

J. Broughton,

Door Spring.

N^o 16,324.

Patented Jan. 6, 1857.

Fig: 1.

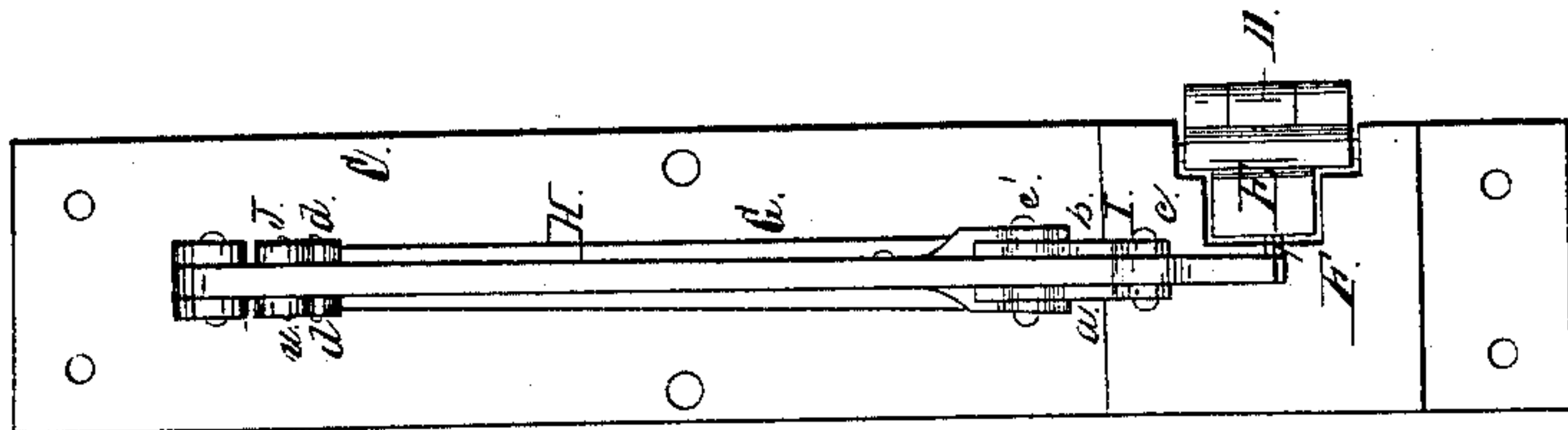


Fig: 3.

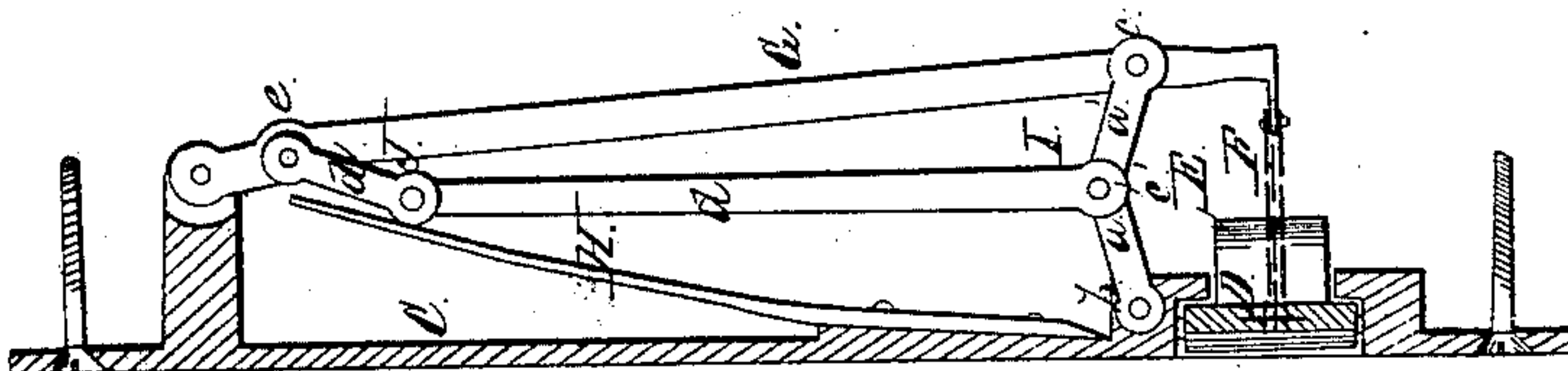


Fig: 2.

