

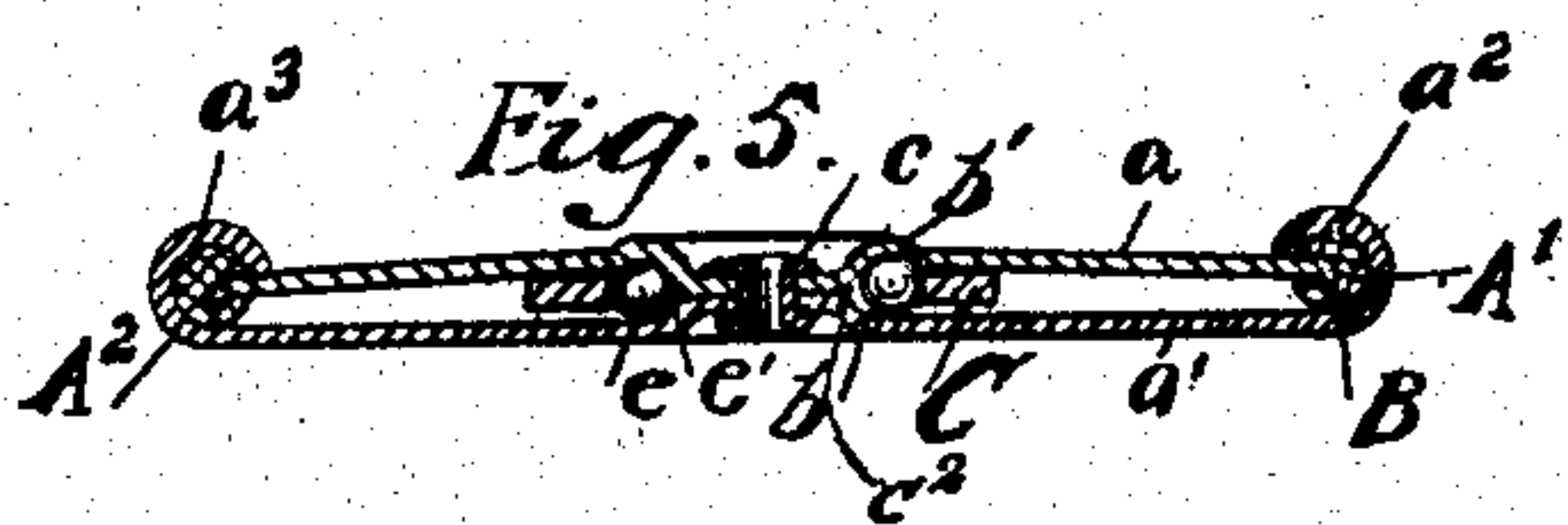
