

T. L. ZOOK.

PARACHUTE.

APPLICATION FILED MAY 12, 1908.

930,452.

Patented Aug. 10, 1909.

2 SHEETS—SHEET 1.

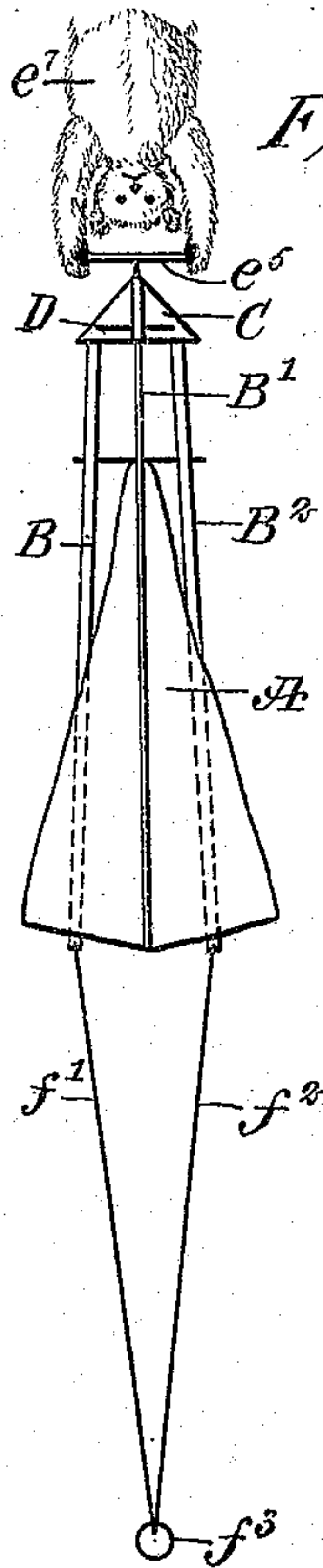


Fig. 1,

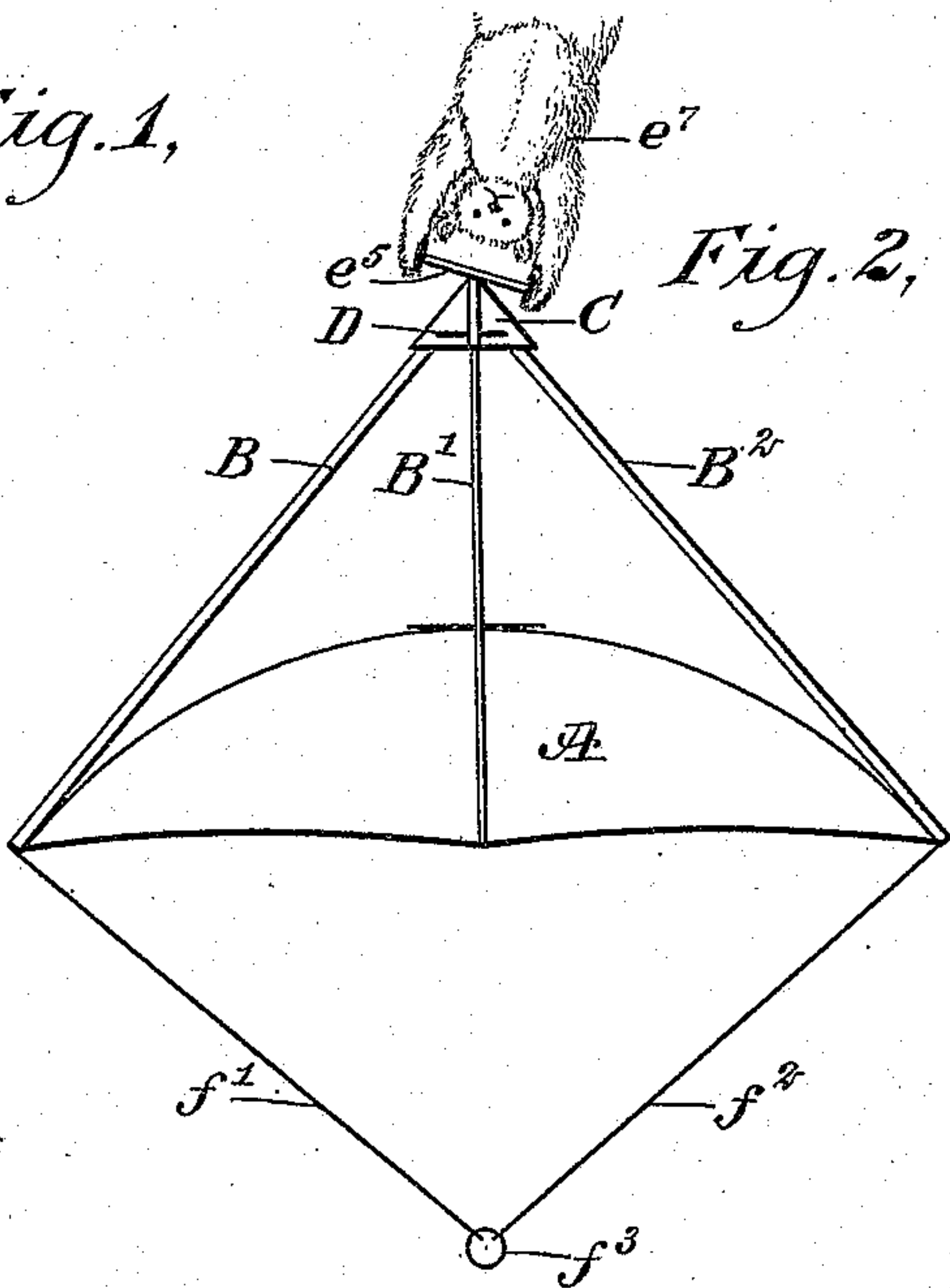
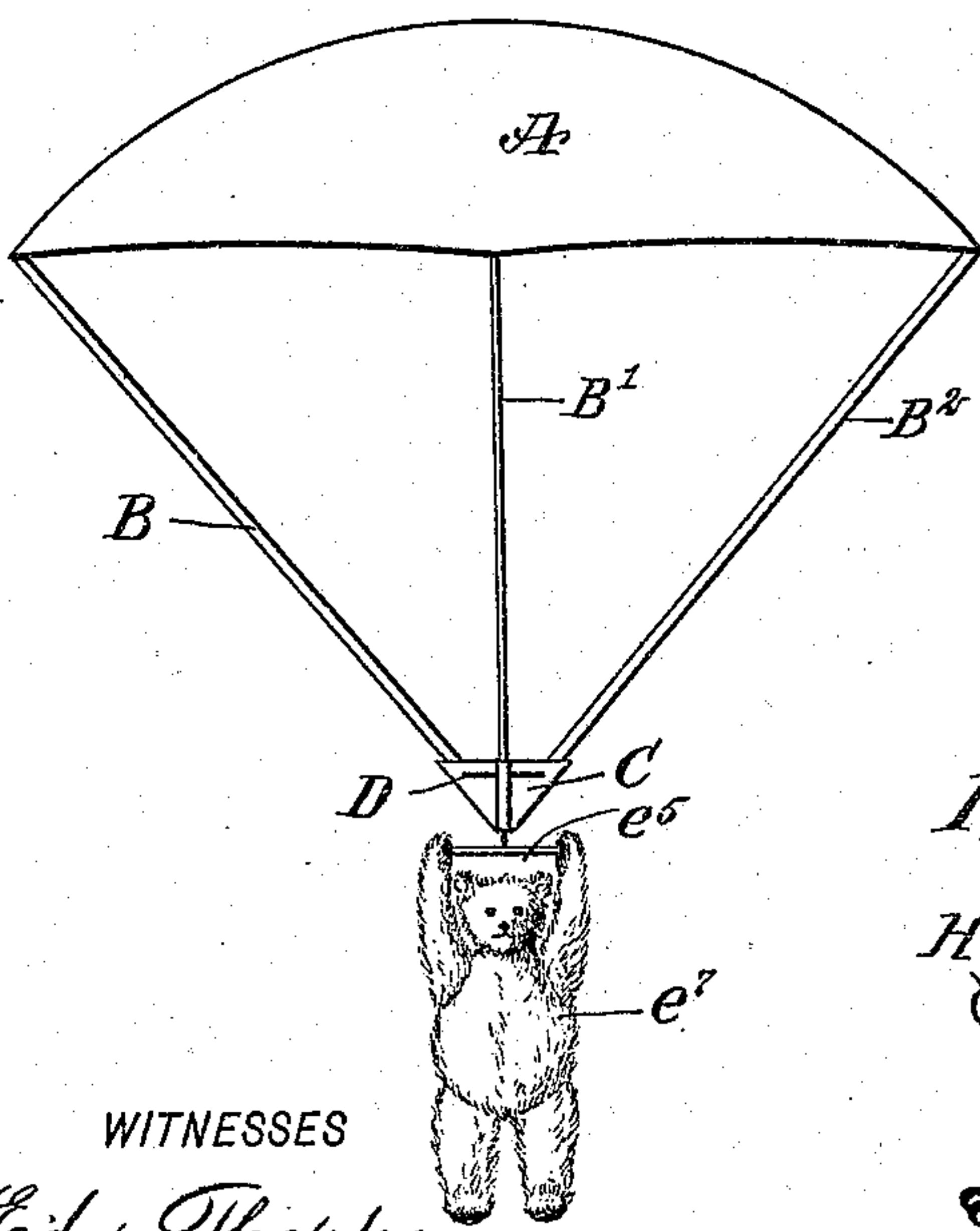


