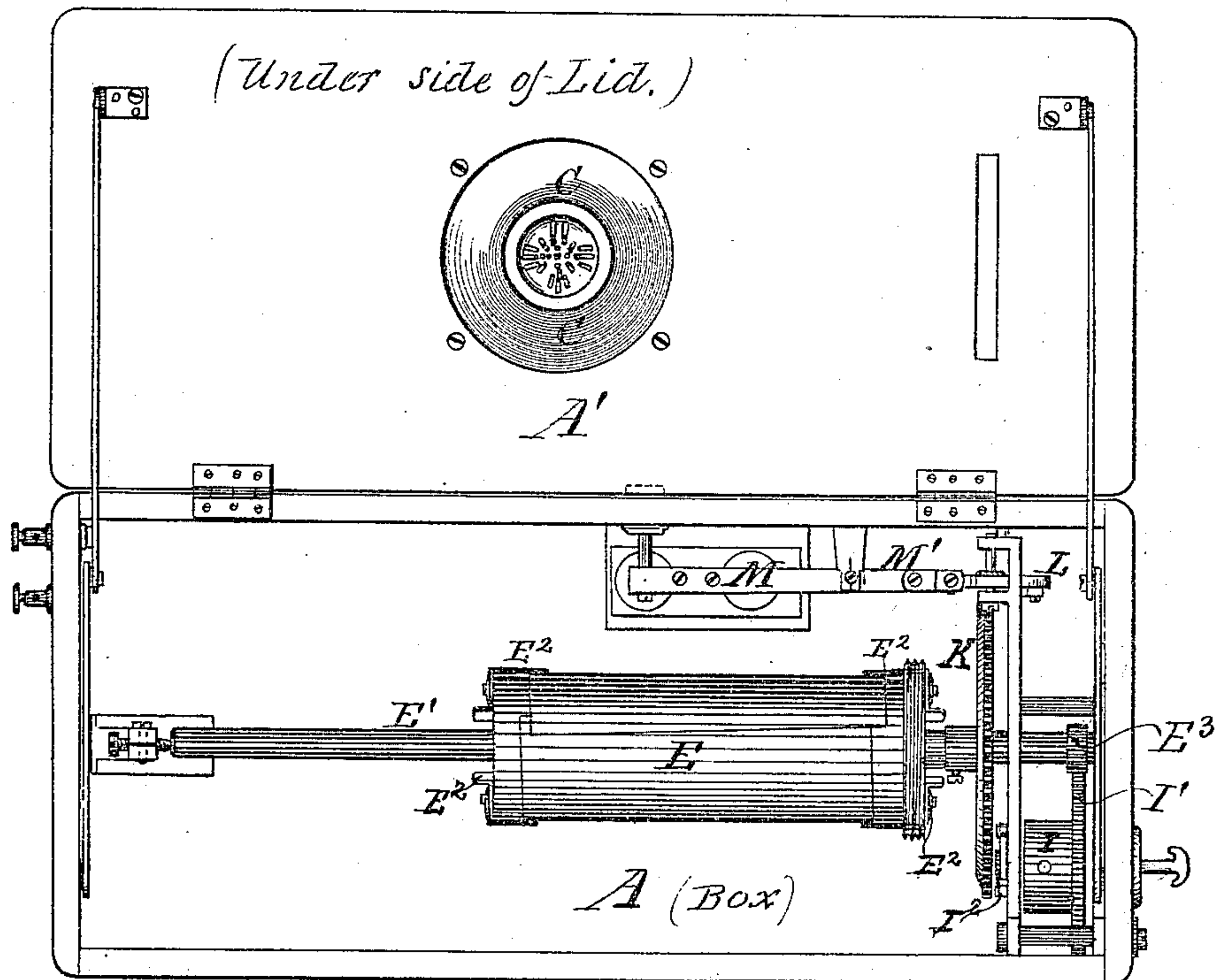
HANS R. MALLING J. HANSEN.

