

No. 692,042.

Patented Jan. 28, 1902.

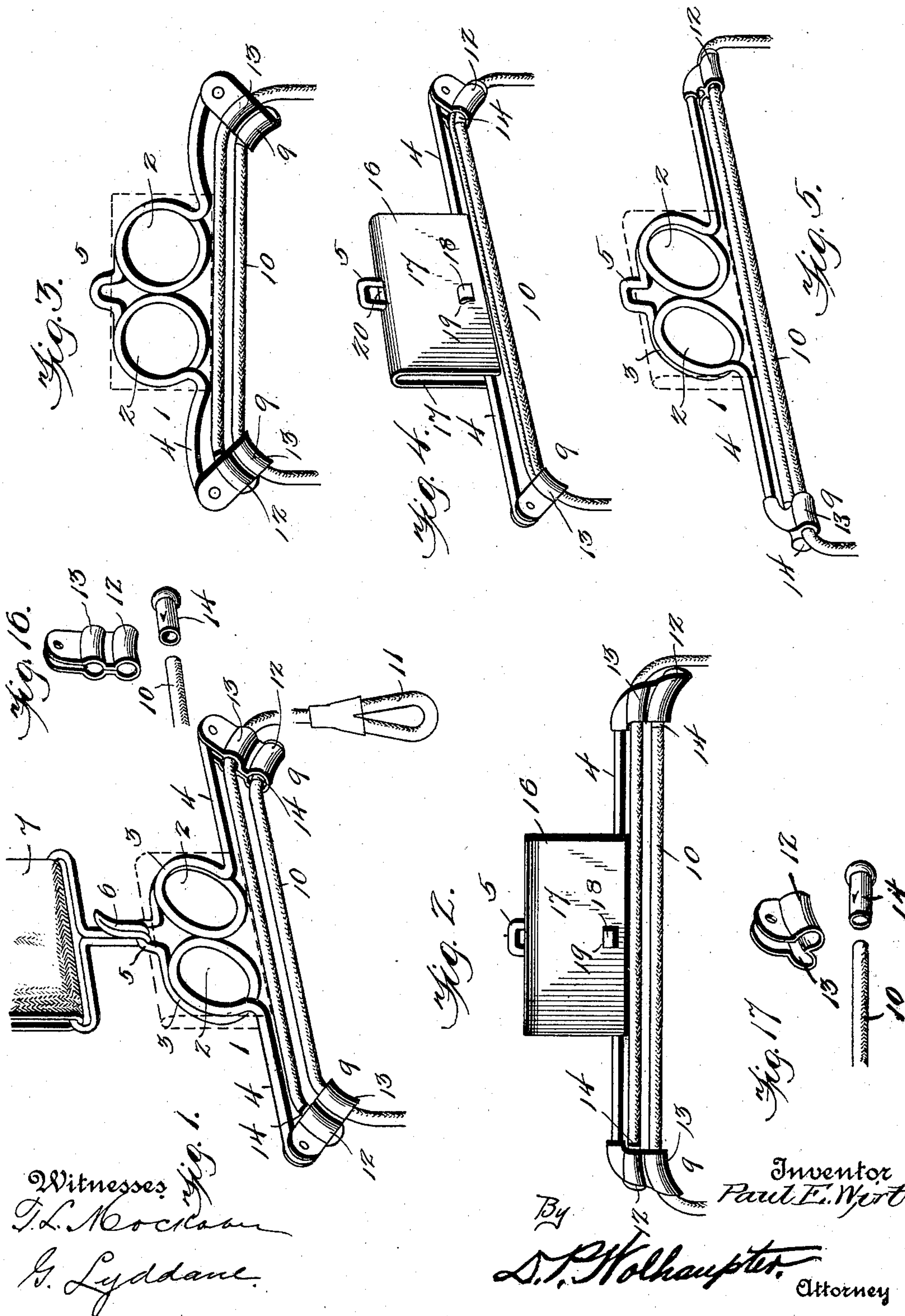
P. E. WIRT.

SPRING ATTACHMENT FOR ARTICLES OF WEAR, &c.

(Application filed Aug. 29, 1901.)

(No Model.)

3 Sheets—Sheet 1.



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3 Sheets—Sheet 2.