Fig. 2,

Fig. 3,



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Edw. Thorpe
S. Kinnon

Fig. 4,

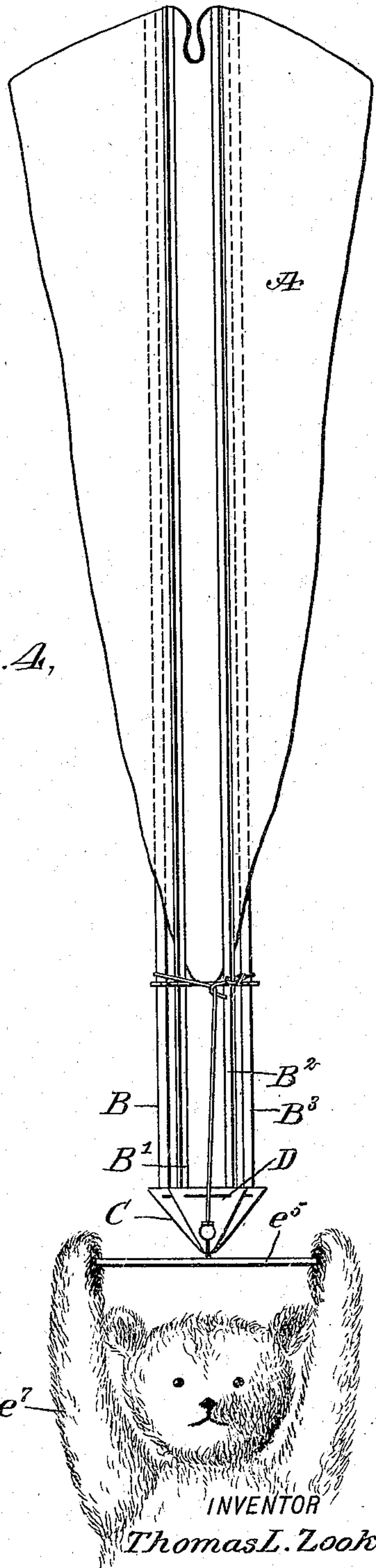
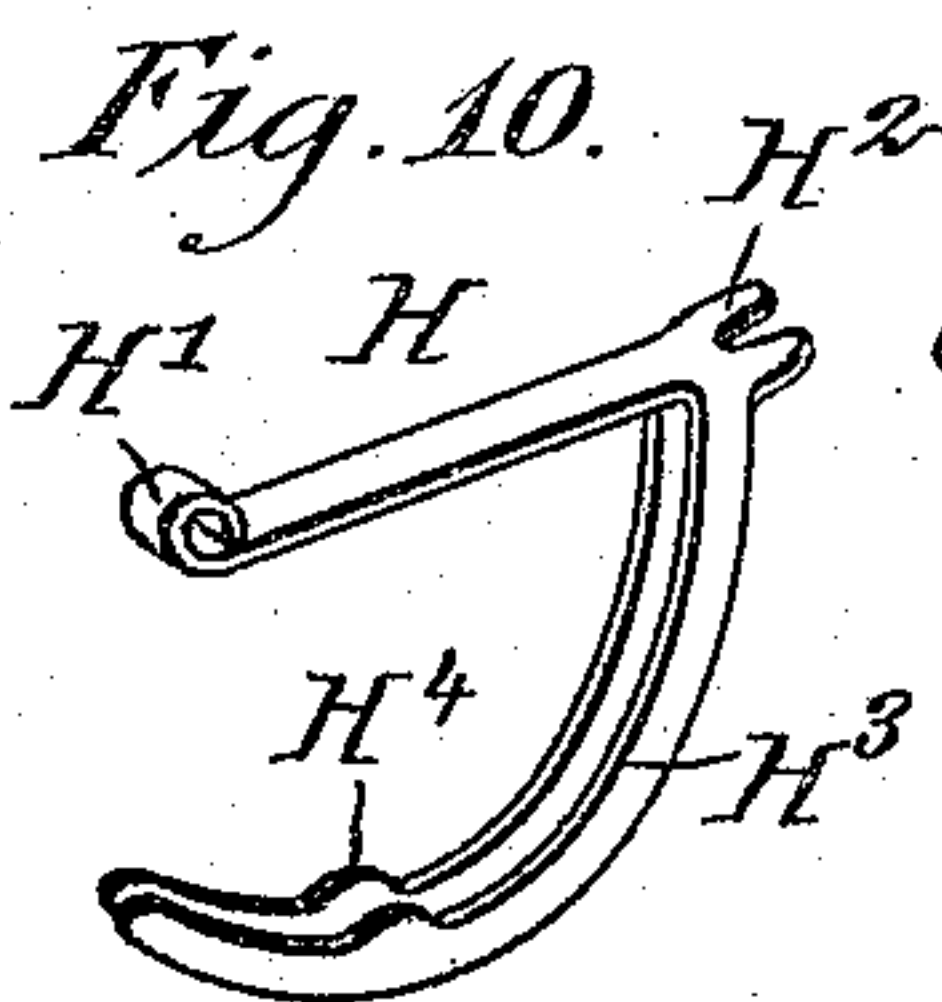


Fig. 10.



