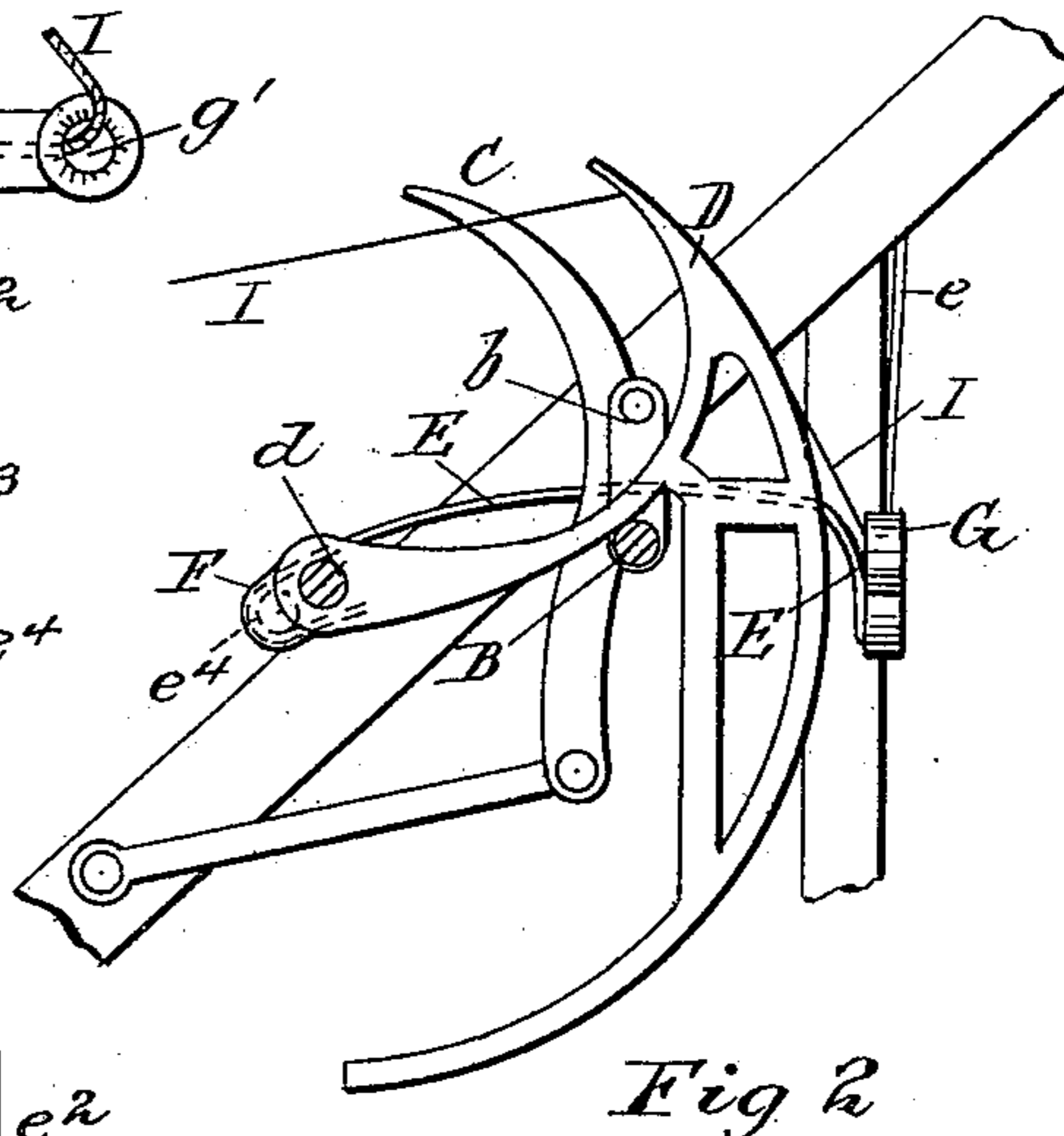
