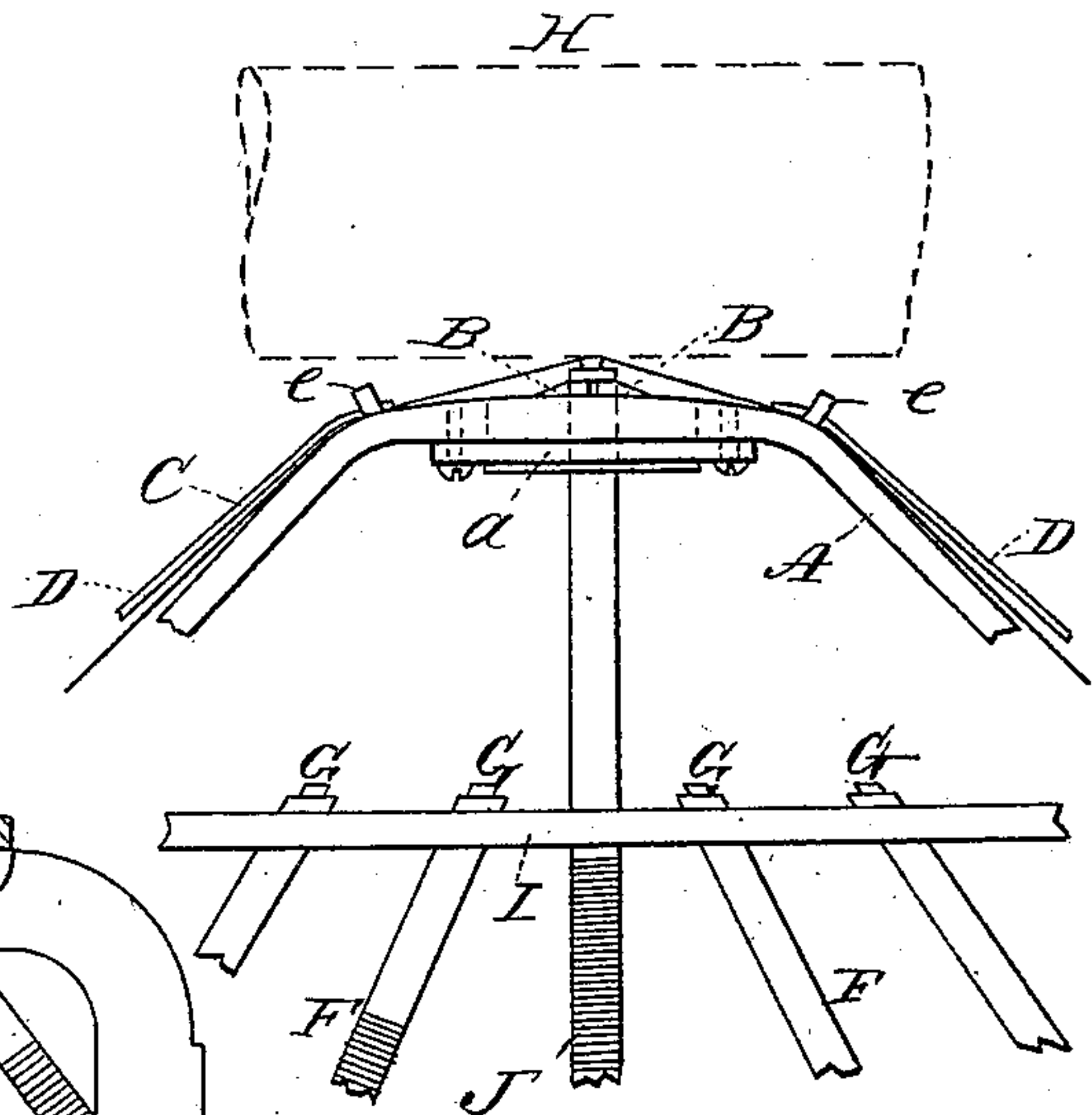