INVENTOR

Thomas L. Zook

BY *Mum & Co*

ATTORNEYS

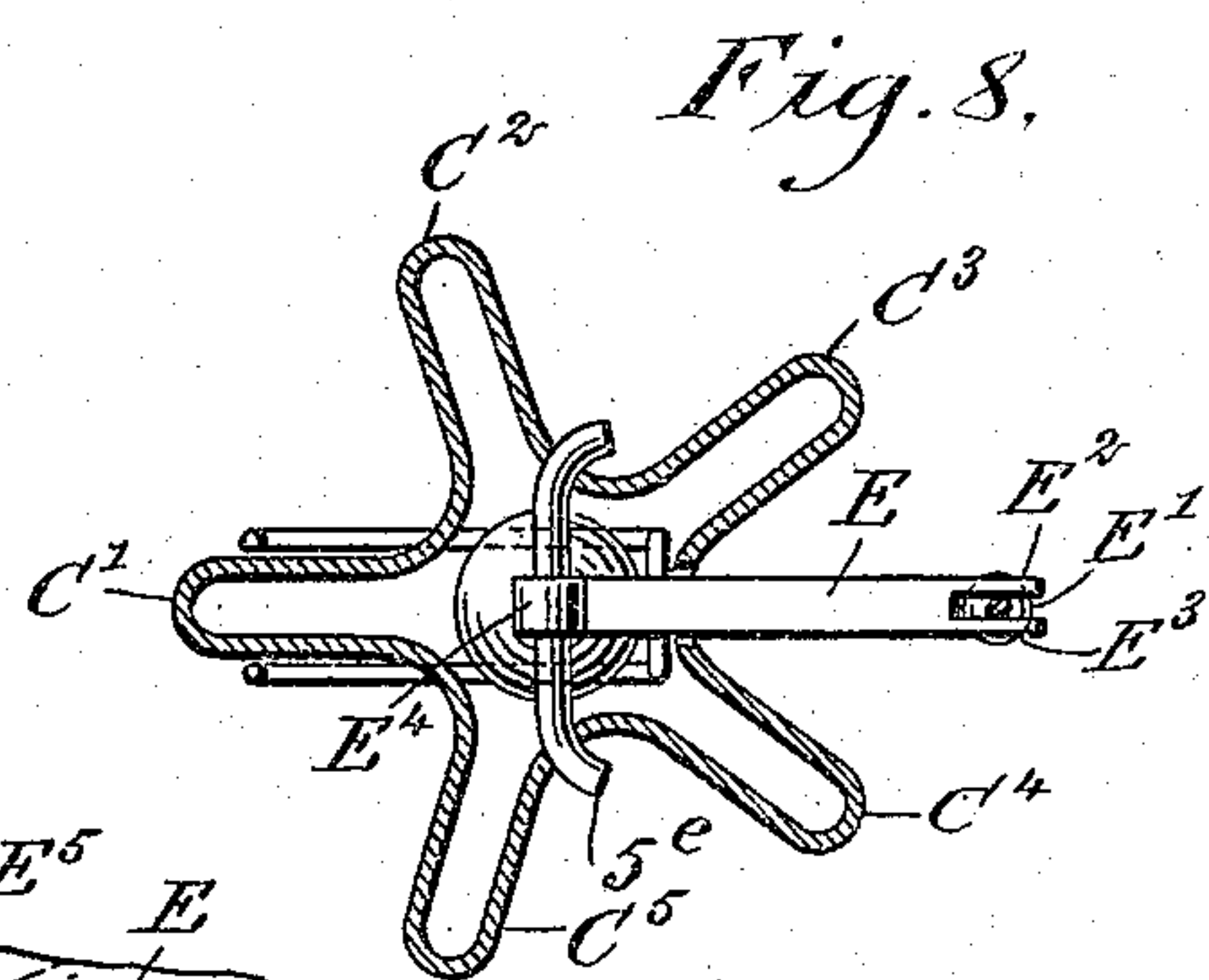
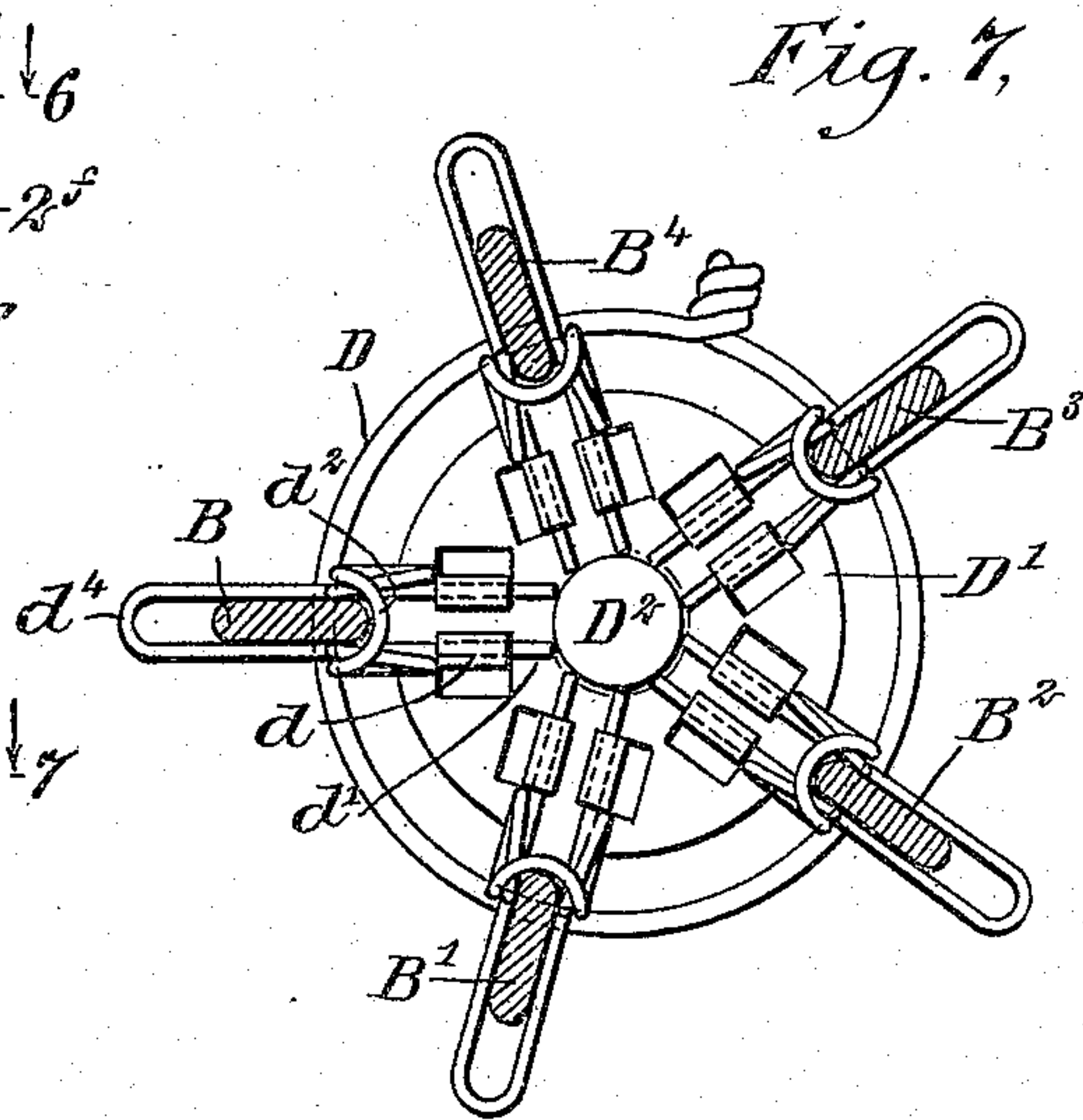