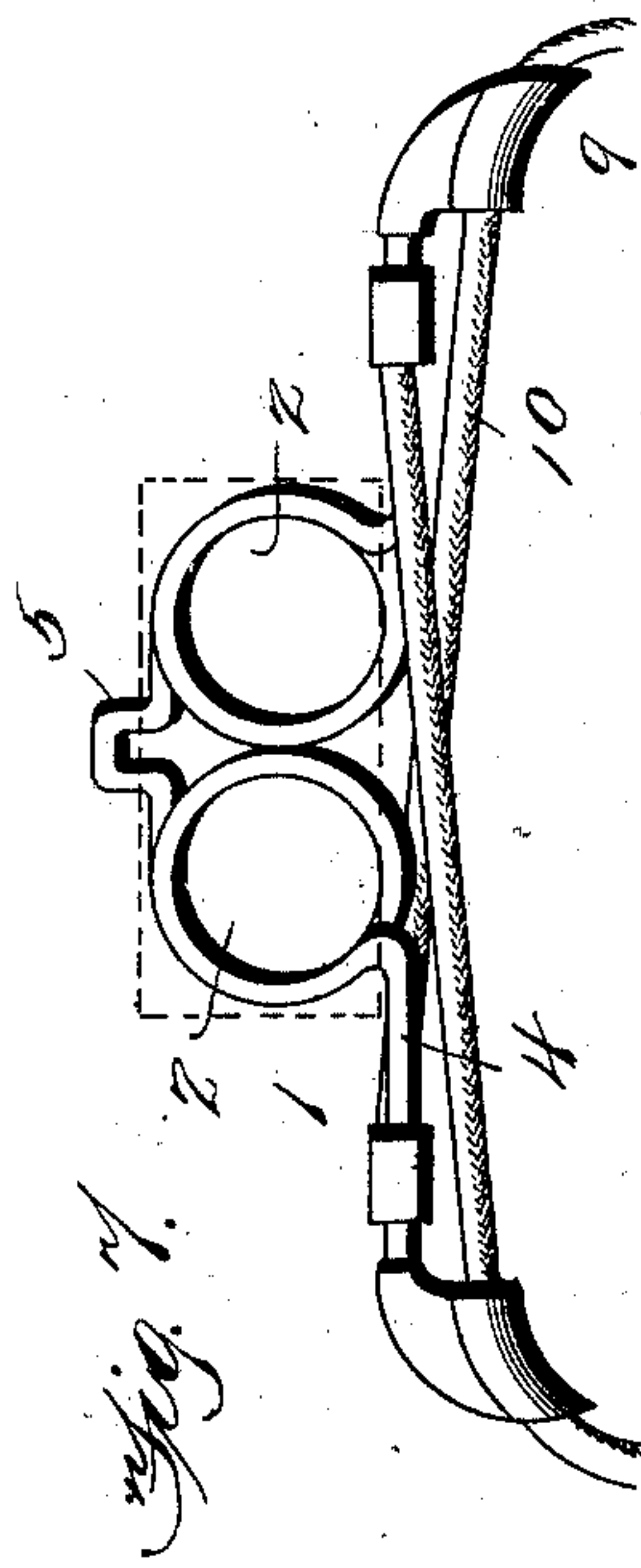
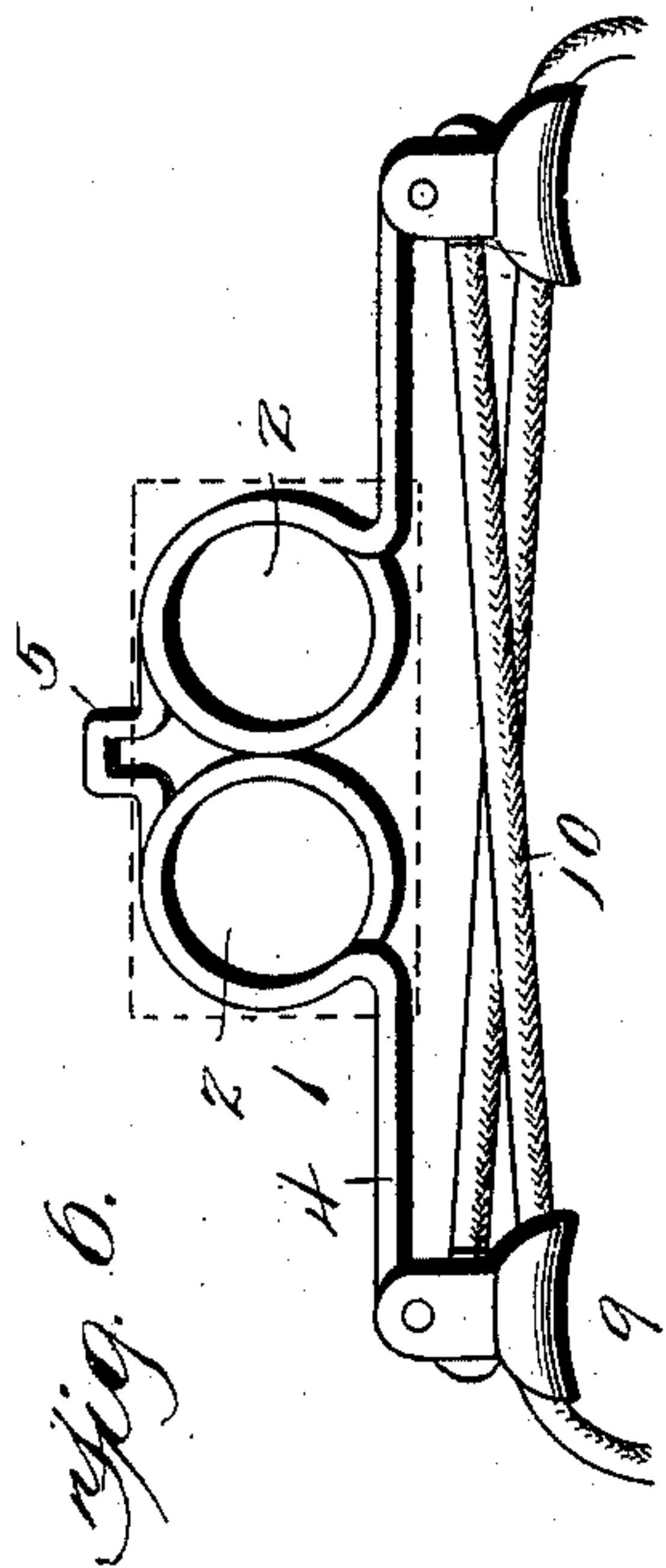
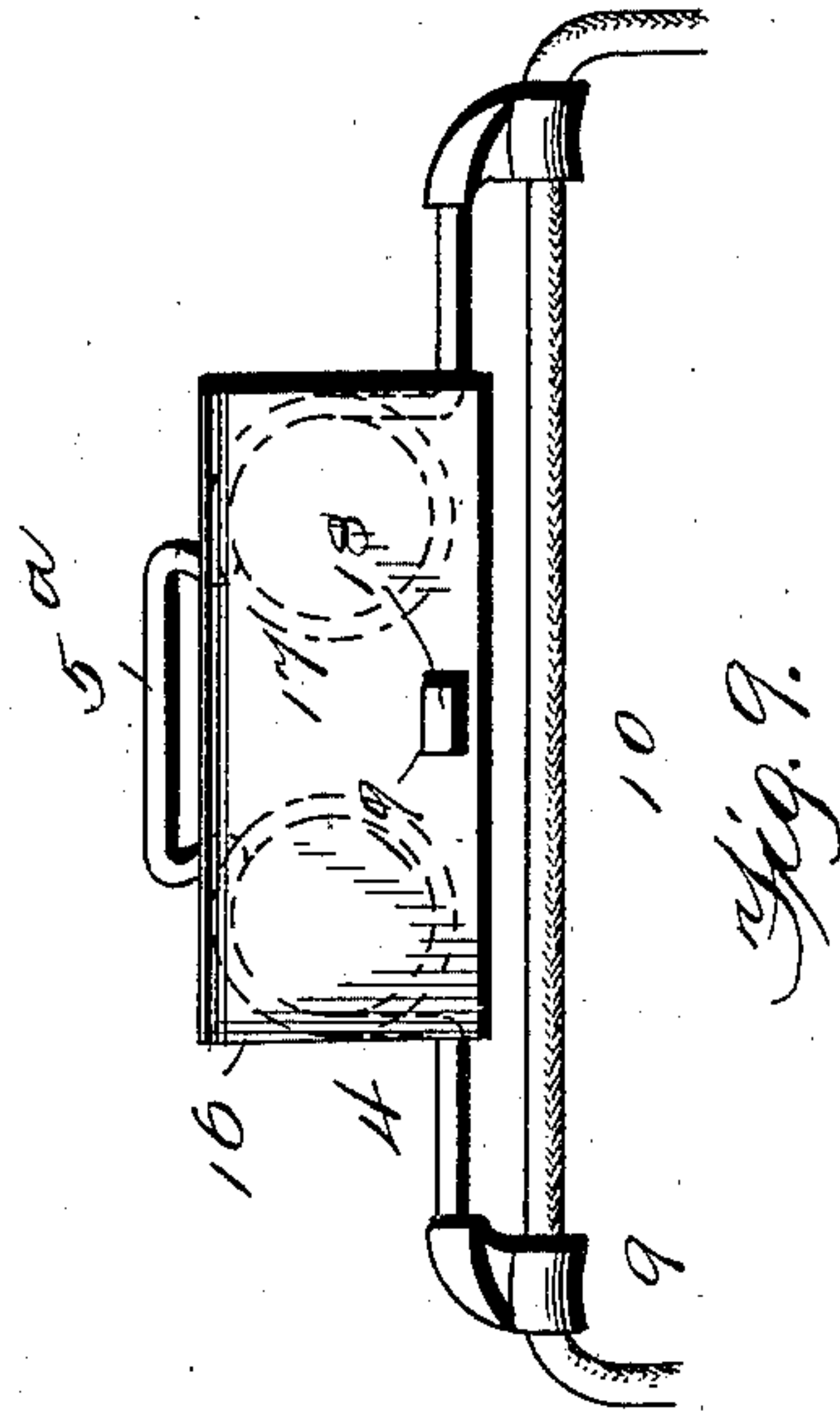