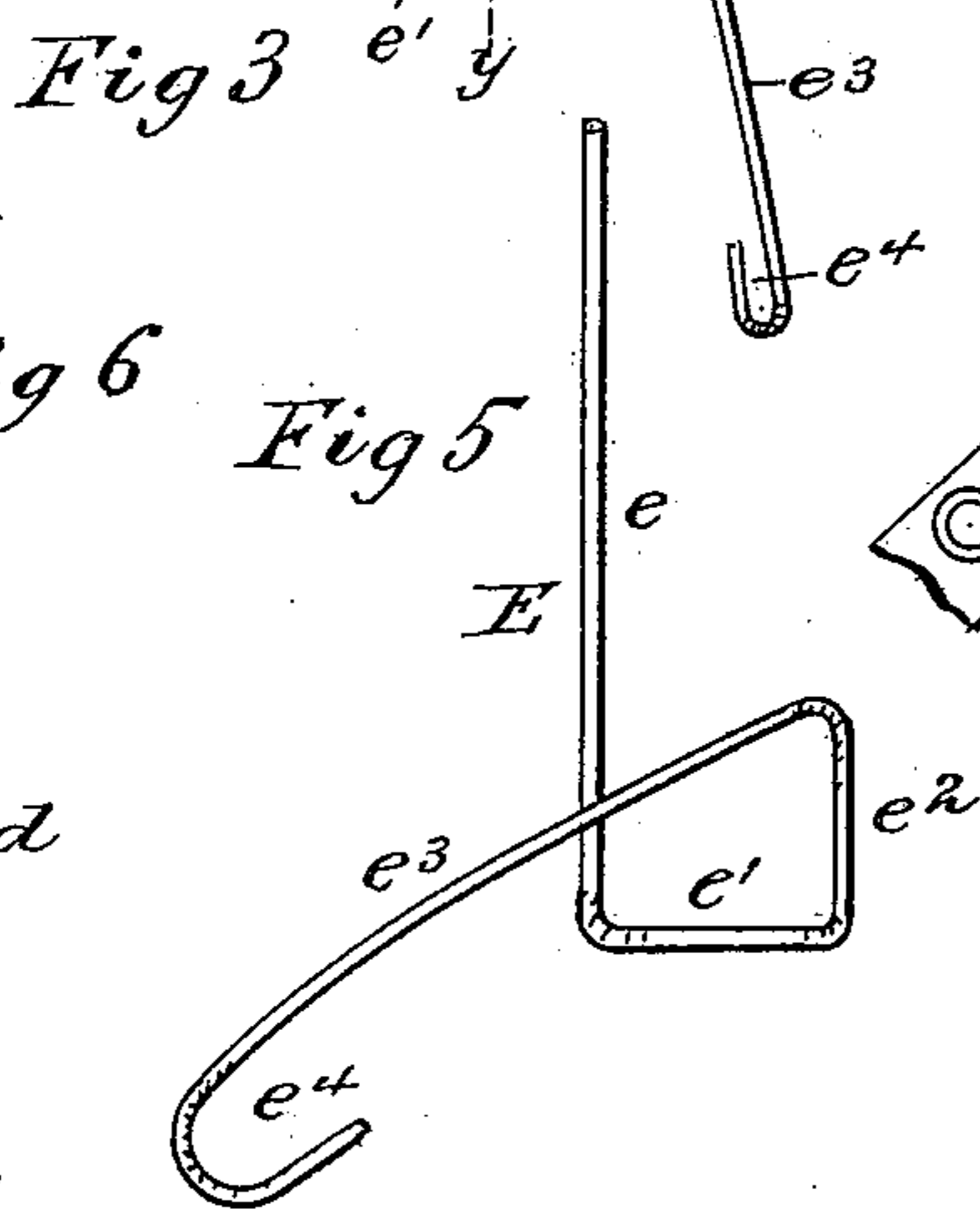