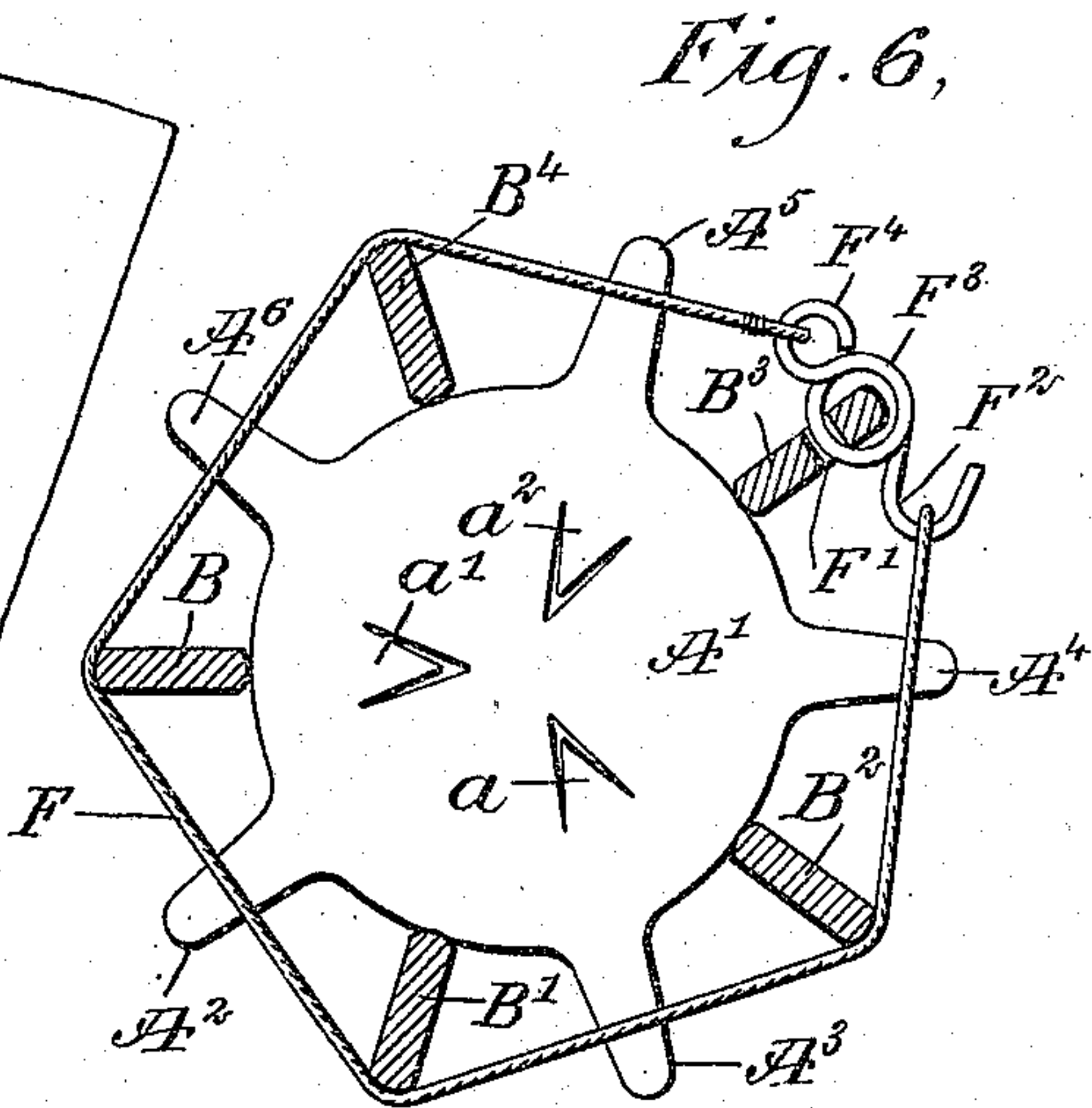
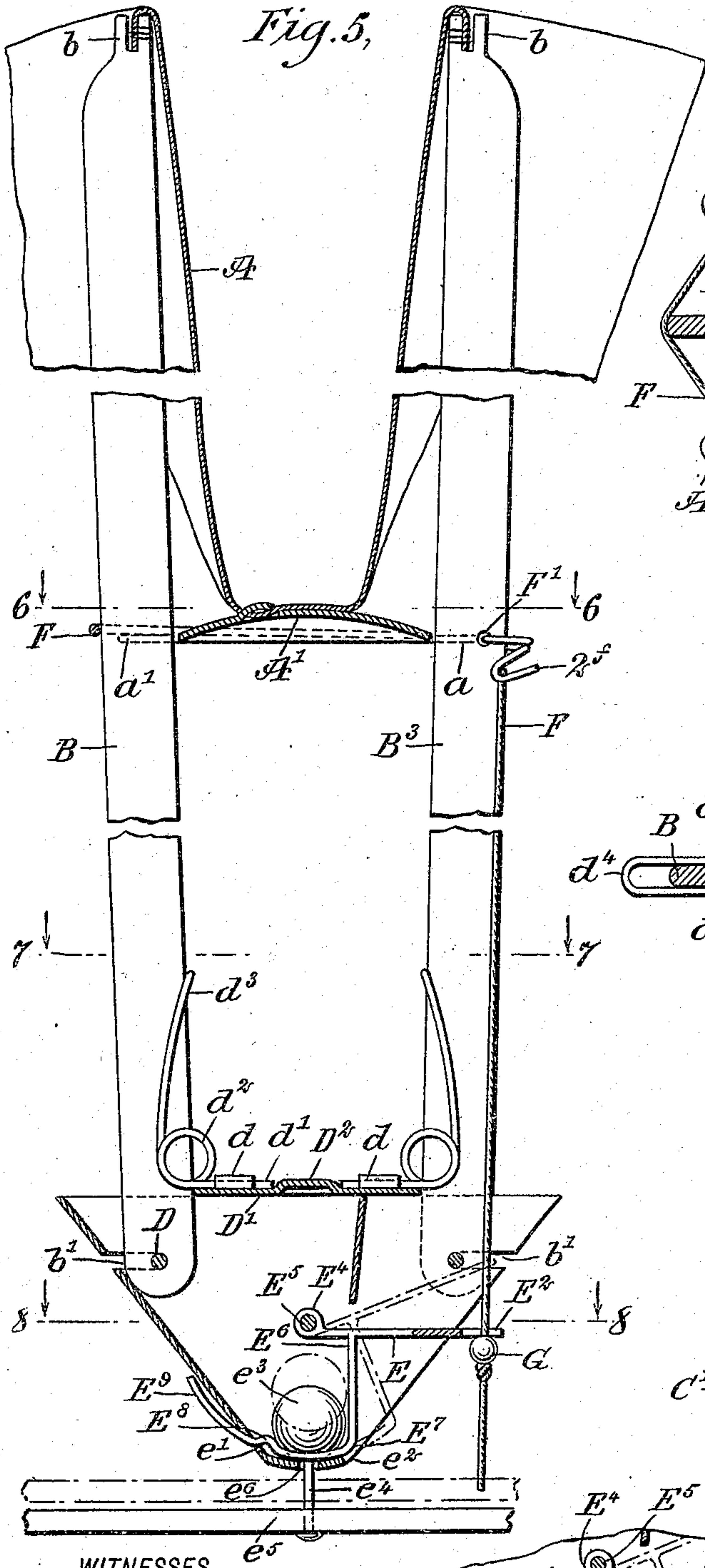
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