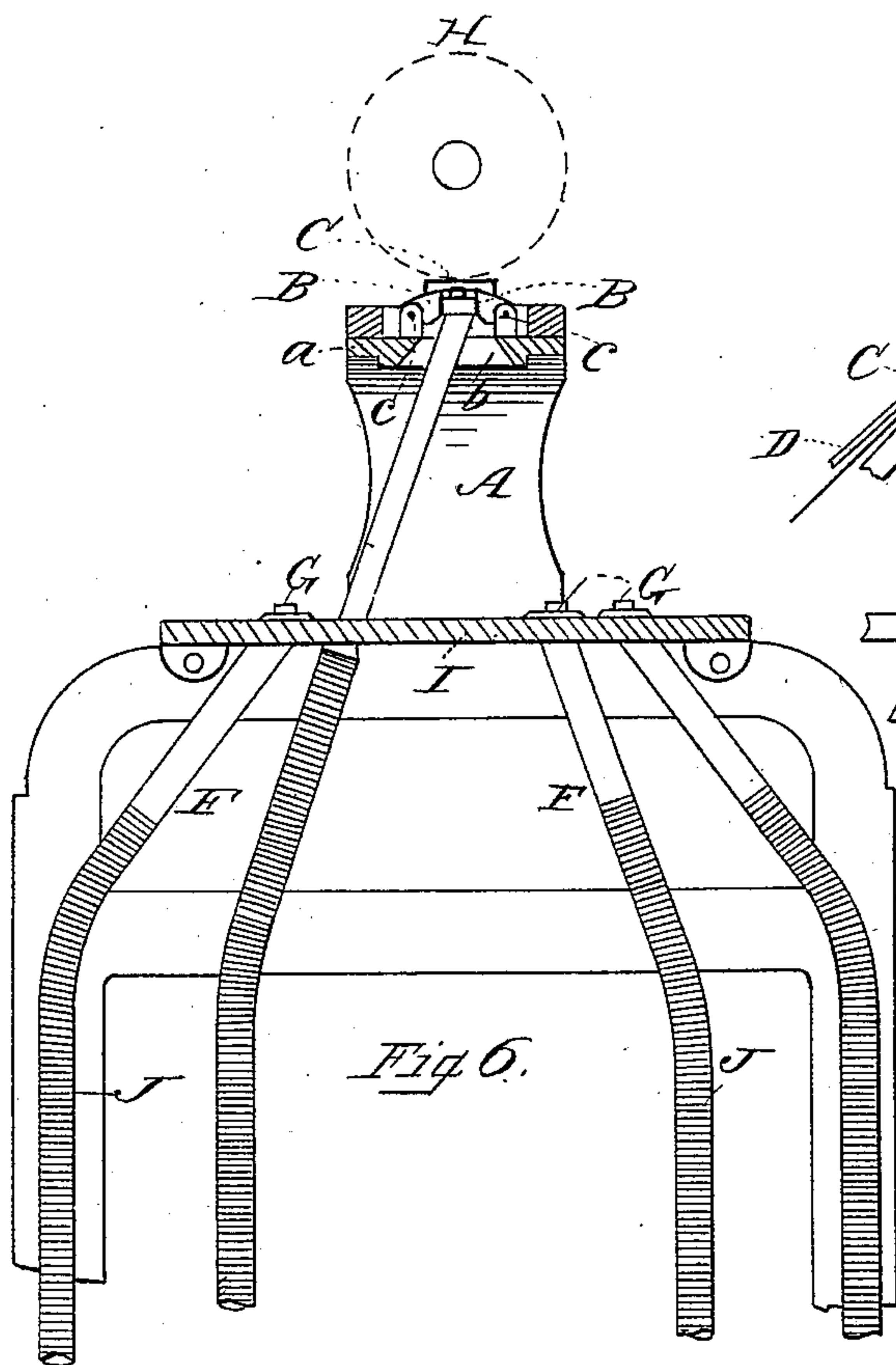