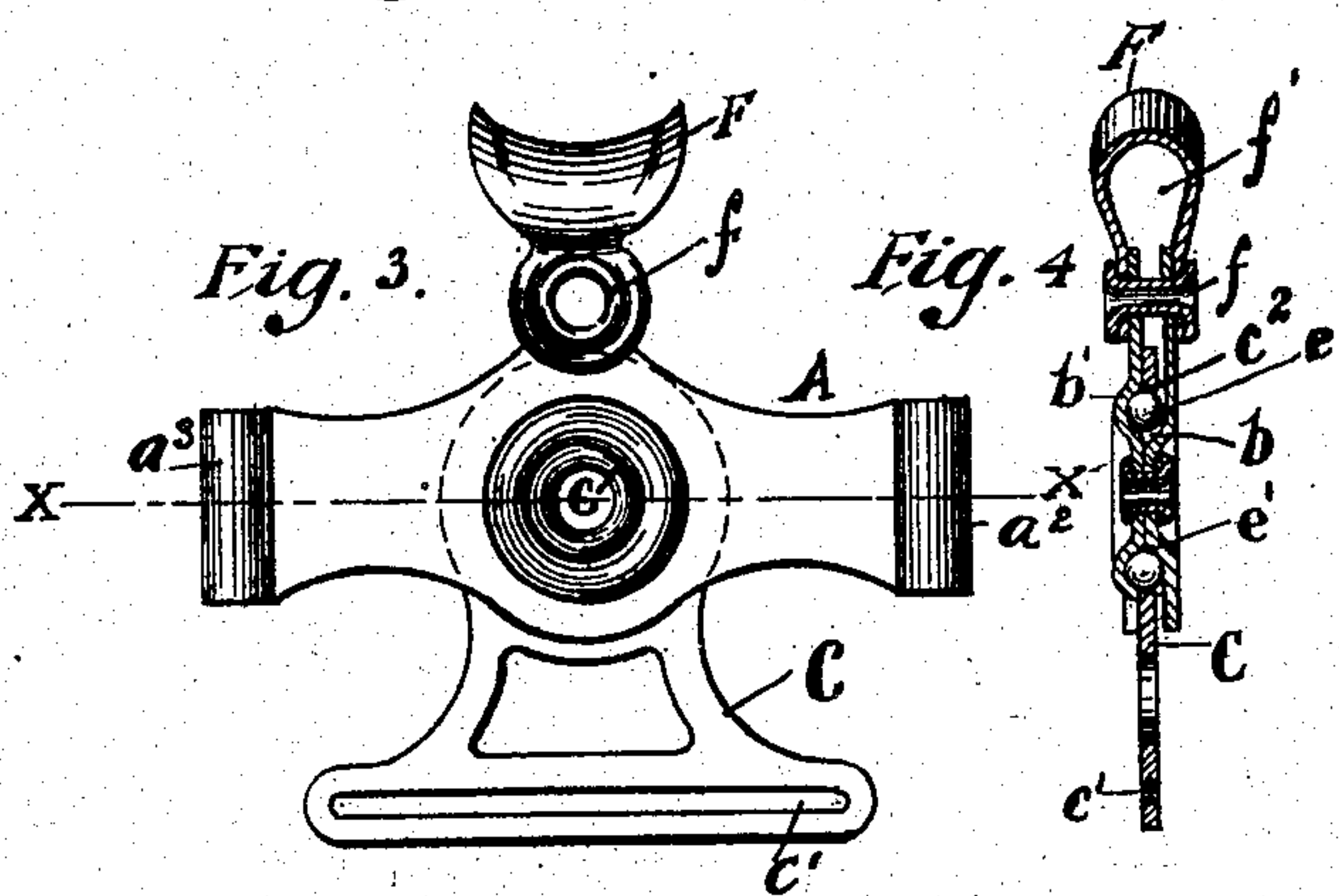
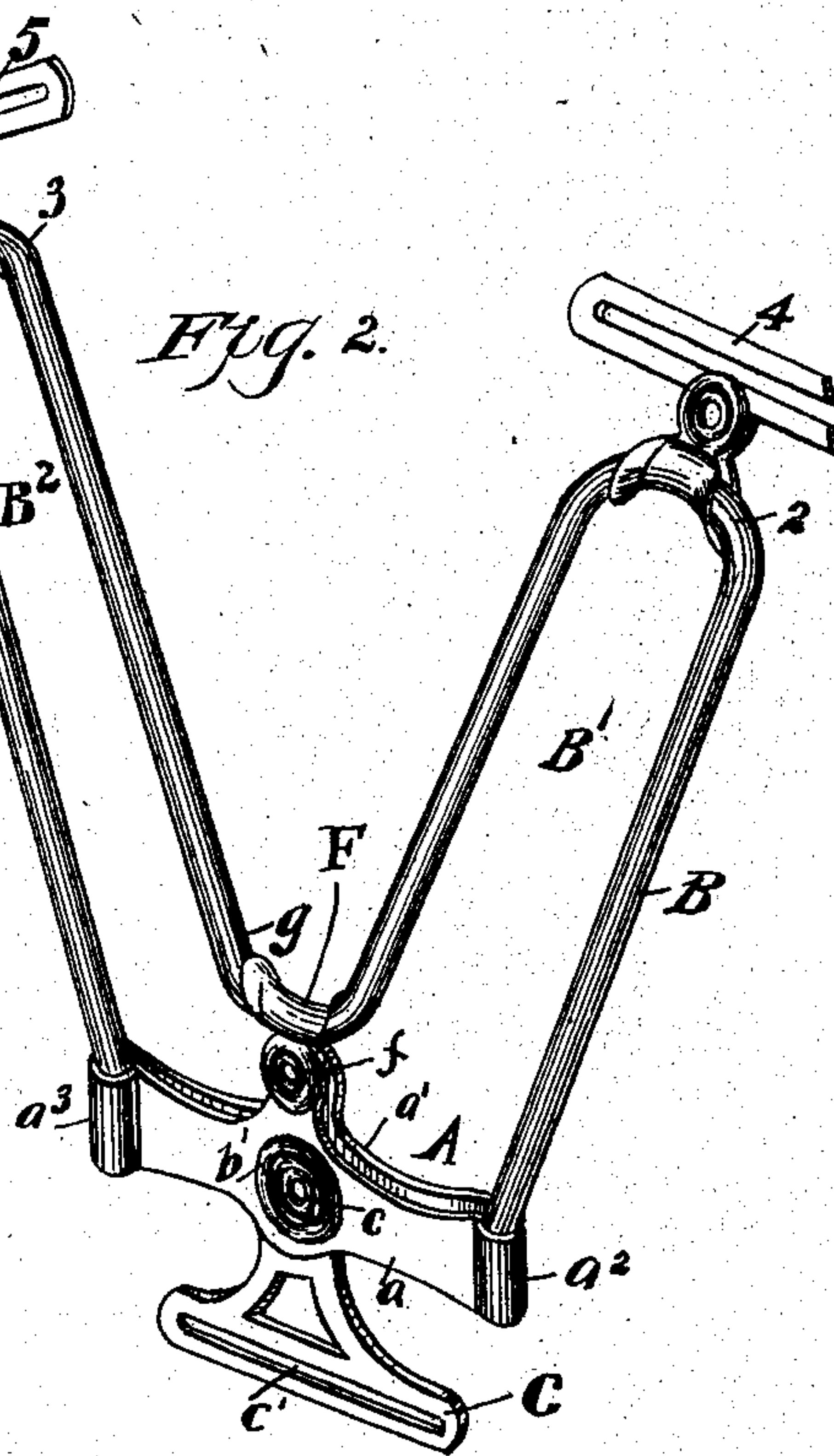