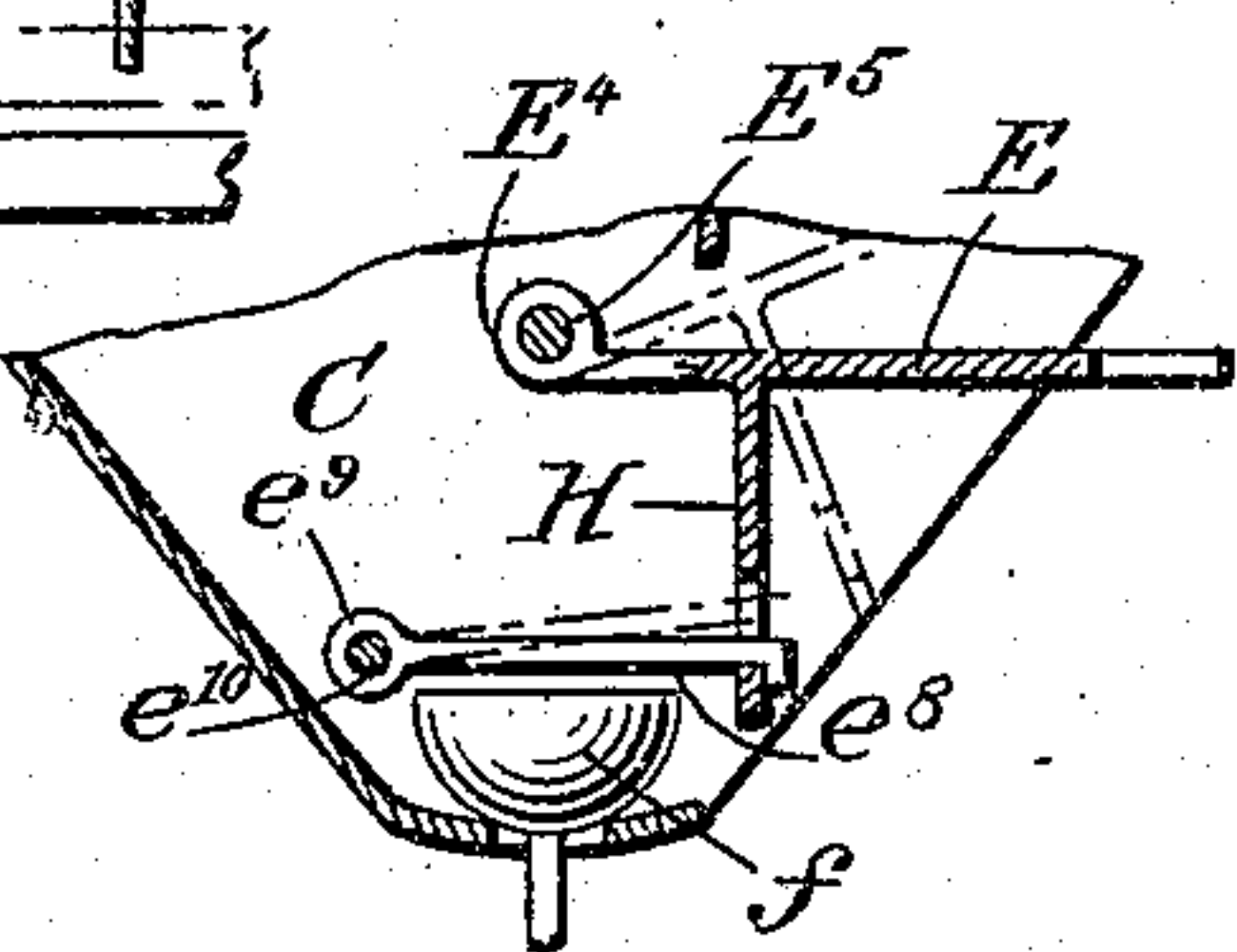
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2 SHEETS—SHEET 2.