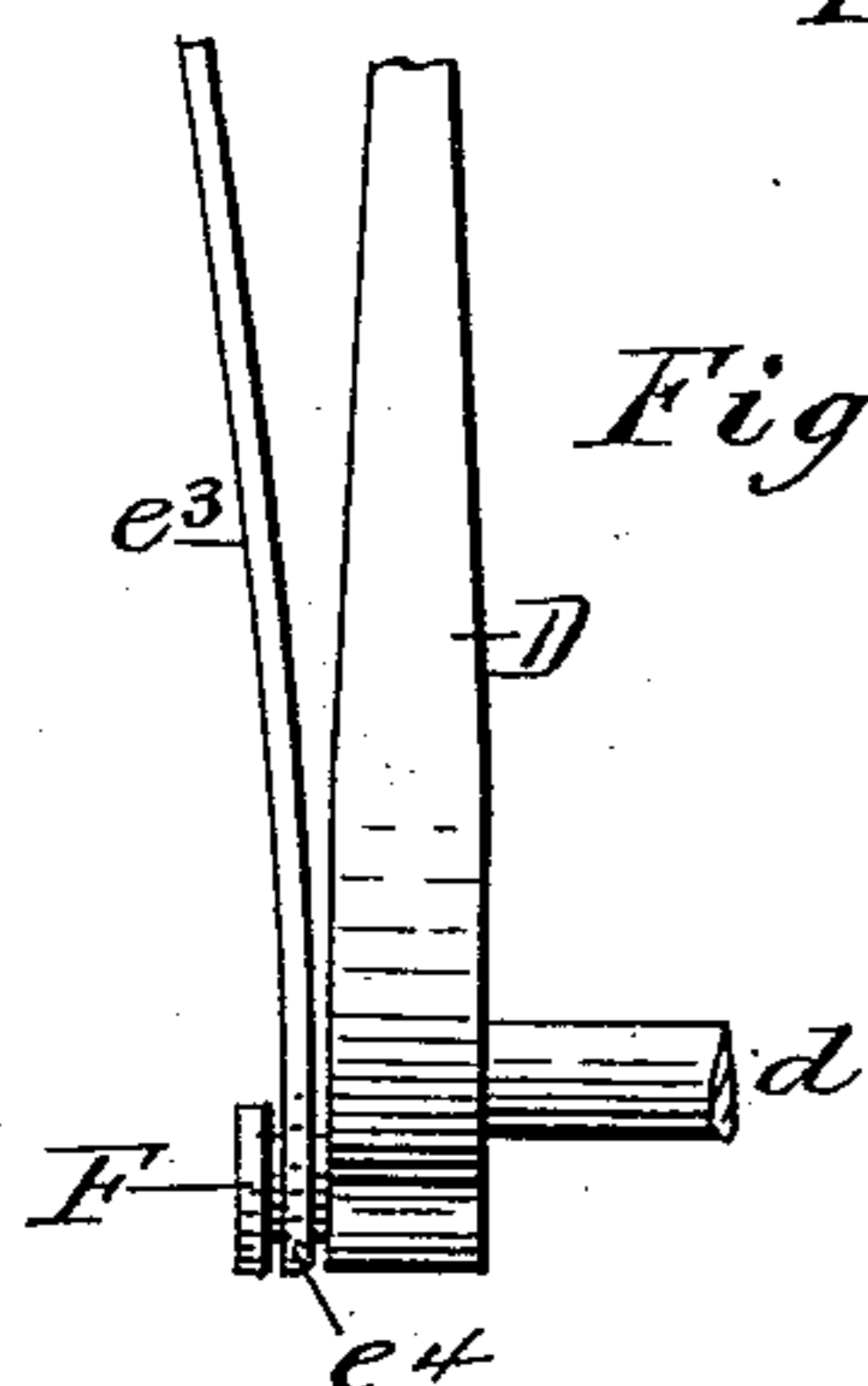