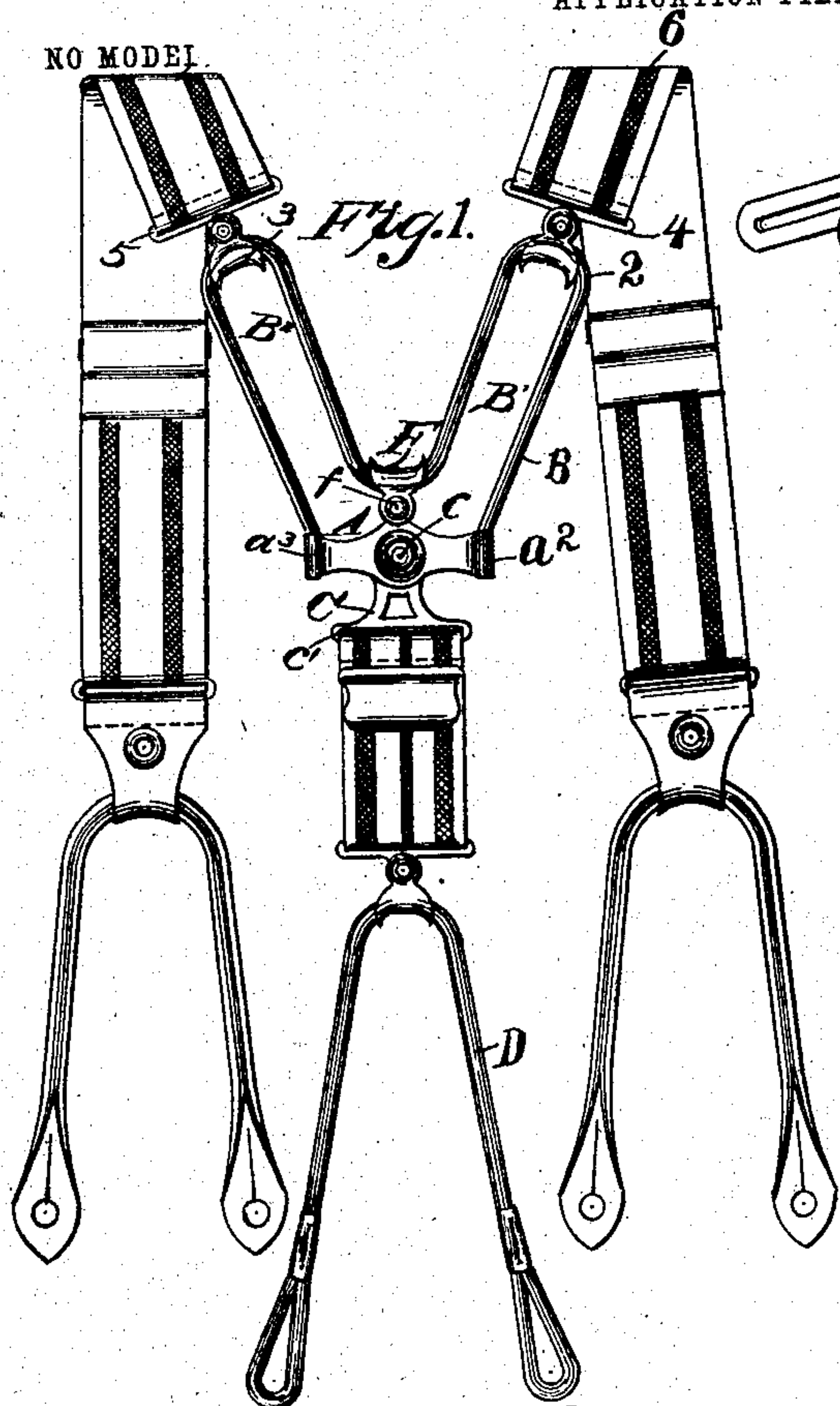
No. 721,634.