WITNESSES
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UNITED STATES PATENT OFFICE.

THOMAS LITTLE ZOOK, OF LIMA, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE TOY PARACHUTE COMPANY, OF LIMA, OHIO.

PARACHUTE.

No. 930,452.

Specification of Letters Patent.

Patented Aug. 10, 1909.

Application filed May 12, 1908. Serial No. 432,434.

To all whom it may concern:

Be it known that I, THOMAS L. ZOOK, a citizen of the United States, and a resident of Lima, in the county of Allen and State of Ohio, have invented a new and useful Parachute, of which the following is a full, clear, and exact description.

My invention relates to improvements in parachutes, in which rigid guys or braces operate in conjunction with a sail or kite to extend the same; and the objects of my improvements are first, to provide positive means for effecting the opening of the parachute in making a descent; second, to afford facilities for the folding and stowing away of the device; and third, to provide a durable and simple construction of the several parts of the parachute and its entirety.

I attain these objects by the construction and the mechanism involved therein, illustrated in the accompanying drawings, in which—

Figure 1 is an inverted front elevational view of my improved parachute when folded and as adapted to a toy; Fig. 2 is a like view of the same when opened; Fig. 3 is an erect front elevational view of the parachute and toy; Fig. 4 is an enlarged erect front elevational view of the framework thereof folded and latched, and a fragmentary view of the sail or kite and the depending toy; Fig. 5 is an enlarged vertical sectional elevational view taken through the parachute when folded, and the guys and sail curtailed by removing portions therefrom; Fig. 6 is a cross sectional view taken on the line 6—6 of Fig. 5; Fig. 7 is a like view taken on the line 7—7 of Fig. 5; Fig. 8 is a similar view taken on the line 8—8 of Fig. 5; Fig. 9 is a sectional view of a modification of the latch or trigger; and Fig. 10 is a perspective view of a further modification of the latch or trigger.

Similar characters of reference designate like parts in the several views.

The sail or kite A, its guys or braces B, B', B², B³ and B⁴ and their hub C, to which they are radially pivoted, constitute the structure proper of the parachute. The hub C I prefer in the instance illustrated, to construct of tin plate, although any suitable material which is sufficiently strong consistent with a minimum of weight, will answer the purpose. This hub is formed preferably from a blank of the desired shape and

proportions, into an annular series of equidistant and radially disposed flutings C', C², C³, C⁴ and C⁵. These are formed to fit the terminals of the guys, in bearing relation and will be referred to hereinafter as sockets.

The sail or kite A consists preferably of light fabric of the character employed for umbrella covers, and is sized. It is peripherally formed to extend over and embrace the terminals b of each of the guys B, B', B², B³ and B⁴ at which points it is secured in the manner of an umbrella cover, to the said terminals of the said guys. Carried by and centrally secured to the sail A is a limiting stop A' of similar material to that of the hub C. This stop has integrally formed spacing fingers A², A³, A⁴, A⁵ and A⁶, and the clips of barbs a, a' and a², and by means of which it is secured in a well known manner to the sail A. The guys B, B', B², B³ and B⁴ are preferably of light wood, as for example bamboo, and of a length requisite to extend radially and conically from the hub C to the marginal edge of the sail A when extended, in order to diverge outwardly at a predetermined angle from each other. In Figs. 2 and 3, this angle is approximately 85 degrees. The other dimensions of these guys are such as will afford the requisite stiffness and durability essential to the proportions of the remaining parts of the parachute and to the load it is designed to carry. They are each provided at their inner terminals with perforations b' where they are pivotally secured to their respective sockets C', C², C³ and C⁴ by a wire binder D, which is strung through them in the manner of securing umbrella ribs to their sockets. The terminals b of the guys are slotted to receive a fold or bight of the sail and are barred to the latter by whipping or any other well known means.

Secured to and centrally carried by the hub C is a circular cap D' provided with integrally formed and radially extending pairs of securing lugs d grouped equidistantly and annularly about a circular stop D² raised from the center of the cap D'. These pairs of securing lugs subtend respectively the sockets C, C', C², C³ and C⁴ and embrace the corresponding terminals d' of expansion springs d². The expansion springs d² consist of a suitable grade and diameter of spring wire to afford the de-

terminated stiffness commensurate with their length, to extend the arms or guys B, B', B², B³ and B⁴ of the parachute, with facility, and are folded intermediately of their length to form a loop d^4 , thereby and to provide the arms d^3 . After the springs d^2 are secured in the lugs d by their respective terminals and positioned against the stop D², the perforated terminals of the guys B, B', B², B³ and B⁴, are thrust obliquely into their respective sockets C', C², C³, C⁴ and C⁵, so that the said arms will lie under the arms d^3 of the springs d^2 respectively, and the pivoting binding wire D is strung through the terminal perforations b' and is secured by twisting its ends together in a familiar manner.

The loops d^4 will now impinge against the adjacent and respective edges of the guys, and will by virtue of the thrust of the springs d^2 through the arms d^3 , exercise a force tending outwardly and one opposed to the folding or closing of the co-acting guys B, B', B², B³ and B⁴.

Looped through a perforation F' of the guy B³, is the eye F³ of a hook F² provided with an eye F⁴ to which latter is secured a binding cord F, and when the guys B, B', B², B³ and B⁴ together with the sail A, are folded as illustrated in Figs. 1, 4 and 5, they are bound by passing the cord F around them, as will be clear by reference to Fig. 6, and catching the bight of the cord in the hook F², the cord will be held with sufficient tension to resist the force of the springs d^2 tending to spread the said guys, but to assure this, I provide a stop G, depending from the cord F and which engages a counter-balanced pivoted latch E. This latch has at its outer terminal a fork E', to freely fit the cord F, which divides the latch at its terminal into prongs E² and E³, between which the cord F is disposed. The opposite terminal of the latch E has an eye E⁴ for the reception of a pivoted stud E⁵ which is passed through the walls of the hub C. The latch E has secured near its pivotal terminal or eye E⁴ a downwardly depending forked arm E⁶, formed of wire bent substantially at right angles at E⁷ to carry a spherical counter-balancing weight e^3 and is then crimped upwardly to form a stop E⁸, and the remainder is bent to provide a rest E⁹ which passes through a perforation e' in the wall of the hub C and impinges, when the latch E is in a horizontal position, against the outer surface of the wall of the hub C. From the counter-balancing weight e^3 depends the headed pin e^4 which carries a trapeze e^5 of wood or other light material. The pin e^4 is driven at a central point through the trapeze, and is then passed through a perforation e^6 in the bottom of the hub C after which it is driven or otherwise made fast to the weight e^3 . As long as the weight is pulling up on