## Type-Writing Machine.

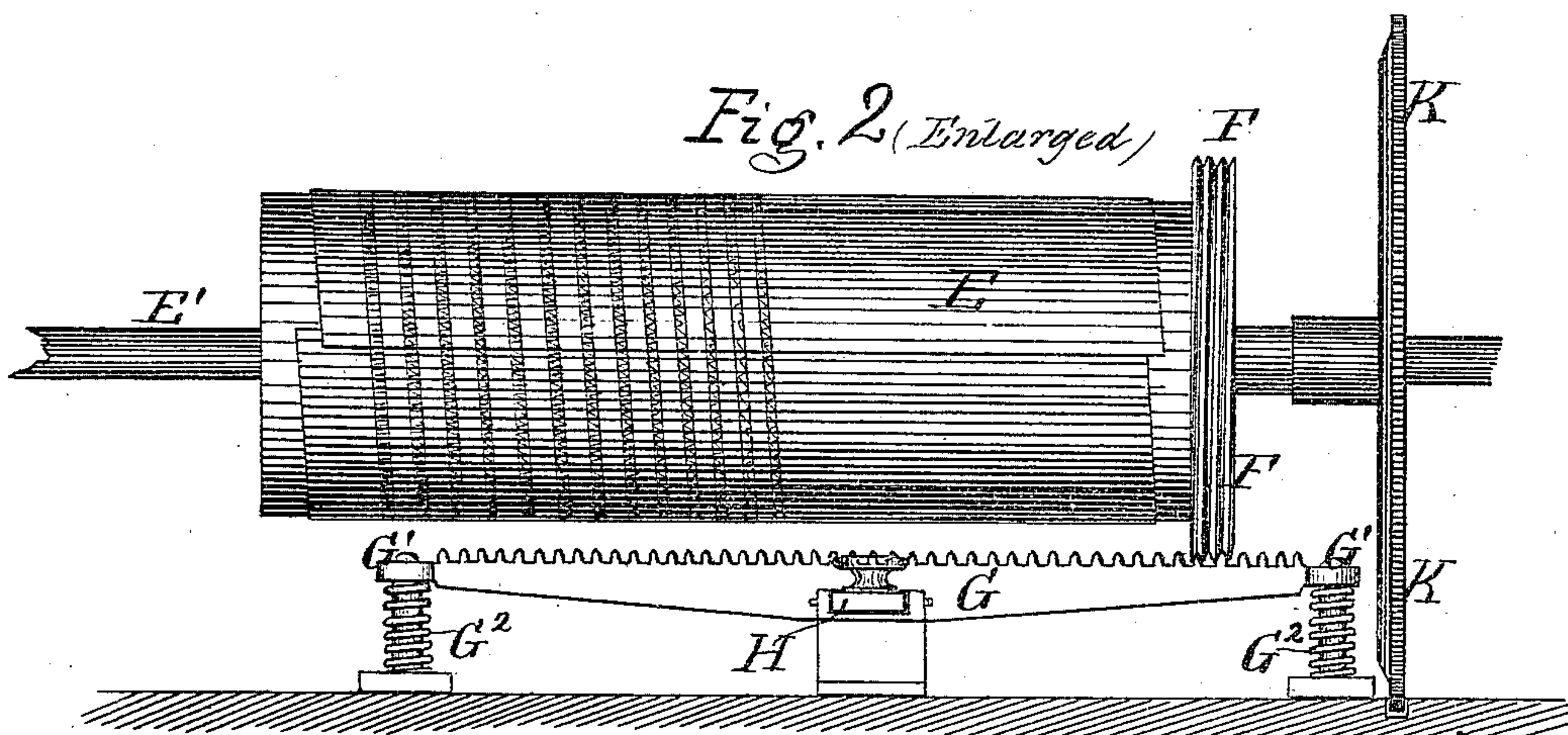
No. 125,952.

Patented April 23, 1872.

Fig. 1. (Plan)



*Fig. 2 (Enlarged)*



Hans R Malling J. Hansen.

*Inventor*

by

C. N. Clausen  
his Atty.

his Atty.