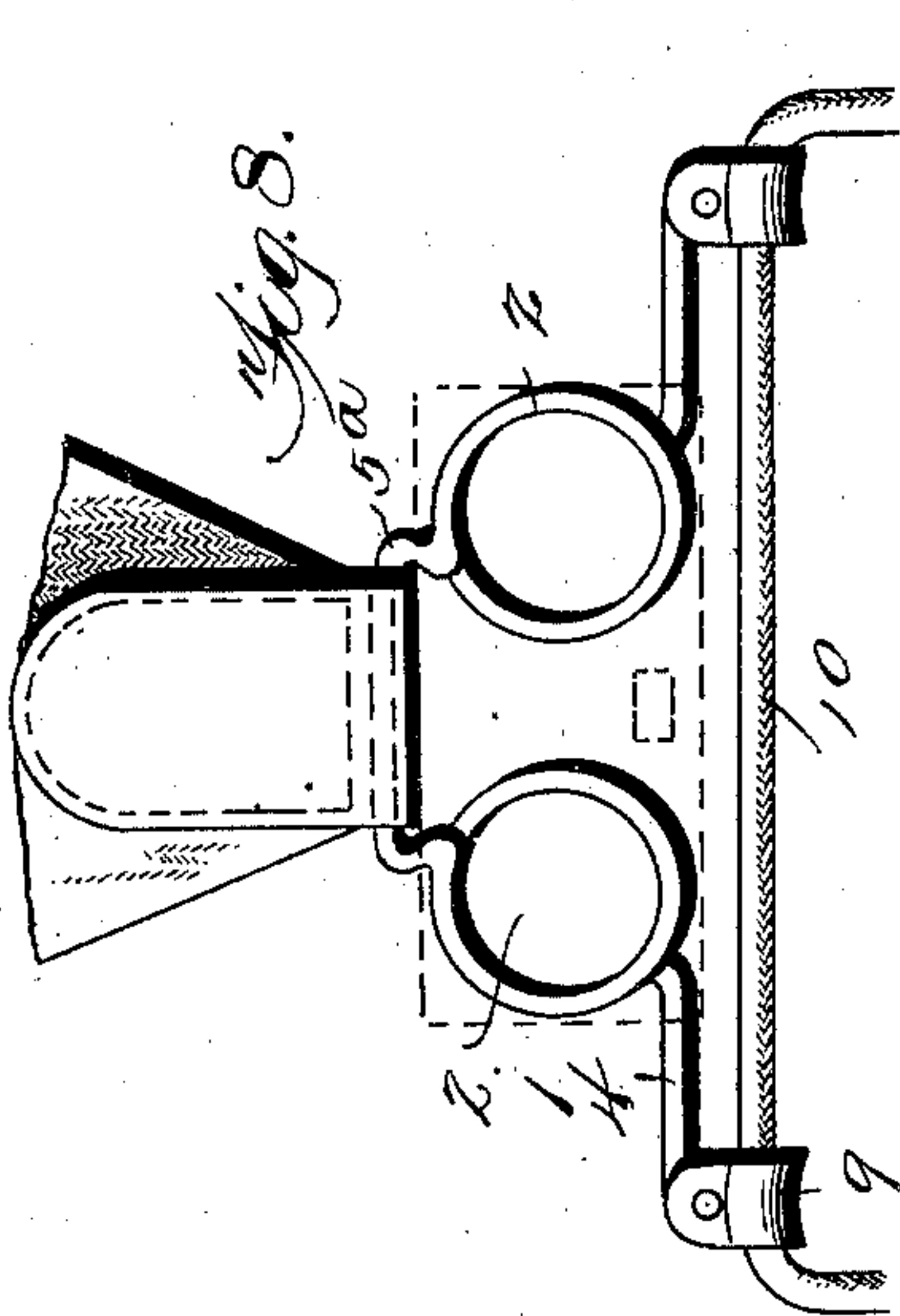
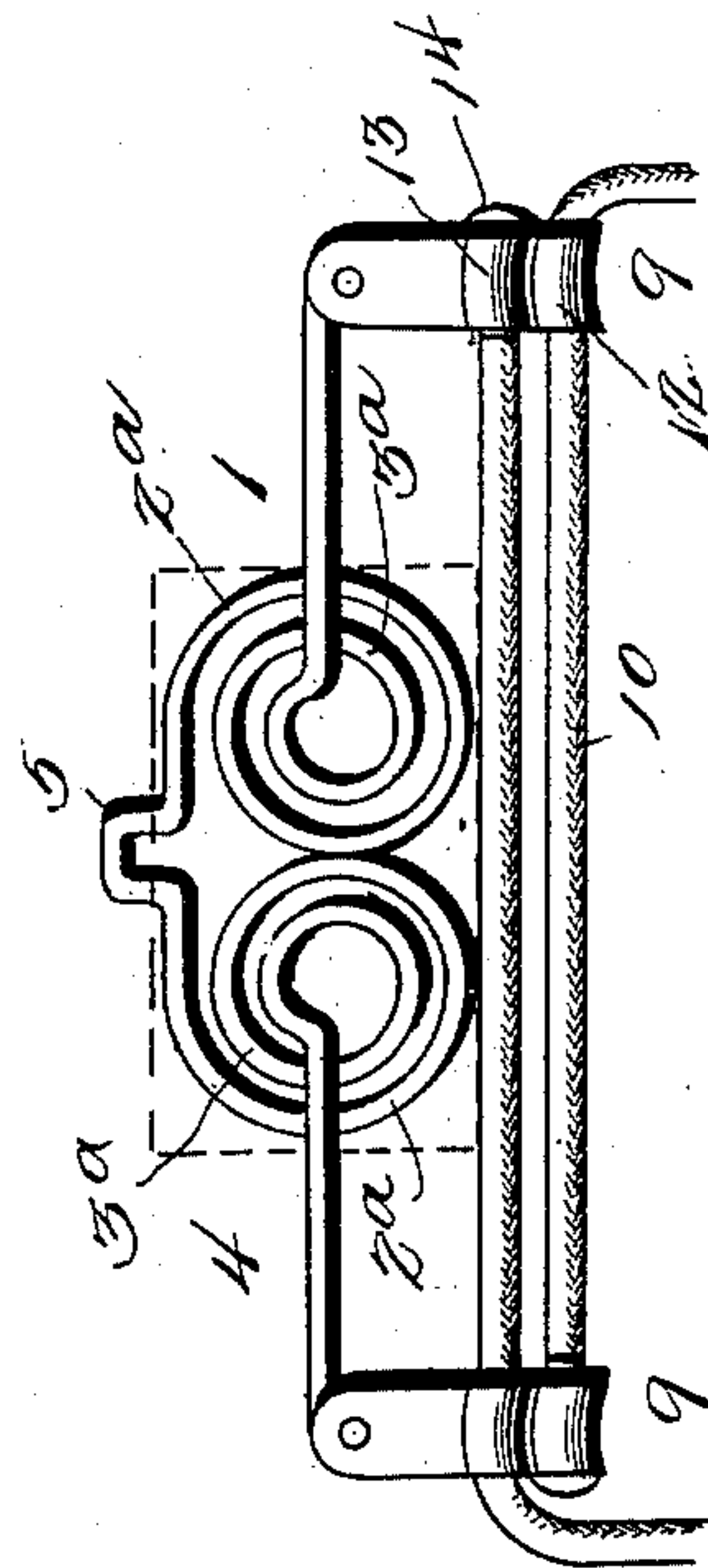