the parachute from the effect of force applied, the parachute will not open even if inverted. It is only when the parachute stops its ascent that gravitation causes the weight to fall and release the latch or trigger. When the latch E is in a horizontal position and thus positioned by virtue of the counterbalancing weight e^3 , and the stop G of the cord F impinges against the under side of the prongs E² and E³ of the fork E', and the arms of the parachute are closed against the stop A', and the cord F is attached to the hook F² as aforesaid, the counterbalancing effect due to the weight of the ball e^3 together with the load upon the trapeze, as for example the toy e^7 , will through the tension it imposes upon the cord F restrain the expansive force of the springs d^2 and the parachute will be held closed. In the event, however, that the parachute is inverted as in Figs. 1 and 2, the weight e^3 and trapeze e^5 will fall and assume the position indicated by the dotted lines in Fig. 5, whereupon the latch E will be swung upon its axis and assume the angular position indicated in Fig. 5, by virtue of the reaction of the springs d^2 , the latch moving outward through a slot e^2 in the hub C, and the stop G will become disengaged from the latch E, thus permitting the extension of the parachute effected by the expansive force of the springs d^2 , as illustrated in Fig. 2.

To operate my improved parachute it is first folded and bound by the cord F and hook F², as already described, and while in the position illustrated in Figs. 4 and 5, the cord F is secured or latched by the stop G to the latch E as aforesaid; then by cords f' and f^2 secured by one of their terminals to the terminals of the opposite arms B, B² or B³, and at the opposite terminals to a ring f^3 , the parachute is suddenly whirled around by the operator while the ring f^3 is grasped firmly in the hand, and sufficient force is exerted to throw the parachute some distance into the air. Upon the grip of the ring f^3 being released, the parachute will be thrown as a sling shot for some considerable distance upward, providing it is discharged at the proper instant, and will assume in its flight the position illustrated in Fig. 1. Due to the unlatching of the stop G from the fork E' of the latch E, the parachute will be opened by the action of the springs d^2 as already explained, and the sail or kite A will be extended as illustrated in Fig. 2, in which position the descent of the parachute will be checked by the resistance which the sail or kite A offers to the action of the air; and furthermore, it will be in unstable equilibrium while thus sailing downward, by virtue of the superimposed weight. The effect of this will be to turn the parachute right side up, whence it will assume the position illustrated in Fig. 3.

In the modification, Fig. 9, I have illustrated a somewhat different arrangement of the latch E with its coacting weight, wherein the latch E is not directly controlled by the action of the weight e^3 , but is latched by a depending hooked arm H to a trigger e^8 having an eye e^9 by which it is swung upon a stud e^{10} , carried by the opposite walls of the hub C. In this construction I substitute for the spherical weight e^3 a hemispherical weight f and dispose the flat surface of the weight in operative proximity to the trigger e^8 , in a manner whereby when the parachute is turned the other side up as aforesaid, the weight f will force the trigger e^8 out of engagement with the hook of the arm H, and thus release the cord F and permit the extension of the arms or guys of the parachute as already described.

In Fig. 10 a further modified form of latch or trigger is shown, which is stamped and bent from metal, and comprises a straight upper member H having an eye H^1 at one end and a fork H^2 at the other end, and depending from the said forked end and integral with the member H, is a pair of curved members H^3 each having a stop H^4 . The operation of the form of the latch or trigger is in all respects the same as that of the form shown in Fig. 5.

I am aware that prior to my invention parachutes have been made with spring actuated extensible arms. I therefore do not claim such construction broadly.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In a parachute, a sail, radially disposed guys connected therewith, a hub uniting the guys, expansion devices coacting with the guys to extend the parachute, and means for controlling the action of the expansion devices.

2. In a parachute, a sail, extension guys connected therewith and carried thereby, a hub connecting the guys, and expansion

springs for the guys, to extend the sail, and means controlled by the position of the parachute for controlling the expansion springs.

3. In a parachute, a sail, mechanically operated extension guys secured thereto and carried thereby, and means controlled by the position of the parachute for controlling the operation of the extension guys.

4. In a parachute, a sail, a positioning stop therefor and carried thereby, guys secured to the sail and embracing the stop, and a hub connecting the guys.

5. In a parachute, a hub, radially disposed rigid guys connected thereto at one extremity, a sail carried by the guys at the opposite extremities, a limiting stop carried by the sail and disposed between the guys, means for mechanically expanding the guys and spreading the sail, and a controller therefor.

6. In a parachute, the combination with sail-extending and controlling mechanism, of spring-actuated extension arms and a gravitational controller co-acting therewith.

7. In a parachute provided with rigid guys for extending the sail thereof, means coacting with the guys to spread the sail upon the inversion of the parachute, and means coacting with the guys to secure the parachute closed in substantially an erect position.

8. In a parachute provided with mechanically operative rigid guys, and a sail secured thereto and carried thereby, a latch and stop mechanism to restrain the activity of the guys, and a trigger provided with gravitational devices coacting with the latch and stop mechanism for controlling the same.

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

THOMAS LITTLE ZOOK.

Witnesses:

LAVERNE H. KIBBY,
ARTHUR C. FELTY.