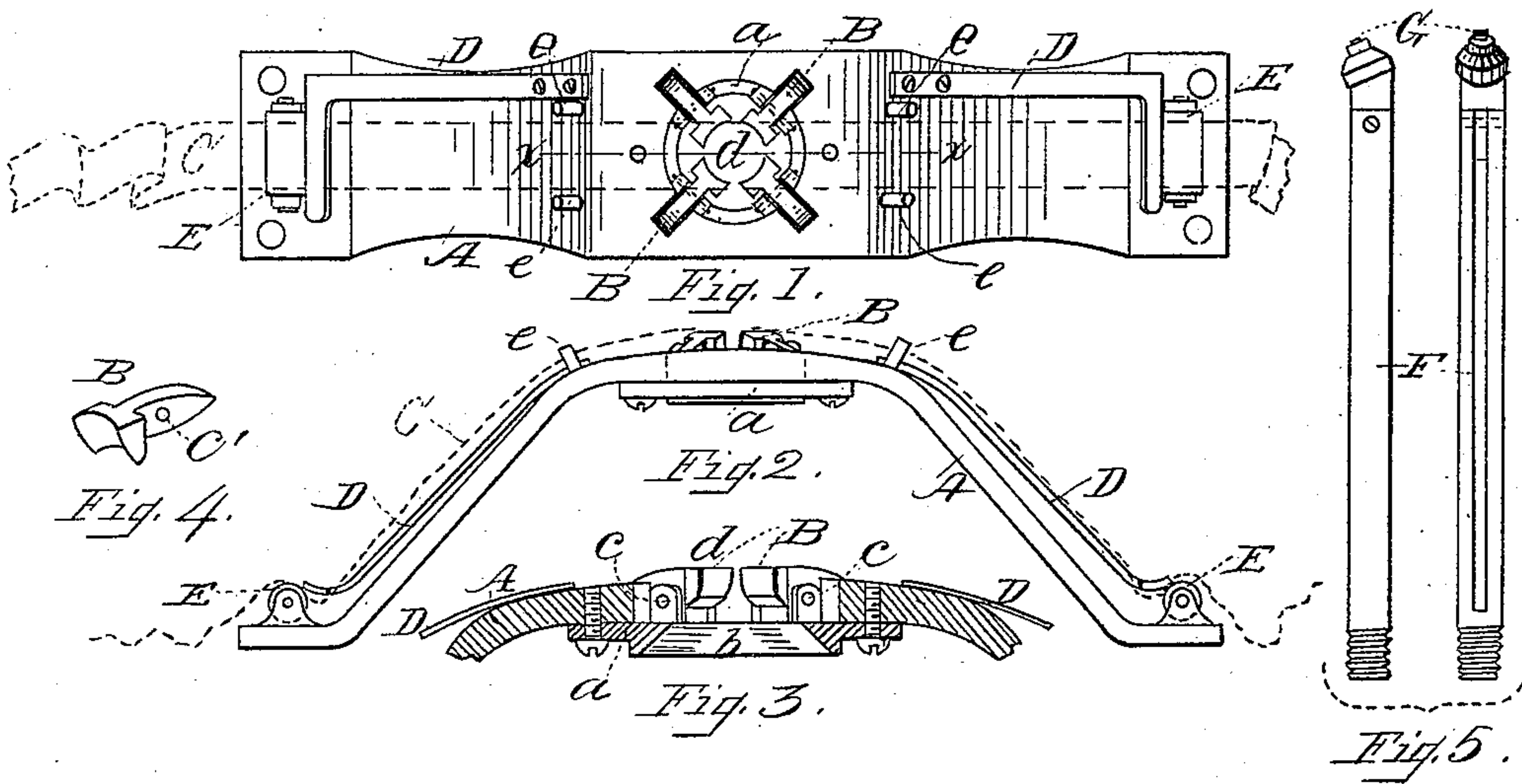