Attest

Attest  
J. H. Sprague  
Clerk J. C. Lib

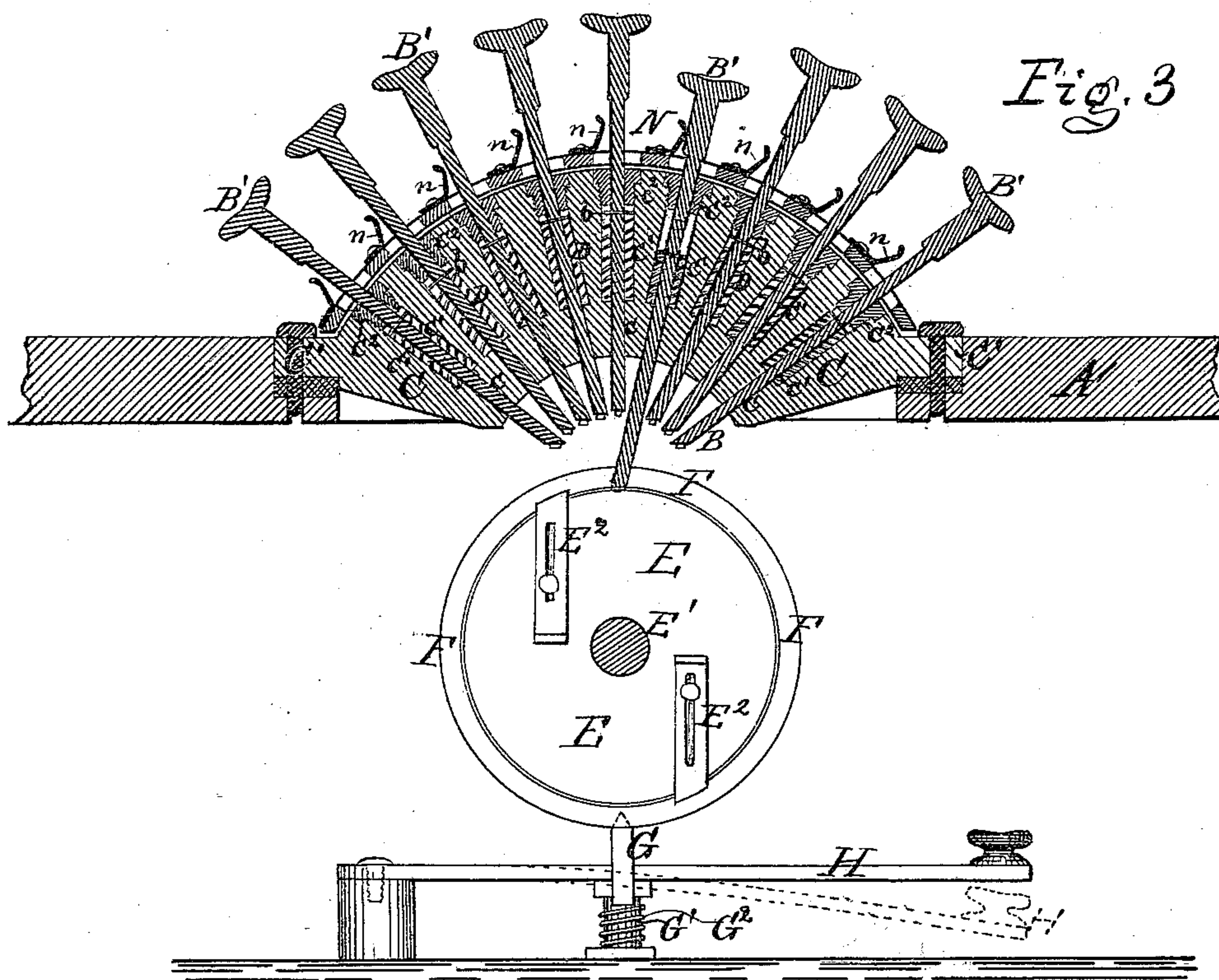