Fig. 10.



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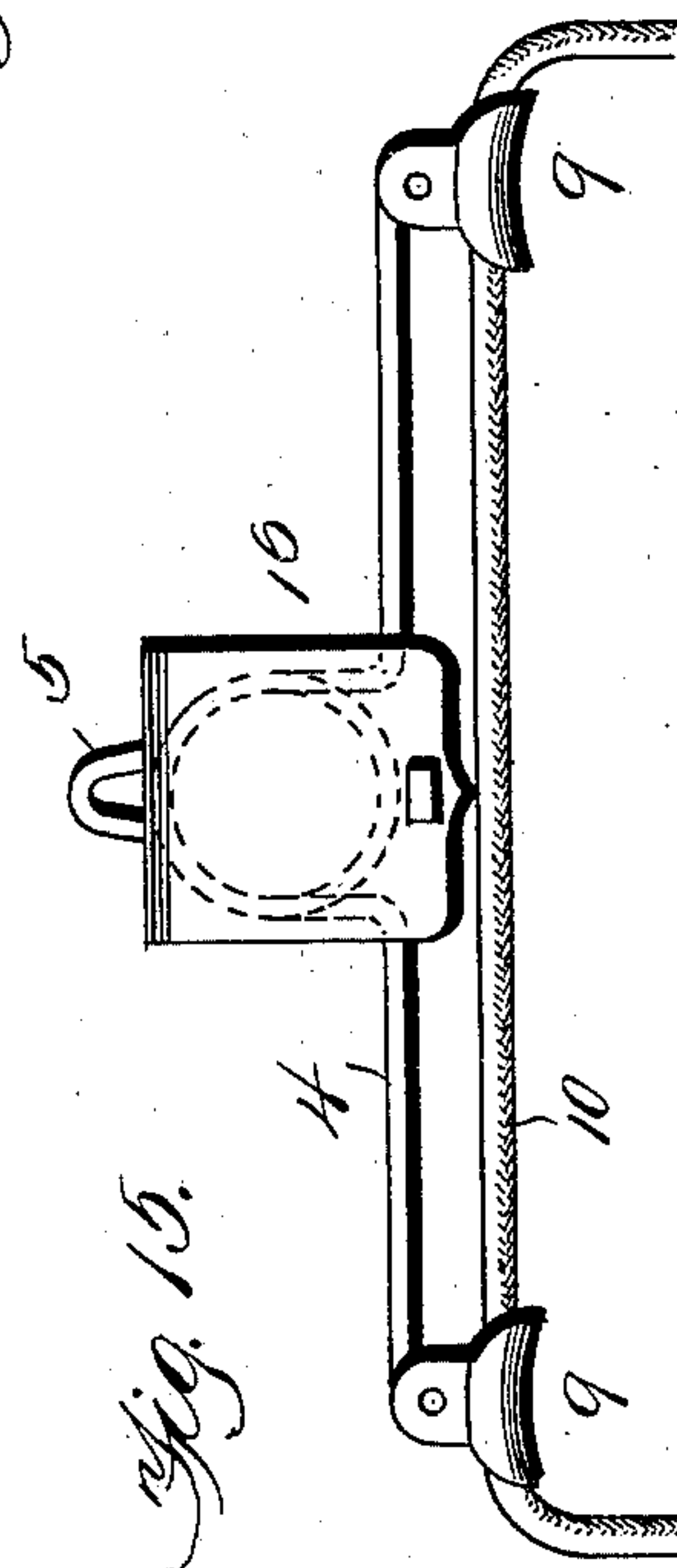
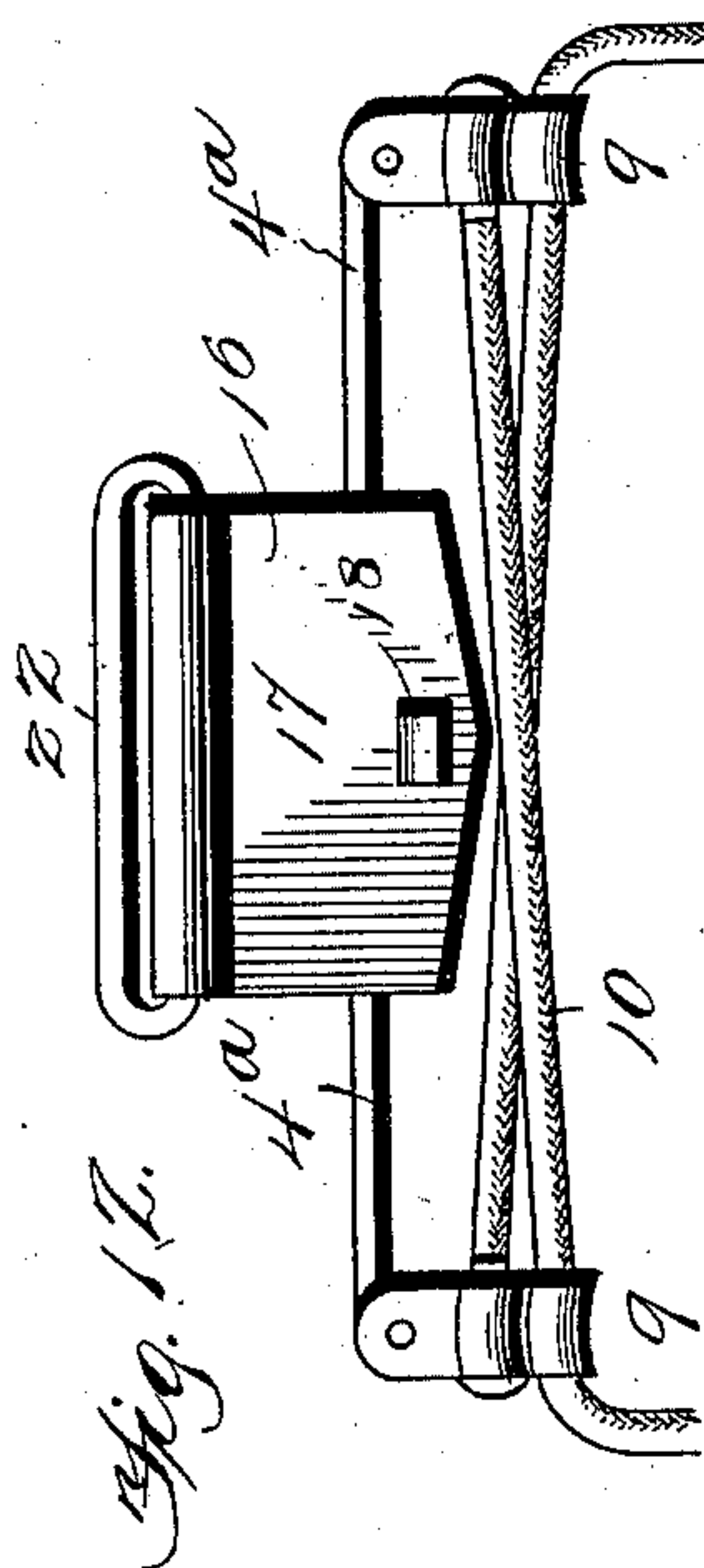
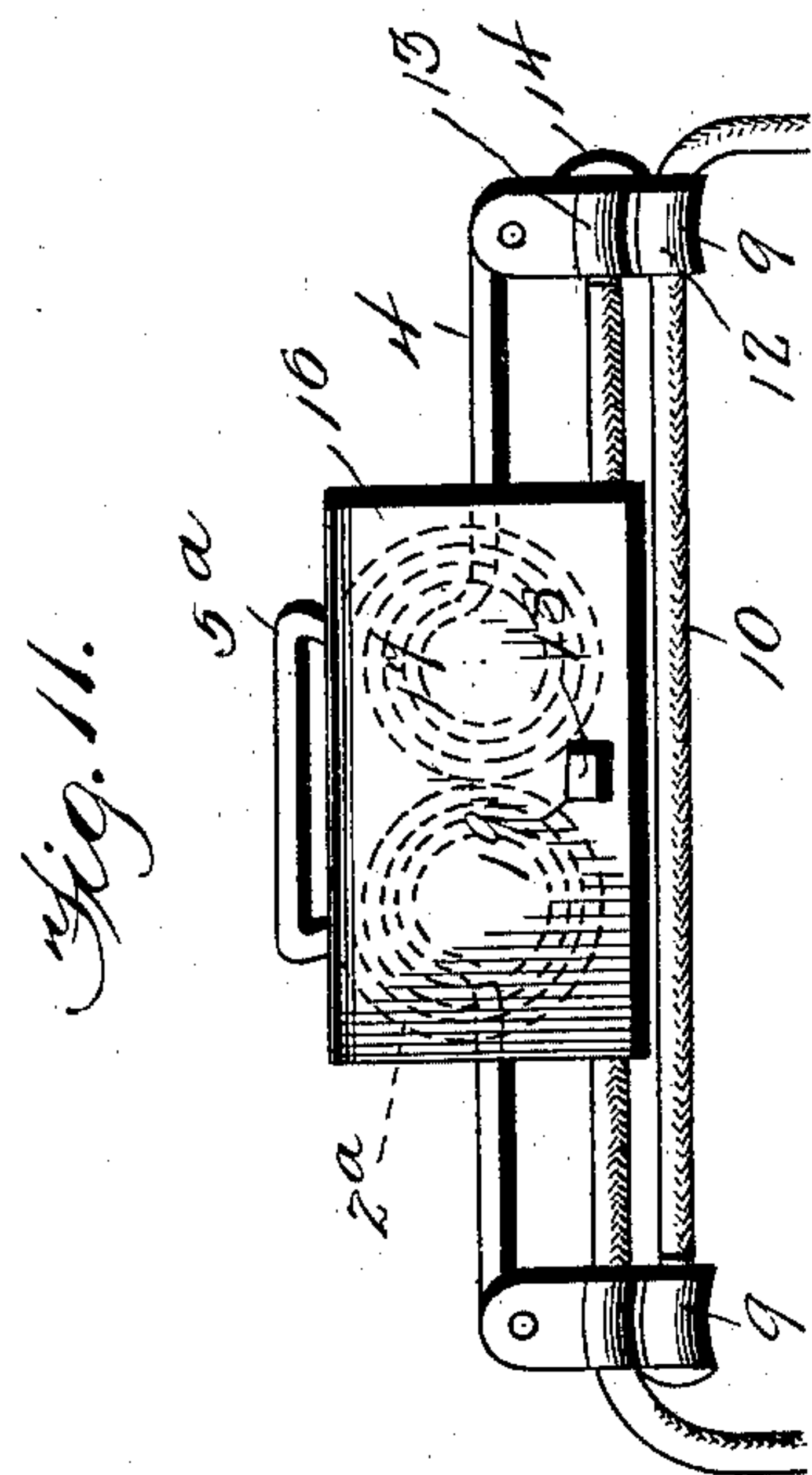