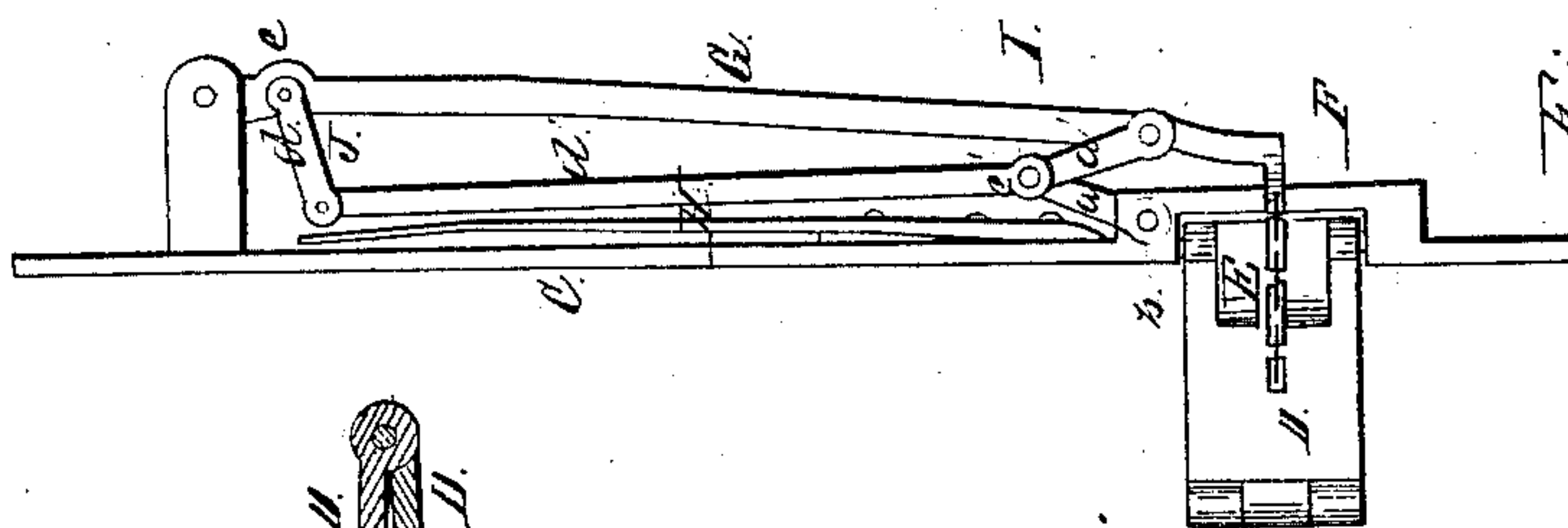