Edw. J. Hib

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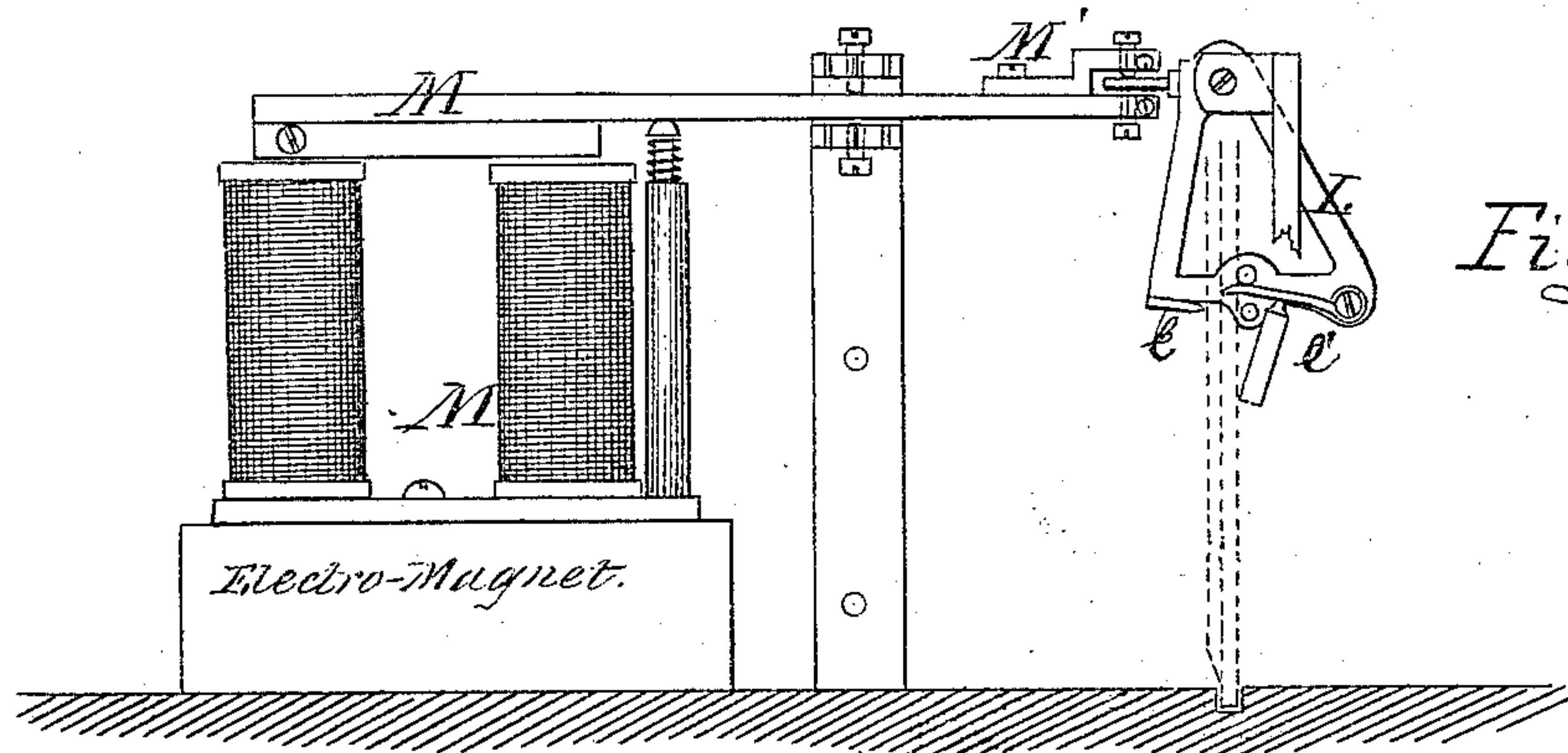
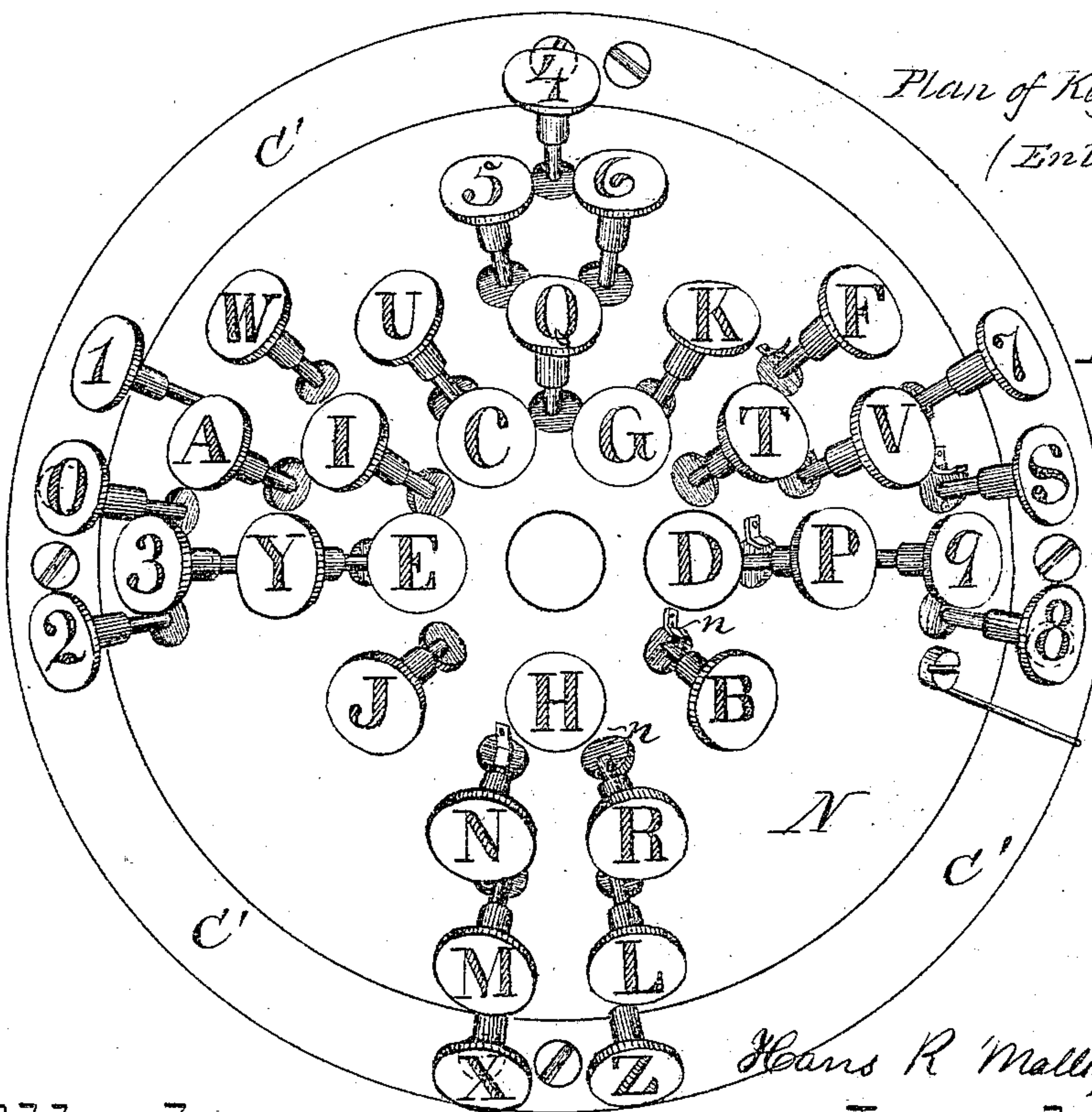