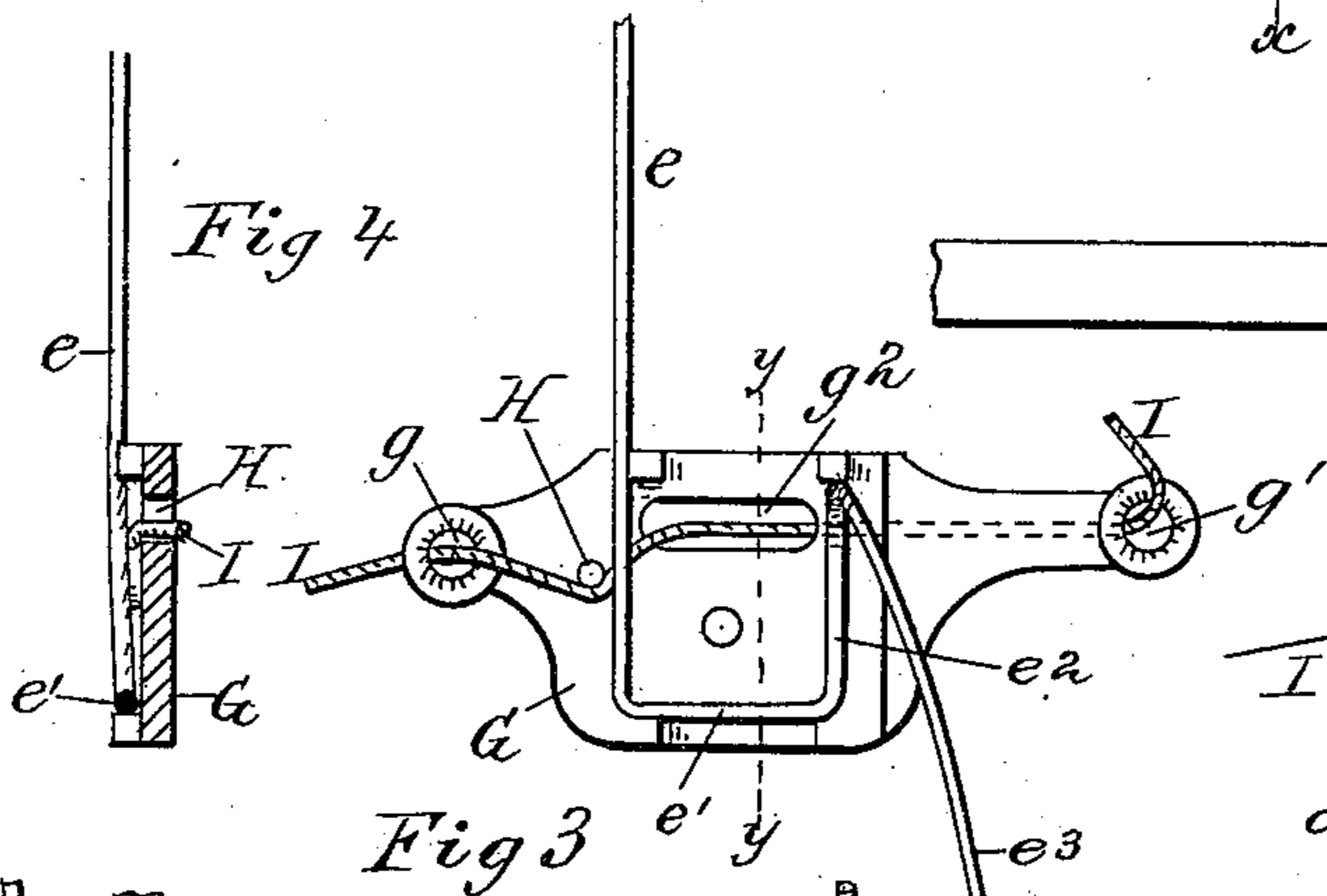