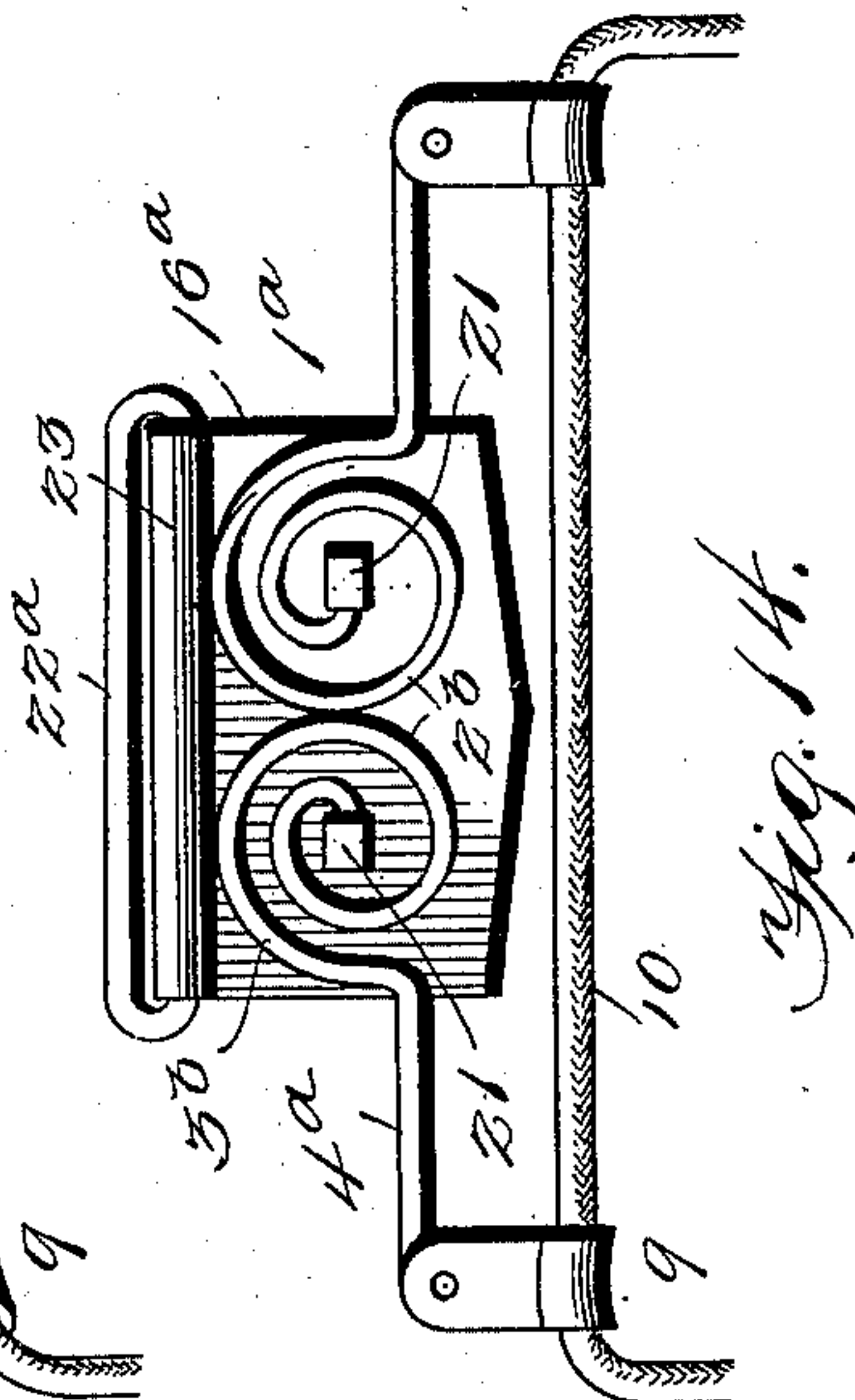
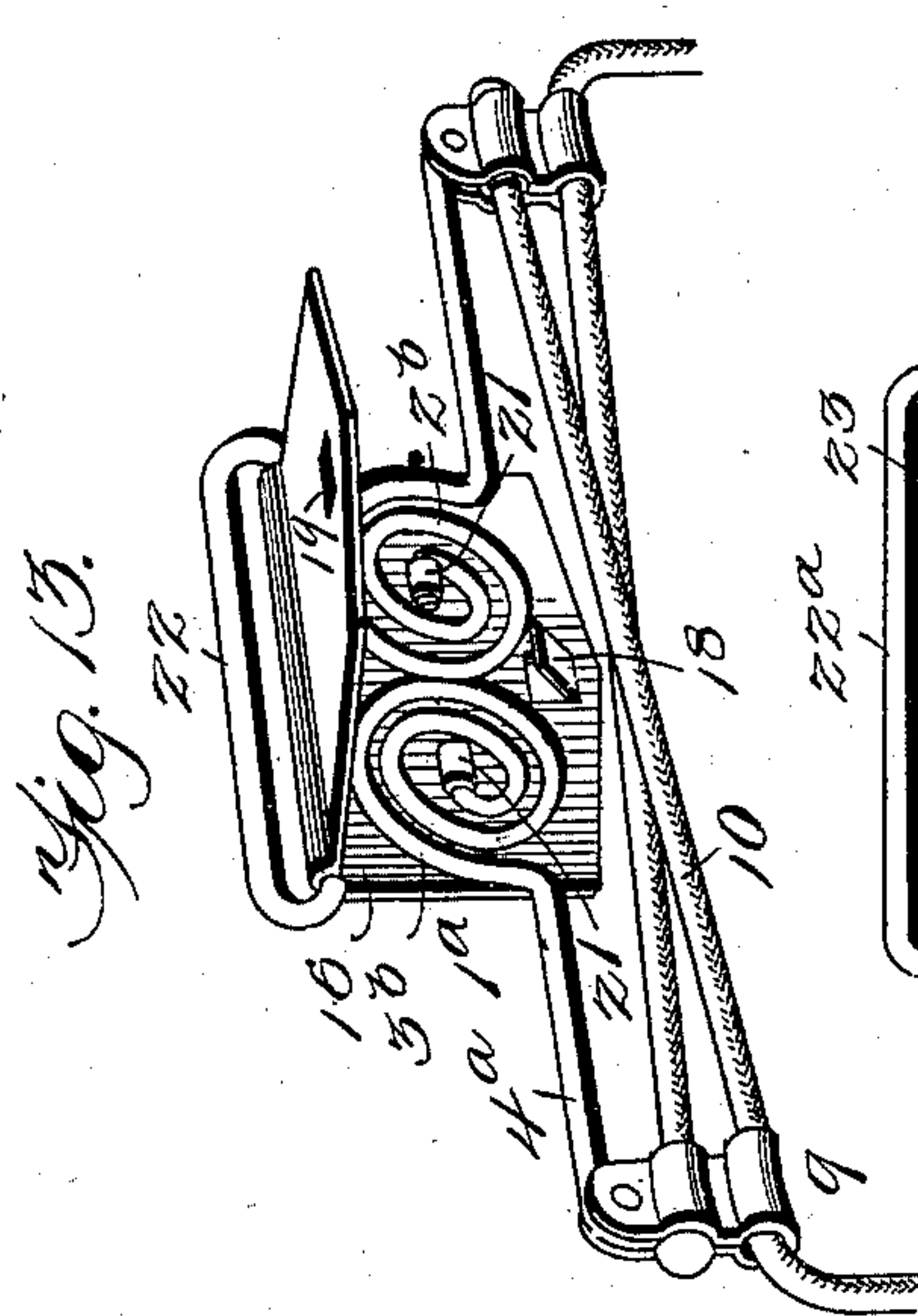
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(No Model.)