Fig. 4



Plan of Key-Board  
(Enlarged)

Fig. 5

Attest  
J. H. Sprague.  
P. Edw. J. Eils.

Hans R. Malling J. Hansen  
Inventor  
by  
C. F. Clausen  
his Atty.



# UNITED STATES PATENT OFFICE.

HANS R. M. J. HANSEN, OF COPENHAGEN, DENMARK.

## IMPROVEMENT IN TYPE WRITING-MACHINES.

Specification forming part of Letters Patent No. 125,952, dated April 23, 1872.

Specification describing certain Improvements in Typographical Machines, invented by HANS R. MALLING J. HANSEN, of Copenhagen, in the Kingdom of Denmark.

This invention relates to that class of typographical machines which for the sake of economizing time and of perspicuity of the work are used by writers and copyists to print what is usually written with a pen, and which are to this end provided with the requisite number of types, comprising the letters of the alphabet and other characters entering into the composition of words and sentences, &c., and arranged in such a manner that characters may be one after another printed upon sheets of paper by the direct action of such types. My improvement consists, principally, in the employment of reciprocating types, all radiating from or converging toward a common center which lies in the plane where the impressions are made.

Figure 1 is a plan view, showing the lid of the box in which the various parts of the machine are arranged, opened and folded back to expose to view the paper-drum and the mechanism for operating the same. Fig. 2 is an elevation of the paper-drum with its worm gearing into a rack underneath. Fig. 3 is a transverse section. Fig. 4 is an elevation of the electro-magnet and escapement. Fig. 5 is a plan view of the key-board. Figs. 2 to 5 are drawn on an enlarged scale.

The same letters of reference are employed in the several figures in the designation of identical parts.

The various mechanical means for operating the drum or roller which carries the paper to be printed upon are arranged in a suitable box, A, and the types in its lid A', which is hinged to the box, so that ready access may be had to the paper-drum and the mechanism for giving it motion. The types B, which should include in their number not only the letters of the alphabet, but also figures, punctuation marks, and other necessary characters, to enable one to print any word or sign occurring in the language, are fitted in a metallic shell, C, of hemispherical form, the convex surface of which projects above the upper surface of the lid A'. This shell is let into an aperture cut through the lid, and is supported upon a ledge around such aperture by a cir-

cumferential flange, C<sup>1</sup>, between which and the ledge is interposed an elastic cushion or washer of India rubber or other elastic material to permit of the proper adjustment of the shell and its types with respect to the surface of the drum where the impressions are made upon the paper in such manner that not only shall the faces of all the types be arranged in planes parallel to this surface, but the types shall also converge to a common point located in such surface. This adjustment is readily effected by adjusting the set-screws, by which the flange C<sup>1</sup> of the shell or type-holder C is clamped to the ledge of the lid. This adjustment may be effected in a slightly different way by supporting the type-holding shell upon several set-screws, screwing through its flange and bearing down upon the ledge of the lid, which is, in such case, lined with metal; said type-holding shell after adjustment being secured by other screws passing into the ledge. The types which, as stated, all converge toward a single point lying in the stroke-plane or the plane where the impressions are made, and have their faces parallel to this stroke-plane, are accurately fitted in square holes c in the interior portion of the shell C, and extending upward through cavities c<sup>1</sup> in the exterior portion of the shell, pass through perforated plugs c<sup>2</sup>, which are screwed into and close the upper end of the cavities c<sup>1</sup>. The latter are considerably longer than the stroke of the types, and contain spiral springs D, which, encircling the elongated stems of the types between a collar, b, thereon and the bottom of the cavity, tend to project the types outward, as clearly illustrated in Fig. 3. The protruding upper ends of the types terminate in knobs or keys B', each of which bear on its face a letter or character corresponding with the character formed on the type. The central type is a little shorter than the rest and bears no character; it is to be struck once or twice after the completion of each separate word or mark, and does not, when thus depressed, come in contact with the paper on the drum, but does cause an advance of the latter and a space to be left after each printed word or mark.

The type-holder C is preferably made of the hemispherical form shown and described, because it not only is the most advantageous



form for arranging the types in a small compass, but also disposes the types in a manner most convenient for playing upon their keys with the fingers.

In arranging the types the more-frequently used letters and characters should be placed conveniently to the strongest fingers, the vowels being disposed in a cluster to be operated by the fingers of the left hand, and the consonants in a similar manner to be struck by the fingers of the right hand.