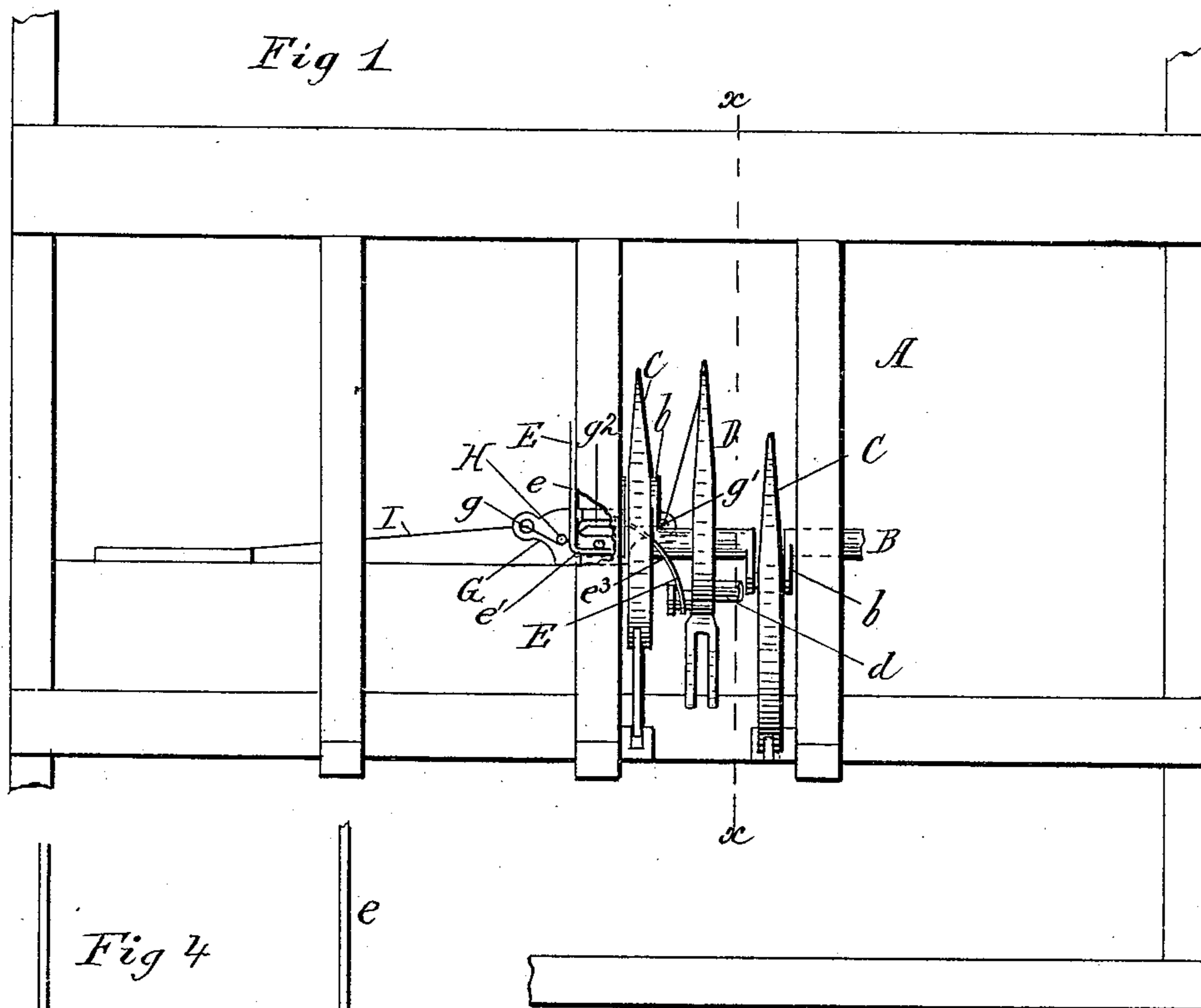