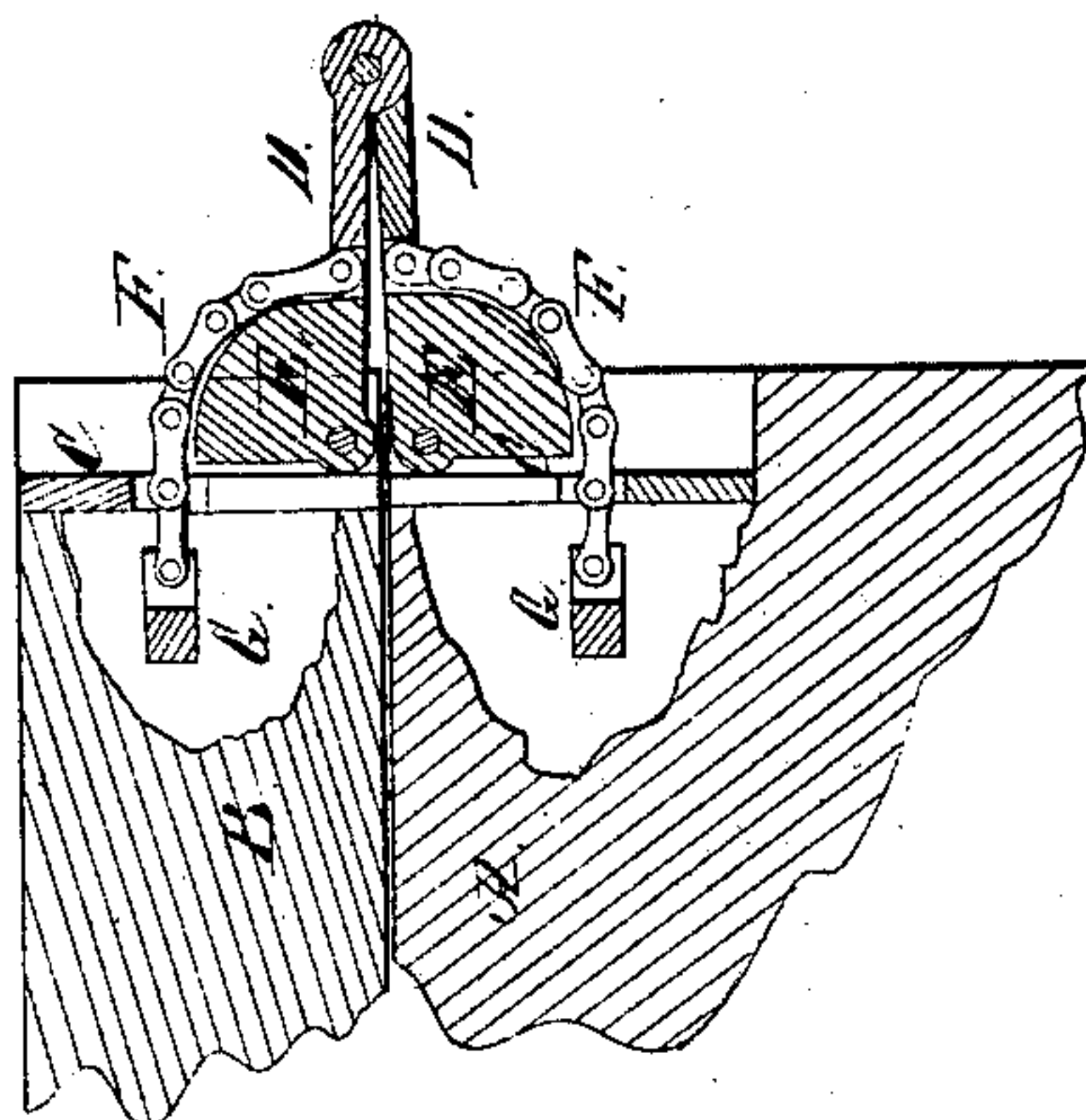