3 Sheets—Sheet 3.



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# UNITED STATES PATENT OFFICE.

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## SPRING ATTACHMENT FOR ARTICLES OF WEAR, &c.

SPECIFICATION forming part of Letters Patent No. 692,042, dated January 28, 1902.

Application filed August 29, 1901. Serial No. 73,666. (No model.)

*To all whom it may concern:*

Be it known that I, PAUL E. WIRT, a citizen of the United States, residing at Bloomsburg, in the county of Columbia and State of Pennsylvania, have invented certain new and useful Improvements in Spring Attachments for Articles of Wear, of which the following is a specification.

This invention relates to that type of spring attachments which are especially designed to provide a spring or elastic action for articles of wear, such as suspenders and the like; and it has for a general object the provision of a number of practical embodiments or developments of the invention disclosed in my allowed application, Serial No. 59,453, filed May 9, 1901, and also in another companion application, Serial No. 73,665, filed of even date herewith.

One of the objects of the invention is to provide an improved construction of spring-wire body embodying a plurality of spring-coils, whereby it is possible to make a much stronger spring with smaller wire and at the same time provide a maximum resilient or yielding efficiency without possibility of the set of the spring being destroyed or impaired by the constant exertion of stress upon the spring-wire body.

The invention also has in view an improvement in the arrangement of the attaching element or elements, so as to obviate the crossing of said element or elements, and thereby obviating the friction or wear incident to crossing cords, besides providing for a compact and neat disposition of the attaching element or elements.

A further object of the invention is to associate with the spring-wire body, whether of the single or duplex coiled form, a spring-guard comprising means for retaining the spring to its working plane and holding the coil or coils thereof in a flat position, thus overcoming the tendency of the convolutions of the coil or coils to pull over themselves when stress is exerted upon the spring-wire body. In this connection the spring-guards also serve as protective housings to cover the moving metal and prevent abrasive friction upon the clothing.

With these and many other objects in view, which will more readily appear as the nature

of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts herein-  
after more fully described, illustrated, and  
claimed.

The essential features of the invention are necessarily susceptible to embodiment in a number of modifications without departing  
from the spirit or scope of the invention; but for illustrative purposes a few of the preferred embodiments are shown in the drawings, in which—

Figure 1 is a perspective view of one form of the spring attachment shown applied to the front end of an inelastic suspender-strap, the view disclosing a simple form of the double or duplex coil-spring body and the parallel reeving of the attaching element or elements between the oppositely-located anti-friction-guides, and also showing in dotted lines a protective guard which may be used in connection with the springs. Fig. 2 is an elevation of the same form of spring, showing fixed guides for the attaching elements and also showing the protective guard in full lines. Fig. 3 is an elevation of another form illustrating the slight variations that may be made in the design or bending of the springs without departing from the spirit or principle of the invention. Figs. 4 and 5 are views similar to Figs. 1 and 2, showing a modification of the parallel reeving of the attaching elements and also illustrating their use respectively with a double-coiled or duplex spring and with self-adjusting or fixed guides. Figs. 6 and 7 are elevations showing the use of the double-coiled or duplex spring, respectively, with self-adjusting and fixed guides and also in connection with the cross-reeved attaching elements, such as disclosed in my application aforesaid. Fig. 8 is a perspective view showing a modification of the double-coiled or duplex spring well adapted for the back of a pair of suspenders, the view showing the protective guard in dotted lines and also illustrating the spring as having self-adjusting guides and a single continuous attaching element or cord. Fig. 9 is a view of the same form, showing the protective guard in full lines and illustrating fixed anti-friction-guides. Fig. 10 is an elevation of a modified form of the duplex or double-coiled spring, in which



the spring-coils are formed by spiral turns or or convolutions within the same plane, and the opposite side arms start from the inside or center of the coils instead of from the outside of the coils, as shown in the preceding views. Fig. 11 is an elevation of a modification of this same type of spring especially designed for connection with the back of the suspender-strap. Fig. 12 is an elevation of another modification in which the protective guard for the coils also affords a medium of connection with the suspender-end, as well as providing a support or backing for the spring-wire body itself. Fig. 13 is a detail in perspective of the same form of invention, showing the protective guard and backing opened up to illustrate the suggested modification of forming the duplex spring in two disconnected sections, though securing the same action as a single-piece spring. Fig. 14 is an elevation of another modification which is a variation of the form shown in Fig. 13. Fig. 15 is a perspective view of the single-coiled type of spring attachment, showing the availability of the protective spring-guard for use with the single or double coiled type of spring-wire body. Fig. 16 is a detail in perspective of the form of antifriction-guide illustrated in Fig. 1 and also the preferred construction of headed sleeve utilized in connection therewith for the fast end of the attaching element. Fig. 17 is a similar view of the parts utilized in the modification shown in Fig. 4.

Like numerals of reference designate corresponding parts in the several figures of the drawings.