PATENTED FEB. 24, 1903.

H. C. HINE.  
SUSPENDERS.

APPLICATION FILED SEPT. 2, 1902.

NO MODEL.



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# UNITED STATES PATENT OFFICE.

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## SUSPENDERS.

SPECIFICATION forming part of Letters Patent No. 721,634, dated February 24, 1903.

Application filed September 2, 1902. Serial No. 121,738. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY C. HINE, a citizen of the United States, residing in New Britain, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Suspenders, of which the following is a specification.

This invention relates to suspenders; and its object is to improve the connection between the shoulder-straps and the rear suspender-end, particularly with a view to securing at low cost an easily-working and durable suspender.

In the drawings forming a part of this specification, Figure 1 illustrates a pair of suspenders embodying my improvements. Fig. 2 is a perspective view of my improved trimming with its connections. Fig. 3 is a view of a lever, hanger, and cord-carrier. Fig. 4 is a vertical section of the parts seen at Fig. 3, and Fig. 5 is a horizontal section taken on line  $x x$  of Fig. 3.

The shoulder-straps of the suspender are designated as 6 and 7 and the rear suspender-end as D. The devices connecting said straps to the suspender-end include a hanger C, which has an eye  $c'$  for connection to the suspender-end, and a lever A, pivoted to said hanger. Said lever is connected to the shoulder-straps by means of a cord B, whose ends are inclosed in eyes (designated generally as  $A'$  and  $A^2$ ) upon the ends of the lever A and which has a running connection with the shoulder-straps, as by running over pivoted cord carriers or loops 2 and 3, connected, respectively, by eyes 4 and 5 to the straps 6 and 7. The cord also runs over a carrier F, which is pivoted at  $f$  to the lever A, between the ends of the latter and preferably eccentrically to the main-lever pivot and above said pivot, as seen at Figs. 1 and 3. By means of the carrier F the straps 6 and 7 are kept apart, or, in other words, the tendency of the straps to run together, which would occur if the cord went directly from carrier 2 to carrier 3, is avoided.