(No Model.)

L. T. FOSS & T. K. KEITH.  
TYPE WRITER.

No. 441,654.

Patented Dec. 2, 1890.



Witnesses  
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# UNITED STATES PATENT OFFICE.

LEWIS T. FOSS AND THOMAS K. KEITH, OF BOSTON, MASSACHUSETTS.

## TYPE-WRITER.

SPECIFICATION forming part of Letters Patent No. 441,654, dated December 2, 1890.

Application filed February 17, 1890. Serial No. 340,791. (No model.)

*To all whom it may concern:*

Be it known that we, LEWIS T. FOSS and THOMAS K. KEITH, both of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Type-Writers, of which the following, taken in connection with the accompanying drawings, is a specification.

Our invention relates to type-writing machines, and more particularly to certain improvements in the type-writing machine previously invented by us. (See specification filed by us February 11, 1889, Serial No. 299,425, and allowed November 20, 1889, and more particularly a second specification filed by us December 9, 1889, serially numbered 333,138, and now pending, to which reference may be had for a description of said machine, and particularly for portions not shown and described in these drawings and specification.)

This invention relates particularly to correctly centering type-tipped plungers as they rise to print, and thereby securing regular and accurate alignment.

Our invention consists of small movable metallic fingers or rocker-levers with their inner ends or heads somewhat broadened in the form of a T, adjusted in an opening in a span or bridge, and an ink-ribbon passing over the same held at the proper tension by tension-springs.

The object of our invention is to perfect the machine described in our previous specification, above referred to, by providing a mechanism for accurately centering type-tipped plungers as they rise at different angles toward a central point, to print a letter or character, and thereby secure even and regular alignment, clear and sharp impressions, and with the least possible friction.

Our invention consists of the improvements shown in the accompanying drawings, and hereinafter described.

Figure 1 is a top plan view of the bridge, showing the opening for the type-tipped plunger, the four movable fingers or rocker-levers, ink-ribbon, ribbon-rollers, and tension-springs. Fig. 2 is a front elevation of the same, showing the inner ends of the fingers or rocker-levers raised or centered. Fig. 3 is an enlarged section of part of same, line  $x x$ ,

Fig. 1. Fig. 4 is one of the fingers or rocker-levers enlarged in perspective. Fig. 5 is the upper unelastic ends of plungers with types on upper tips. Fig. 6 is a vertical sectional side view of the upper part of the machine with type-tipped plunger raised and centered by the rocker-levers and type pressed against the ink-ribbon as in the act of printing a character. Fig. 7 is a front elevation of the upper part of the machine, also with type-tipped plunger raised and centered as in printing a character.

Corresponding letters in the several figures of the drawings designate like parts, referring to which—

A is a metallic bridge to be secured to the upper shelf of the frame-work of the machine.

B are the movable fingers or rocker-levers which guide and center the tips of the plungers bearing the types.

C is the ink-ribbon, and D the tension-springs, which regulate the tension of the ink-ribbon.

E are rollers, over which the ink-ribbon passes on its way to the reels on which it winds.

F represents type-tipped slotted sleeves intended to be secured to the upper ends of elastic spiral plungers, which reciprocate in a general vertical direction outside curved directing-rods.

G are types.

H is the printing-roller on which the paper is held to receive the impressions from the types.

I is the upper shelf of the frame-work of the machine, through which the upper ends of the type-tipped plungers reciprocate in a general vertical direction, and to which the bridge A is secured.

J are elastic spiral plungers, so constructed as to work easily outside of curved directing-rods.

$a$  is a circular piece of metal having a conical opening in its center, and on the upper side of which (near the opening) are shoulders, to which are fulcrumed the rocker-levers B.

The bridge A has a circular opening in its center, and from this circular opening four wide slots in the form of a cross are cut. The piece of metal with the rocker-levers at-



attached is fitted to the bridge from below, with the outer ends of the rocker-levers in the slots above referred to, and the piece *a* is screwed to the under side of the bridge, thus leaving the rocker-levers free to work on their pivots.