Fig: 5.



Fig: 4.



UNITED STATES PATENT OFFICE.

JOHN BROUGHTON, OF CHICAGO, ILLINOIS.

DOOR-SPRING.

Specification of Letters Patent No. 16,324, dated January 6, 1857.

To all whom it may concern:

Be it known that I, JOHN BROUGHTON, of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Door-Springs; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1, is a back view of the improvement not applied to the door, the parts being in the position they occupy when the door is open. Fig. 2, is a side view, the parts being in the same position. Fig. 3, is a section, the parts being in the position they occupy when the door is shut. Fig. 4, is a horizontal section of a door and frame having my improvement applied to them. Figs. 5 and 6, are diagrams for illustrating the difference between my improvement and others in use.

Similar letters of reference indicate corresponding parts in the several figures.

This improvement relates particularly to the device patented to me on the 19th of August, 1856, for automatically closing doors, but may, it is thought, be used to advantage in connection with other devices employed for effecting the same results; and its object is to render the action of such devices very powerful on the door at the closing point, or when the door is shut, and comparatively slight when the door is open, and thus, in the one case, preventing the door opening with the wind and slamming, and in the other case avoiding a too sudden closing of the same with the action of the spring.

The nature of the present improvement proposed, consists in combining a flat or other suitable spring with the leaves of the auxiliary hinge or other actuating device, by means of a compound or double action toggle, applied and operating essentially as hereinafter described.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A, Fig. 4, represents a door frame, B the door, C, C, metal face plates to which the actuating mechanism is attached, D, D, are the leaves forming the auxiliary or actuating hinge, E, E, segmental projections cast on the back of said leaves, and F, F, chains or tugs combining the auxiliary

hinge with the intermediate mechanism, presently described, which I introduce between it and the actuating spring. The device thus far described, is covered by Letters Patent, issued to me, August 19, 1856—and are only referred to in order to facilitate the description of my present improvement. To do which still further, I shall confine myself to the parts of one section only of the device, as they are the same in both sections.

G, is a vertical pendulous rod pivoted to a bracket cast on the rear of the face plate D. To the lower end of this rod the chain or tug F, is fastened, as shown.

H, is a curved flat taper spring fastened to a raised wedge-shaped seat, cast on the back of the face plate, by its thickest end, so that its thinnest end shall stand out some distance from the face plate as illustrated in Fig. 3.

I, J, are two toggles combined so as to form a compound or double action toggle. The loose ends of the arms a , a^1 , forming the toggle I, being pivoted one to the face plate at b , and the other to the lower end of the pendulous rod, at c , and the loose end of the arms d , d' , forming the toggle J, being pivoted one to the upper end of the pendulous rod at e , and the other to the joint e^1 , of the toggle I; as shown. The two sections thus constructed, are applied, one to the door frame and the other to the door and combined so as to operate together by the two leaves of the auxiliary hinge and the chains or tugs F, as shown in Fig. 4.

It may be evident from the drawing, that by thus arranging the toggles, they will both be acted upon at their most effective or central joint: the joint of J being acted upon by the spring H, and the joint of I, simultaneously therewith by the vertical arm d^1 , of the toggle J; and consequently when the door is closed, as in Fig. 3, the arms d , d^1 , are caused to spread so as to form nearly a straight vertical line as shown in same figure; and thus lose their tendency to approximate and in doing so, cause the arms a , a^1 , to spread or form nearly a straight horizontal line as shown in same Fig. 3 and thus overcome their tendency to approximate and thereby enable the spring, although very light, to exert a powerful action, through them, on the door at the closing point. And when the door is opened, the arms a^1 , a , of the toggle I, approximate and by forming

the acutest angle it is possible for them, they nearly lose their tendency to spread, and simultaneously with this, the arms d , d^1 , of the joint J, approximate and form nearly
5 a right angle with each other, owing to which and the action of the spring H, against the joint of J, being at right angles to the back of the face-plate, the tendency of J, to descend is as nearly as possible over-
10 come, and thus the action of the spring upon the door when entirely open is almost imperceptible, yet sufficient when the door is not thrown entirely open to cause it to close
15 automatically with a gradually increasing force and speed. The action of the spring is also less when the door is open than when closed, on account of the joint of J, bearing against the weakest part of the spring in the former case, and the strongest part, in
20 the latter.

The diagrams Figs. 5 and 6, illustrate two methods of applying the power of the spring to the toggles—Fig. 5, being my method and Fig. 6, the method adopted by
25 Mr. Westcott in his single action toggle door spring. In Fig. 5, the power is shown applied to the center joint which is the most effective point and in Fig. 6, owing to the toggle being long and having to make a long

movement, with a short movement of the spring—the power is applied at m , the least effective point.

In the drawing, the device is shown applied to a single-action door, but it may be used for operating double-action doors with
35 equal advantage, it only being necessary in the latter case to employ two of the devices, upper one arranged to be passive and the lower active when the door is opened inward, and vice versa when the door is
40 opened outward.

This device is simple, cheap and effective and when on the door and the door closed, is not perceptible, and even when the door is open is not, in one case out of ten, noticed. 45

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

Combining a flat or other suitable spring H, with the leaves D, D, of the auxiliary hinge, or other actuating devices, by means
50 of a compound, or double-action toggle I, J, applied and operating substantially as herein described and for the purposes set forth.

JOHN BROUGHTON.

Witnesses:

CALVIN D. WOLF,
CH. FIELDKAMP.