The lever A consists, preferably, of plates  $a$  and  $a'$ , in which are struck up opposite annular grooves or channels  $b$  and  $b'$  for the reception of a single circular series of balls  $e$ . The plates are preferably connected centrally

by a rivet  $c$ . The hanger is formed with an eye  $c^2$ , inserted between the lever-plates  $a$  and  $a'$ , and surrounds the bearing-balls, whereby the hanger is pivoted to the lever. The grooves  $b$  and  $b'$  cooperate with the eye  $c^2$  to form a race  $e'$  for the balls.

To form the cord-eyes  $A'$  and  $A^2$ , the ends of one of the plates  $a'$  of the lever are curled to form loops, as at  $a^2$  and  $a^3$ , while the ends of the other plate  $a$  of the lever project within the loops and hold the cord therein, as will be understood from Fig. 5.

As seen at Fig. 4, the carrier F preferably consists of a yoke pivoted to the lever by a rivet  $f$  and has a curved cord-channel  $f'$ .

It will be understood that when the lever A is turned upon its pivot the yoke F is moved to either right or left, so that the stress of the bight  $g$  of the cord which passes through said yoke is exerted to a certain extent to restore said lever to its normal position, thereby conducing to the effectiveness of the entire "equalizing" device, which term is intended to include the lever A and the parts pivoted thereto. It will be seen that the cord runs from one end of the lever up over a yoke of one strap, then down and over the lever-yoke F and up and over the lever of the other strap, then back to a point of engagement to the other end of the lever, thereby forming two loops or bights of cords  $B'$  and  $B^2$ . It will be understood that considerable freedom of movement of the cord is permitted over the yokes, whereby when one shoulder-strap is drawn away from the lever the other shoulder-strap may draw toward the lever. This conduces to freedom of action and comfort of the wearer, as well as to the durability of the suspender.

It will be seen that the lever has cord-receiving devices at its ends, a cord-carrier between its ends, and a suspender-end hanger pivoted to the lever between the ends of the latter; that the shoulder-cords are connected to the lever at its ends and also at a point between its ends; that the shoulder-straps are connected to the cord in such a manner as to enable relative movements between them and the cord; that the hanger is pivoted to the lever in this instance by a single row of bearing-balls; that the lever and hanger elements



are formed of thin sheet metal, one thereof consisting of a pair of plates and the other thereof being inserted between such plates and having an eye; that means, as the central transverse fastener c, are provided for retaining the lever-hanger and balls in cooperative relation, and that the cord-carrier F is pivoted to the lever between the ends of the latter, but eccentrically to the pivot of the hanger C.

Variations may be resorted to within the scope of my improvements.

Having described my invention, I claim—

1. A suspender comprising a pair of straps, a cord carried thereby, an equalizing device attached to said cord and comprising a lever, a hanger pivoted thereto, a suspender-end attached to said hanger, a ball-bearing between said lever and hanger, and means for securing said cord to said lever.

2. A suspender comprising a pair of straps, a cord member carried thereby, an equalizing device attached to said cord, and comprising a lever having a ball-channel, balls mounted in said channel, a hanger pivoted to said lever, and bearing on said balls, a suspender-end attached to said hanger, and a cord-channeled yoke also pivoted to said lever and holding a portion of said cord.

3. A suspender comprising a pair of straps, a cord member attached thereto, an equalizing device carried by said cord and comprising a lever having a ball-channel around its pivot, balls in said channel, a suspender-end hanger pivoted to said lever and bearing on said balls, a yoke pivoted to said lever and having a channel to receive said cord.

4. In a suspender, the combination with shoulder-straps and with the suspender-end D, of a connecting device comprising a lever connected midway its ends, to said suspender-end, a ball-bearing at said connection, a cord attached to said hanger and a yoke holding said cord.