In the types of springs shown in my other applications aforesaid the same have been illustrated only as provided with a single-coil spring between the yielding side arms thereof, and the present invention contemplates as one of the important features thereof an improvement in this type of spring. In this class of attachments the spring is subject to a very severe test on account of the almost constant and varying stress which is exerted thereon, and consequently it is of the utmost importance that great care be exercised in the formation of the spring that it may be durable and effective, besides giving the very best results as to liveliness and elasticity. It is also essential to so construct the spring-wire body as to obviate the possibility of its becoming useless or out of set under protracted stress. Furthermore, it is very desirable to so shape the parts of the spring and to arrange the attaching elements therewith in such a way as to obtain the greatest lengthening of the suspender or other article by the action of the spring within the most limited space. To insure the effective carrying out of this object, the present invention retains in combination with the improvements the important features of the invention disclosed and covered in the companion application, Serial No. 73,665, particularly in

reference to the opposite yielding side arms normally being substantially in alinement and the portion of the attaching element between the guides being approximately coextensive in length with the length of the body in its normal extended condition. To provide a spring-wire body embodying these very essential characteristics, the present invention has in view the formation of the body with separate spring-coils so arranged as to occupy a minimum space, besides providing each arm of the spring-wire body with its own spring, thus permitting the coil to be better compressed as to size within narrower and more presentable limits than is possible in the construction of a spring-wire body having but a single spring-coil for both arms thereof.

Referring more particularly to the drawings, the numeral 1 designates the spring-wire body, which in the preferable forms is made of a single length of spring-wire of sufficient strength and weight for the purpose intended, and in carrying out the present invention the spring-wire body, whether of a single length of wire or of separate pieces, is provided between the opposite extremities thereof with a plurality of spring-coils 2. These spring-coils may be formed in a variety of ways and also disposed in different relations to each other; but in order to permit the coils to be compressed into a minimum size and within comparatively narrow limits without affecting the general flatness of the spring-wire body it is preferable that the spring-coils be arranged side by side within the longitudinal plane of the wire-spring body, or, in other words, said coils in their preferred adaptation may be said to be disposed edge to edge, with their axial lines in parallel relation.

In the preferable forms of the invention (shown in Figs. 1 to 11, inclusive, of the drawings) the entire spring-wire body, including both coils thereof, is made of a single length of spring-wire, and each of the coils consists of a plurality of individual convolutions or turns 3 of the wire to produce a well-defined and strong spring-coil, and in the forms of the invention shown in Figs. 1 to 9, inclusive, of the drawings the individual convolutions or turns 3 of the coils are of the same diameter and arranged side by side, with the yielding side arms 4 of the spring-wire body starting from the outside of the coils. The said yielding side arms 4, which extend from the coils 2 in their normal condition, may be said to be disposed at approximately right angles to said coils, although the same may necessarily be slightly curved or bent, as suggested, for instance, in Fig. 3 of the drawings, without affecting the general relation specified which should exist between the coil or coils and the oppositely-extending yielding side arms of the wire body.

The formation of the separate coils 2 of individual convolutions or turns of the same diameter is only one of the several ways in which the said coils may be formed, and while



this type of spring-coil is shown in Figs. 1 to 9, inclusive, of the drawings in Figs. 10 and 11 are shown modifications of the spring-wire body, illustrating the same as provided with 5 spring-coils 2<sup>a</sup>, formed of spiral convolutions 3<sup>a</sup>, bent within the same plane and producing a flat spiral convolute spring-coil, with the yielding side arms 4 starting from the center of the coils. This formation of the spring- 10 coils provides a construction of the spring-body which can be made very thin or narrow, besides affording an exceedingly strong, reliable, and resilient spring of great efficiency for the purposes intended. Furthermore, 15 spiral convolute coils of the character shown in Figs. 10 and 11 render the device capable of being more neatly adapted for use in connection with suspenders and the like than the forms of spring in which the coils are 20 made up of a number of convolutions or turns of the same diameter.

In the forms of the attachment already described and embodying the double coils, besides being made of a single length of spring- 25 wire, provision is made to connect the spring-wire body with the suspender-ends independently of the coils themselves. The forms which are adapted for use in connection with the front ends of the suspenders have the 30 portion of wire connecting the two coils bent into the form of an attaching-loop 5, offset from and above the plane of the coils and adapted to be detachably connected with the hooks 6, carried by the suspender-strap 7 in 35 any suitable manner, while the forms of the attachment designed for the back of the suspender have the portion of wire connecting the two coils bent into a widened loop 5<sup>a</sup>, offset from and projecting above the coils, as 40 plainly shown in Figs. 8 and 9 of the drawings, and adapted to have one thickness of webbing passed therearound. In this form of the spring attachment—that is, the form shown in Figs. 8 and 9 of the drawings—the same 45 may be most advantageously employed at the back of suspenders, inasmuch as it permits of the back connection being made flatter where the spring connects with the webbing. This insures less bulk or thickness at the point 50 of junction between the spring attachment and suspender than where the web or other material is put through the coils of the spring, with the possibility of interfering with the action thereof. The attaching-loops 5 and 5<sup>a</sup>, 55 respectively, for the front and back of the suspenders are also plainly shown in connection with the forms of the invention illustrated in Figs. 10 and 11 of the drawings.

The double or duplex coiled spring-wire 60 body already described may have associated therewith any forms of antifriction-guides and any arrangement of attaching elements, it only being necessary in all forms that the oppositely-extending side arms 4 be provided 65 at the terminals thereof with pendent antifriction-guides 9 of a suitable form to loosely receive therethrough the attaching element

or elements 10, having the usual tabs or loops 11 for connection with the buttons of the pantaloons. However, the present applica- 70 tion involves a novel arrangement of the attaching element or elements not covered by either of my other applications aforesaid, said arrangement of attaching elements being shown in the preferred forms illustrated 75 in Figs. 1 to 5, inclusive, and Figs. 10 and 11 of the drawings.

Referring particularly to Figs. 1 to 3 of the drawings, it will be seen that separate attaching elements 10 are employed. These separate 80 attaching elements 10 are oppositely reeved, but are arranged in parallel relation between the oppositely-located antifriction-guides 9, each separate element 10 having a fast connection at one end, as at 12, with a 85 stress-point contiguous to the terminal of one arm and loosely running through the guiding-sleeve 13 of the antifriction-guide at the terminal of the opposite arm, thereby providing for a direct pull or stress upon the 90 terminals of both of the side arms of the spring-wire body. An important feature in the reeving described resides in the parallel arrangement of the separate attaching elements 10, whereby the portions of said ele- 95 ments between the oppositely-located guides 9 do not cross upon themselves, thus obviating the friction or wear and making the entire device less bulky than where the cords cross, as in other forms. 100

The arrangement of the attaching elements described may be used in connection with self-adjusting or fixed antifriction-guides, as shown in Figs. 1 to 3 of the drawings, and instead of having the parallel portions of the 105 elements arranged one above the other, as shown in Figs. 1 to 3 of the drawings, the same may be arranged side by side in the same transverse plane, as suggested in Figs. 4 and 5 110 of the drawings, one of which figures of the drawings shows this arrangement in connection with self-adjusting or pivoted guides and also in connection with fixed guides. While 115 in the forms just described any expedient may be resorted to for securing the fast ends of the attaching elements 10 at the stress-points 12, a simple construction is shown in the drawings and resides in fitting upon the 120 fast ends of the said elements headed buttons or sleeves 14 for engagement with the sockets or collar portions provided in the bodies of the antifriction-guides 9.

In connection with the arrangement of attaching elements just described it is obvious 125 that the importance thereof resides in the opposite reeving of the attaching elements in such a way that the same will maintain a non-crossing relation, and while the truly parallel disposition of the separate elements secures 130 this result in the most practical and efficient manner still it should be understood that the word "parallel" is used in an approximate sense. Furthermore, the parallel or non-crossing relation of the attaching elements in



the preferred forms of the invention may be utilized, as stated, with either pivoted or fixed antifriction-guides and also with a spring-wire body having either a single or a double coil.