(No Model.)

G. G. HUNT & G. H. STEWARD.  
GRAIN BINDER.

No. 353,560.

Patented Nov. 30, 1886.



Witnesses  
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# UNITED STATES PATENT OFFICE.

GEORGE G. HUNT, OF BRISTOL STATION, AND GEORGE H. STEWARD, OF PLANO, ILLINOIS; SAID HUNT ASSIGNOR OF ONE-HALF OF HIS RIGHT, AND SAID STEWARD ASSIGNOR OF ALL HIS, TO THE PLANO MANUFACTURING COMPANY, OF PLANO, ILLINOIS.

## GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 353,560, dated November 30, 1886.

Application filed April 18, 1885. Serial No. 162,709. (No model.)

*To all whom it may concern:*

Be it known that we, GEORGE G. HUNT, residing at Bristol Station, in the county of Kendall and State of Illinois, and GEORGE H. STEWARD, residing at Plano, in the county of Kendall and State of Illinois, both citizens of the United States, have invented certain new and useful Improvements in Grain-Binders, which are fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a front elevation of such portion of a grain-binder as is necessary to illustrate our present improvement; Fig. 2, a detail section taken on the line *x x*, Fig. 1; Fig. 3, an elevation of the cord-holder and tension device detached; Fig. 4, a cross-section of the same, taken on the line *v v*, Fig. 3; Fig. 5, a perspective view of the spring tension device detached, and Fig. 6 a detail plan showing the lower end or heel of the needle-arm. Figs. 1 and 2 are on the same scale, and Figs. 3, 4, 5, and 6 are on the same scale, but enlarged from that of the first two.

Our invention relates to automatic grain-binders, especially such as are intended for the use of cord or twine for the band material.

Our present improvements relate to a peculiar spring-tension device and cord-guide. We have therefore shown in the drawings only so much of a grain-binder as is necessary to illustrate the construction and operation of these particular improvements, and we shall only describe these parts, it being understood that in features not shown and described the machine may be of any ordinary construction, and that the binder is attached to a grain-harvesting machine in any usual way.

We will proceed to describe in detail the construction and operation of the improvement of our present invention, and will then point out definitely in the claims the special improvements which we believe to be new and wish to protect by Letters Patent.

In the drawings, A represents a portion of the frame-work of the binder, which is mounted on or attached to the main frame of the harvesting-machine in any usual way, and B represents a portion of the packer-shaft, and C

packer-arms, which are connected to cranks *b* on the said shaft, by which they are operated in a well-known way. The needle-arm D is attached to a rock-shaft, *d*, the oscillation of which vibrates the needle in the usual manner and for the usual and well-known purposes.

There is nothing peculiar in the construction of any of the devices named above; but they may be of any ordinary type having their usual and well-known functions in this class of machines.

Our tension device consists of a spring, E, bent in peculiar form, as shown in Figs. 3 and 5 of the drawings. The upper end, *e*, of this spring is straight. Some distance from this end there is a bend, *e'*, at right angles to this straight section, then a bend, *e''*, upward and parallel to the first section, and then a bend, *e'''*, outward and downward, terminating in a hook or loop, *e<sup>4</sup>*. On the needle-shaft, or on the needle itself, is a pin, F, which is located so as to be eccentric to the journal or center of motion of the needle. This tension spring is attached at its upper end to some part of the binder-frame, thence passes down by the side of one of the uprights of the frame, the centrally-bent portion crossing and resting upon some suitable support, along which the cord is carried, and thence extends outward, passing over the eccentric-pin F and at its outer end hooking around it, as shown in Figs. 1, 2, and 6 of the drawings. It will be seen that this double bending of the spring brings the ends of the latter into different planes, thereby facilitating the attachment of these ends to the parts mentioned above, and at the same time providing sufficient surface for surely clamping the cord. In connection with this tension spring we preferably use a cord guide or holder, G, which is particularly adapted to this spring, though the latter may possibly be used without it. This holder is made of metal or some other suitable material, of a form substantially as shown in Figs. 3 and 4 of the drawings, in which it will be seen that it is a kind of oblong plate, provided at each end with an aperture, *g g'*, and having a central slot, *g''*. A pin or lug, H, is also provided on the surface of this