5. A suspender comprising a pair of straps, an equalizing device, a cord connecting said equalizing device and straps, said equalizing device comprising a lever, and a hanger pivoted thereto, said lever and hanger having a ball-bearing connection, and a yoke member holding the bite of the loop in said cord.

6. A suspender comprising a pair of straps, a cord attached thereto, an equalizing device attached to said cord, and comprising a lever, a ball-channel therein, balls running in said channel, a hanger carried by said balls, and a yoke pivoted to said lever and holding said cord so that the latter forms loops leading from the lever to the straps.

7. The combination of a lever having cord-receiving devices at its ends, a suspender-end hanger pivoted to said lever between the ends of the latter, and a cord-carrier pivoted to said lever between the ends of the latter but eccentrically to the pivot of said hanger.

8. The combination with a lever of a sus-

pender-end hanger pivoted thereto between the ends thereof, a pair of shoulder-straps having cord-carriers, a cord-carrier pivoted upon said lever at a point above said hanger-pivot, and a cord attached to the ends of said lever and rove through said carriers.

9. The combination of a lever, a suspender-end hanger pivoted thereto by means of a single row of bearing-balls, a pair of shoulder-straps, and means connecting said shoulder-straps to said lever in such a manner that either strap may move away from the lever while the other strap moves toward the lever.

10. The combination of a lever having cord-receiving devices at its ends, a cord-carrier upon said lever between its ends, and a suspender-end hanger pivoted to said lever between the ends of the latter by means of a series of bearing-balls.

11. The combination of a lever having cord-receiving devices at its ends, a suspender-end hanger pivoted by means of a series of balls to said lever between the ends of the latter, and a cord-carrier pivoted to said lever between the ends of the latter but eccentrically to the pivot of said hanger.

12. The combination with a lever of a suspender-end hanger pivoted thereto by means of a series of balls, a pair of shoulder-straps having cord-carriers, a carrier pivoted upon said lever between the ends of the latter, and a cord running from the ends of said lever over the carriers on said shoulder-straps and also over the carrier on said lever.

13. The combination with a lever of a suspender-end hanger pivoted thereto between the ends thereof by means of a series of balls, a pair of shoulder-straps having cord-carriers, a cord-carrier pivoted upon said lever at a point above said hanger-pivot, and a cord attached to the ends of said lever and rove through said carriers.

14. The combination of a lever, a suspender-end hanger pivoted thereto by means of a series of balls, and means for connecting the shoulder-straps to said lever at its ends and also at a point between its ends.

15. The combination of a lever, a suspender-end hanger pivoted thereto by means of a series of balls, a cord attached at its ends to the ends of said lever, and a pair of shoulder-straps connected to said cord so as to permit relative movement between the shoulder-straps and the cord.

16. The combination of a lever, a suspender-end hanger pivoted thereto by means of a series of balls, a pair of shoulder-straps, and means, including connections between said shoulder-straps and the ends of said lever, for enabling either of said shoulder-straps to move toward said lever and the other thereof to move simultaneously away from said lever.

17. The combination of a lever, a suspender-end hanger pivoted thereto by means of a series of balls, a pair of shoulder-straps,



a cord connected to said lever and having a running connection with said shoulder-straps, and means for keeping the ends of said shoulder-straps separate.

5 18. The combination of a lever, a suspender-end hanger pivoted thereto by means of a series of balls, a pair of shoulder-straps, a cord connected to the ends of said lever and having a running connection with said shoulder-straps, and a cord-carrier over which said  
10 cord runs between said shoulder-straps; said cord-carrier having a connection to one of said lever and hanger elements.

15 19. The combination of a lever, a suspender-end hanger pivoted thereto by means of bearing-balls, a pair of shoulder-straps, and means connecting said shoulder-straps to said lever in such a manner that either strap may move away from the lever while the  
20 other strap moves toward the lever; one of said hanger and lever elements consisting of a pair of plates, and the other thereof being inserted between said plates.