*b* is the inner surface of the conical opening and constitutes the outer portion or rim of a guiding-funnel.

*c* are pivot-pins on which the rocker-levers *B* work, and by which they are attached or secured to the shoulders on the piece *a*.

*c'* is the hole in the rocker-lever through which the pivot-pin passes.

*d* is the opening through which the type-tipped ends of the plungers pass through the bridge *A* to make the impression on the paper, and *e* are guide-posts to hold the ink-ribbon in place.

In Figs. 6 and 7 the machine is represented with one type-tipped plunger raised, the type centered and in the act of printing a character. The machine as there represented has but few plungers for the purpose of simplicity.

The machine described in our previous application, and to which this device is especially applicable, consists, briefly, of elastic spiral plungers, type-tipped, which reciprocate outside curved directing-rods. The power is exerted by pressure of the hand on keys and is transmitted to the elastic plungers by means of levers conveniently arranged. In the machine there described the types when forced upward were centered in a fixed funnel or hollow cone, the functions of which are much better performed by the device herein described.

The plungers are arranged in the machine in a general circular form, and upon being forced upward rise at different angles, but in a general vertical direction, and no two of the plungers enter the opening in the bridge at exactly the same angle, therefore the necessity of some device for accurately centering the various types to secure an even and regular alignment. The type is secured to the plunger at the proper angle to secure an accurate horizontal impression on the paper and an even pressure of its face. The object then of this improvement is to accurately center the types, and thereby secure a perfect alignment. The fixed funnel or hollow cone shown in our previous specification, above referred to, is not as well adapted for the purpose of centering the types, securing clear impressions, and accurate alignment as the device herein described, as in its use the types were not accurately centered until the moment of striking the paper, in consequence of which slight inaccuracies of alignment, as well as occasional blurred impressions, might occur. It was also attended with considerable friction. By using the device herein described these objections are avoided.

The operation of this new device may be thus described: The elastic plunger *J* and sleeve *F*, bearing the type *G*, is forced upward on a curved directing-rod in the manner described. As it advances toward the center and into the opening in the bridge *A*, in case of inaccuracy of adjustment it may strike the inclined surface *b*, by which it is further guided toward the center. As it still advances upward it strikes the inclined surface of one or more of the fingers or rocker-levers, by which it is still further directed toward the center. In its continued upward passage it touches all the rocker-levers and raises their inner ends until their outer extremities touch a bed or stop. The ink-ribbon, too, is carried up by this operation. The opening *d* is now the exact size to receive the head to which the type is secured, and as the type enters the opening *d* thus contracted (practically a collar) it is exactly central. The type now passes vertically a short distance through the opening *d*, presses against the ink-ribbon, and makes an even and regular impression on the paper secured to the print-roller *H*. As the power causing the upward pressure is removed, the plunger bearing the type drops to its former position, and as soon as the type recedes from the rocker-levers their inner ends are pressed downward to their former position by the pressure of the ink-ribbon, which is held at proper tension for the purpose by the tension-springs *D*. The opening *d* becomes somewhat enlarged, particularly as seen from below, where it assumes the form of a hollow cone, and the device is in position and ready for another operation. This device assures an accurate centering of every type in the machine and with a very slight amount of friction.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. The combination, in type-writing machines, of elastic type-tipped plungers, a metallic bridge with a conical opening at its center, and four rocker-levers, all arranged as shown, and for the purpose specified.

2. The combination, in type-writing machines, of elastic type-tipped plungers, a metallic bridge with rocker-levers pivoted thereto, and an ink-ribbon and tension-springs, substantially as described, and for the purposes specified.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, on this 15th day of February, A. D. 1890.

LEWIS T. FOSS.  
THOMAS K. KEITH.

Witnesses:

SETH P. SMITH,  
GILBERT O. BURNHAM.