To illustrate the various arrangements of attaching elements which may be utilized with the double-coil or duplex spring, Figs. 6 and 7 of the drawings show this spring having associated therewith the cross-reeved attaching elements combined with either self-adjusting or fixed guides. These figures, in connection with the others, will suffice to show that the double-coiled spring may be utilized in every possible way that the single-coil spring shown in the other applications is employed.

Another feature of the invention resides in the employment of a protective guard for the spring, and especially for the coils thereof. In the principal forms of the invention this guard preferably covers or houses the spring-wire body upon both sides thereof and upon its central portion and is particularly designed to inclose therein the spring coil or coils of the body. In Figs. 2, 4, and 9 of the drawings the guard 16 is illustrated in a simple aspect and is shown as consisting of a body of sheet metal folded upon itself to provide the cheek-pieces 17, lying at opposite sides of the spring-coils and fastened together beneath the coils by a tongue-and-slot connection 18 19 or by any equivalent means for holding the cheek-pieces together to form a perfect housing for the spring-coils. In the form of guard illustrated the same is also preferably provided with a slot or opening 20 (see Fig. 5) at the top thereof to permit of the projection therethrough of the attaching-loops 5 or 5<sup>a</sup>, which connect the attachment with the front or rear ends of the suspender-straps.

The protective guard 16, just described, may obviously be used with not only the double-coiled springs, (shown in most of the views of the drawings,) but may also be employed with equal advantage in connection with the single-coil type of spring. (Shown in Fig. 15 of the drawings.) It will also be understood that the protective guard or housing may be made of any suitable material, such as leather or light metal; but in all cases the said structure serves to retain the spring coil or coils in a flat position and obviates the tendency thereof to pull over themselves when stress is exerted. Furthermore, the protective guard adds to the general appearance of the article and protects the clothing from abrasive friction.

A modification is illustrated in Figs. 12 and 13 of the drawings in which the protective guard 16 not only subserves the functions already described, but also constitutes a backing-support for a modified form of duplex or double-coiled spring-wire body 1<sup>a</sup>. In this modification of the spring-wire body the spring is made in two sections and the individual spring-coils 2<sup>b</sup> are disconnected. Similar to the modifications shown in Figs. 10 and

11 of the drawings, the spring-coils 2<sup>b</sup> of the separate spring-wire sections are formed of spiral convolutions or coils 3<sup>b</sup> within the same plane; but in contradistinction to the construction shown in Figs. 10 and 11 the modification of Figs. 12 and 13 involves an arrangement wherein the yielding side arms 4<sup>a</sup> start from the outside of the coils. Consequently in the construction shown in Figs. 12 and 13 the wire is not laid over itself or offset out over the convolutions to project the arms outward, so that a flatter and neater arrangement of spring-coils is obtained. Furthermore, in the construction shown in Figs. 12 and 13, one of the cheek pieces or plates 17 is provided with suitable eyes 21 to receive the inner terminals of the separate coils, thus supporting the separate coils in the same relation as if both coils and both spring-arms were made from a single length of wire, as in the other forms. This construction also involves the provision of an attaching-loop 22, fitted to the upper end of the guard and support 16 to provide for the attachment thereof to the suspender.

A variation of the construction shown in Figs. 12 and 13 of the drawings is suggested in Fig. 14, in which the protective guard 16<sup>a</sup> simply consists of a back plate holding the separate sections of the spring-wire body 1<sup>a</sup> in the same manner as shown in Fig. 13 and provided at its top edge with an eye 23, receiving the attaching-loop 22<sup>a</sup>. This figure of the drawings is illustrative of the great variety of forms which may be resorted to in utilizing a protective spring-guard in connection with spring-coil bodies made either of a single length of wire or of separate sections.

From the foregoing it is thought that the construction, uses, and many advantages of the various embodiments of the invention will be readily understood without further description, and it will also be understood that various changes in the form, proportion, and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

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

1. An attachment of the class described comprising a body having a plurality of spring-coils, oppositely-projected yielding side arms extending outwardly in opposite directions from said coils and carrying terminal antifriction-guides, said side arms normally being substantially in alinement, and the attaching element having its portion between the guides approximately coextensive in length with the body in its normal extended condition.

2. An attachment of the class described comprising a spring-wire body having a plurality of spring-coils, yielding side arms extended in opposite directions from said coils and normally being substantially in aline-



ment, said side arms carrying terminal anti-friction-guides, and the body being further provided with attaching means for connecting the same with the suspender or the like, 5 and the flexible attaching element.

3. An attachment of the class described comprising a spring-wire body having yielding side arms each provided with an individual spring-coil consisting of spiral convolutions within the same plane, the said side 10 arms extending in opposite directions and normally being substantially in alinement, guides at the terminals of said arms, and the attaching element extending across the space 15 between the guides.

4. An attachment of the class described comprising a spring-wire body having a pair of separate spring-coils each consisting of a series of spirally-arranged diminishing convolutions within the same plane, yielding op- 20 positely-projecting side arms extended from the terminals of said coils and normally being substantially in alinement, and terminal guides carried by the side arms for the at- 25 taching element.

5. In an attachment of the class described, the combination of a spring-wire body having a spring-coil, and yielding side arms extended from the coil, and a protective guard fitted 30 to the body flatwise with reference to the coil portion thereof and constructed to permit of free play of the side arms and the projection of the latter outwardly from opposite sides of the guard.

6. In an attachment of the class described, the combination with the spring-wire body having a coil, and yielding side arms extended from the coil and carrying the attaching ele- 35 ment and a protective housing comprising oppositely-arranged cheek-pieces fastened upon the body and fitting respectively over opposite sides of the coil to retain the latter in a flat position under stress, said cheek- 40 pieces having a fastening or interlocking connection.

7. An attachment of the class described, comprising a spring-wire body having oppo- 45 sitely-extending yielding side arms carrying antifriction-guides at their terminals, and op-

positely-reeved attaching elements, each hav- 50 ing a loose running engagement with one guide and a fast connection at one end with a stress-point contiguous to the terminal of the opposite spring-arm, the portions of the elements between the opposite guides being 55 disposed in separate working planes to maintain a non-crossing relation.

8. An attachment of the class described, comprising a spring-wire body having oppo- 60 sitely-extending yielding side arms carrying antifriction-guides at their terminals, and oppositely-reeved attaching elements, each hav- ing a loose running engagement with one 65 guide and a fast connection at one end with the opposite spring-arm, the portions of the attaching elements between the opposite guides being arranged in parallel relation.

9. A spring attachment of the class de- 70 scribed, comprising a spring-wire body having oppositely-extending yielding side arms carrying pendent guides at their terminals, and oppositely-reeved attaching elements each having a loose running engagement with 75 one guide and a fast connection at one end with the opposite guide, the portions of the attaching elements between the opposite guides being disposed in separate working planes to maintain a non-crossing relation.

10. An attachment of the class described, 80 comprising a spring-wire body having oppositely-extending side arms, antifriction-guides pendent from the terminals of said side arms, and each of which guides is provided with a guiding-sleeve and a holding member or 85 socket contiguous thereto, and oppositely-reeved attaching elements each having a running engagement through the guiding-sleeve of one guide and provided at one end with a 90 headed sleeve or the like having a fast en- gagement with the holding member or socket of the opposite guide.

In testimony whereof I affix my signature in presence of two witnesses.

PAUL E. WIRT.

Witnesses:

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W. H. WALLACE.