20. A pair of suspenders comprising a pair  
25 of shoulder-straps, a cord having a running connection therewith, a suspender-end, and a device connecting said cord to said suspender-end; said connecting device comprising a lever to whose opposite ends said cord  
30 is connected, and a hanger to which said suspender-end is connected; said lever and hanger elements being formed of thin sheet metal, and one of said elements consisting of a pair of plates and the other thereof being  
35 inserted between said plates and having an eye; means cooperating with said eye to form a ball-race; a set of balls in said race; and means for retaining said lever, hanger and balls in cooperative relation.

40 21. A pair of suspenders comprising a pair of shoulder-straps, a cord having a running connection therewith, a suspender-end, and a device connecting said cord to said suspender-end; said connecting device comprising  
45 a lever having at its opposite ends devices whereby said cord is fastened, and a hanger to which said suspender-end is connected; said lever and hanger elements being formed of thin sheet metal, and one of said elements  
50 consisting of a pair of plates and the other thereof being inserted between said plates and having an eye; a transverse fastener extending through said eye and connecting said plates, and the elements which compose said  
55 connecting device being so formed or stamped up and arranged as to form a ball-race, a part whereof consists of said eye; and a set of balls in said race.

22. A pair of suspenders comprising a pair  
60 of shoulder-straps, a cord having a running connection therewith, a suspender-end, and a device connecting said cord to said suspender-end, said connecting device comprising a lever to whose opposite ends said cord  
65 is connected, a cord-carrier between the ends

of the lever, and a hanger to which said suspender-end is connected; said lever and hanger elements being formed of thin sheet metal, and one of said elements consisting of a pair of plates and the other thereof being  
70 inserted between said plates and having an eye, and at least one of said plates having a struck-up annular depression which cooperates with said eye to form a ball-race; and a set of balls in said race.

75 23. A pair of suspenders comprising a pair of shoulder-straps, a cord having a running connection therewith, a suspender-end, and a device connecting said cord to said suspender-end, said connecting device comprising  
80 a lever to whose opposite ends and middle portion said cord is connected, and a hanger to which said suspender-end is connected; said lever and hanger elements being formed of thin sheet metal, and one of said  
85 elements consisting of a pair of plates and the other thereof being inserted between said plates and being connected thereto by a set of bearing-balls.

24. A pair of suspenders comprising a pair  
90 of shoulder-straps, a cord having a running connection therewith, a suspender-end, and a device connecting said cord to said suspender-end, said connecting device comprising a lever to whose opposite ends said cord is at-  
95 tached, and a hanger to which said suspender-end is connected; said lever and hanger elements being formed of thin sheet metal; said lever consisting of a pair of plates and said hanger being inserted between said plates  
100 and having an eye; said plates having similar struck-up annular depressions, and said depressions cooperating with said eye to form a ball-race; a set of balls in said race; and a rivet passing through said eye and connect-  
105 ing said plates; one of said plates being formed with loops and the other thereof projecting into the loops and holding the cord therein.

25. A pair of suspenders comprising a pair  
110 of shoulder-straps, a cord having a running connection therewith, a suspender-end, and a device connecting said cord to said suspender-end; said connecting device comprising a lever to whose opposite ends said cord is at-  
115 tached, a cord-carrier pivoted to said lever between its ends, and a hanger to which said suspender-end is connected; said lever and hanger elements being formed of thin sheet metal; said lever consisting of a pair of plates,  
120 and said hanger being formed with an eye and being inserted between said plates; means cooperating with said eye to form a ball-race; a set of balls in said race; and means for retaining said lever, hanger and balls in coop-  
125 erative relation.

26. A pair of suspenders comprising a pair  
of shoulder-straps, a cord having a running connection therewith, a suspender-end, and a device connecting said cord to said suspender-  
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end; said connecting device comprising a lever to whose opposite ends said cord is connected, a hanger to which said suspender-end is connected, and a cord-carrier pivoted to  
5 said lever above said hanger-pivot; said lever and hanger elements being formed of thin sheet metal, said lever consisting of a pair of plates, and said hanger being inserted between said plates and pivoted thereto by means of a set of balls.

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