holder, near the aperture  $g$ , and a little below the slot  $g^2$ , as shown in Fig. 3 of the drawings. This plate, constructed thus to adapt it for use as a cord guide and holder, is fastened to some convenient support on the binder-frame in such position that the rectangle formed by the double bend in the tension-spring described above will rest substantially flat upon the face of the holder, as shown in Figs. 3 and 4 of the drawings. The cord or twine I is carried from the spool to this guide G, passing in from the back thereof through the aperture  $g$ , thence around the pin H, through the slot  $g^2$ , to the back of the holder again, and thence to the aperture  $g'$ , through which it passes to the front of the holder, and thence to the needle, as shown in Figs. 2 and 3 of the drawings. The cord is of course run under the tension-spring as it is carried from one end to the other of the holder, as described above, and it will be seen from Fig. 3 of the drawings that this spring, if left free, will rest upon the cord near the pin H, clamping it lightly between the spring and the holder-plate. When, however, the needle is open, the eccentric-pin F is thrown forward, substantially as shown in Fig. 2 of the drawings, and thereby the loop at the outer end of the tension-spring is pushed forward sufficiently to remove the pressure of the latter on the cord at the holder-plate, so that the cord will run out freely while the bundle is being formed. As soon as the needle begins its closing movement, however, the eccentric-pin will be carried downward and inward, thereby releasing the pull on the tension-spring, and so permitting it to press upon the cord again; hence as the needle closes around the bundle the cord will be held taut by the tension-spring clamping it at the holder, with the usual result of making a taut band around the bundle. As we have already stated, the tension-spring may be used without this particular cord guide and holder, though the latter is especially adapted and intended for use with this spring; and it should be remarked that some means must be employed for conducting the cord under the tension-spring and retaining it there in proper relation for the operation of the spring against a suitable rest or seat.

Our improvement provides a very simple, cheap, and efficient tension device. It will be seen that it does not greatly increase the parts of the machine, and is constructed and arranged so that its operation is practically positive.

We do not wish to be understood as limiting ourselves to the exact construction, form, and arrangement of the parts herein described and shown, for they may be modified in some particulars without departing from the essential characteristics of our improvement. The spring may have a differently-shaped bend, and it is obvious that it may be connected to some other part of the needle-arm, or instead of the needle-arm to some projection or piece

on the needle-arm shaft, it being necessary only that this connection be made to some part that vibrates with the said shaft or eccentric to this shaft, so as to produce the necessary pull of the tension spring at the proper time, as described above. It is also obvious that this plan of actuating the tension device by means of the rocking motion of the needle-arm shaft may be applied to a tension device of very different construction from the spring here shown; and therefore we do not wish to be understood as limiting ourselves, in the application of our improvement, to this particular construction of the device, the main feature of our improvement being the connection of the tension to the needle-arm or some other projection on the needle-arm shaft, whereby the tension is relieved by the rocking of the latter.

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

1. In a grain-binder, a tension-spring fastened to a fixed point at one end, and arranged to clamp the cord between the spool and needle-arm, in combination with the needle-arm shaft, to which, at the other end, it is attached eccentrically, whereby the rocking of the shaft alternately strains and releases the spring, substantially as and for the purposes set forth.

2. In a grain-binder, a tension-spring consisting of an elastic strip or rod of metal provided with a double bend between its ends, substantially as specified, in combination with a suitable seat for the bend, whereby said elastic strip is adapted to clamp the cord, and the ends are arranged in different planes for their respective attachments, substantially as and for the purposes set forth.

3. In a grain-binder, the tension-spring E, provided with the double bend  $e' e^2 e^3$ , in combination with a cord-guide, G, provided with a seat for the bent portion of the spring, substantially as and for the purposes set forth.

4. In a grain-binder, the bent tension-spring E, attached at one end to a fixed portion of the frame, in combination with the needle-arm D and eccentric-pin F, to which the other end of the spring is attached, substantially as and for the purposes set forth.

5. The cord-guide G, provided with the apertures  $g g'$ , and the slot  $g^2$ , substantially as and for the purposes set forth.

6. The tension-spring E, bent as described, and attached at one end to a fixed portion of the frame, in combination with the cord-guide G, provided with a seat for the double bend in the spring, the needle-arm D, and the eccentric-pin F at the heel of the needle-arm, to which the other end of the spring E is attached, substantially as and for the purposes set forth.

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GEORGE H. STEWARD.

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