The impressions are made upon sheets of paper fastened around a drum or roller, E, which is mounted on a horizontal shaft beneath the types in such a manner that it may have besides its revolving motion with the shaft an endwise movement thereon, causing its surface to travel in a spiral course. The axis of the roller is stationary, and is arranged to bring its surface on top as near to the point toward which the types converge as possible, so that only a slight adjustment of the type-holder may be necessary. At one end the drum carries a screw, F, which gears into the teeth of the rack G underneath, by means of which the drum is slid on its shaft a slight distance with each intermittent rotative motion. The endwise movement of the drum during each entire revolution should be equal to the width of the space usually left between two lines. The drum being driven in the above manner it follows that the printing may be continued without interruption from the top to the bottom of the sheet of paper, which should be wound around the drum in a spiral manner, as seen in Figs. 1 and 2, with its pitch corresponding with the pitch of the screw F, so that the lines may be printed parallel to the top and bottom edges of the sheet. The blank sheet of paper, having been wound on the drum, is covered with a sheet of inking-paper, and both sheets having been drawn tightly around the drum are fastened thereto at the ends by sliding-clasps E<sup>2</sup>, as shown, or by any other suitable and well-known devices. The rack G has perforated ends passing over vertical standards, G<sup>1</sup>, which are encircled by stiff spiral springs, G<sup>2</sup>, whereby the rack is supported. The rack can be depressed by the lever H to disengage it from the screw F on the drum that the latter may be slid on the shaft quickly whenever a new page must be begun. Rotary motion is imparted to the drum through its shaft by a coiled spring contained in the barrel I, the spur-wheel I<sup>1</sup> of which gears into the pinion E<sup>3</sup> on the shaft E<sup>1</sup>. The barrel I is attached to the end of the box, the spindle to which the end of the spring is fastened being exposed on the outside that it may be conveniently turned to wind up the spring. Suitable stop-works, I<sup>2</sup>, are also provided, as indicated in Fig. 1. The action of the spring is controlled by the escapement-wheel K and the crotch L, the pallets l and l' of which engage alternately with the teeth of the escapement-wheel in the ordinary manner.

The crotch may be operated by a pendulum or balance, in which case the drum will receive a constant intermittent movement. The more preferable because more practicable mode of operating the crotch is by means of an electro-magnet, M, the armature M' of which is connected with an arm of the crotch in the manner shown best in Fig. 4. The circuit is arranged so that it will be closed during each descent of a type and before the type makes its impression, so that the drum shall have been moved the proper distance before the type reaches it, and hold the sheet of paper stationary while the impression is made. To this end one pole of the battery is connected with the magnet and the metallic shell or type-holder C, and, consequently, the types also, while the other pole is connected to an insulated metallic cap, N, which is fastened over the convex surface of the shell C, and provided with apertures through which the stems of the types play without coming in contact with the edges thereof. At the side of each such aperture the cap N is provided with an upwardly-projecting bent spring, n, which serves as a circuit-closer by coming in contact with the upper enlarged end of the type on depressing the latter, the contact being broken as the type is returned by the spiral-spring which brings its thinner portion opposite the circuit-closer n. The different circuit-closers are so arranged with reference to the upper enlarged ends of the types that the contact will occur, closing the circuit and causing an attraction of the armature of the magnet whereby the clockwork is set a going to move the drum before the type struck reaches the paper to make the impression. The drum being moved instantaneously with the closing of the circuit will have come to a state of rest by the time the type descends upon it. The escapement-wheel projects through a slot in the lid of the box, and it has a scale upon one side with as many numbered division lines as there are teeth on the wheel. These lines come consecutively opposite to a line on the lid. On placing the sheet of paper on the roller its left-hand edge should be arranged in a definite relation to the zero line of the escapement-wheel, so that the operator may know by watching the wheel when he begins a new line.

In operating this machine it is of the utmost importance to look to the proper relative arrangement of the types and the drum, which must be such that the point toward which the types converge is coincident with the point where the impressions are made. Otherwise the characters will be printed in a "staggering" manner, instead of in straight lines, so as to do work difficult to read.

Instead of a drum for carrying the paper driven in the manner set forth, a flat surface, as, for instance, a table, may be employed with the same result by moving it simultaneously in both a longitudinal and a transverse direction.



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

1. The combination of the converging types circularly disposed and a paper-carrying surface, arranged relatively as set forth, so that the point toward which the types converge shall coincide with the point where the impressions are made.

2. The combination of the types and the paper-carrying surface, which is operated by

a coiled spring, or its equivalent, with the insulated cap N n, electro-magnet M M', and escapement L K, substantially as set forth.

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

HANS R. M. J. HANSEN.

Witnesses:

A. APPELT,  
MALTHE GETHER.