

J. G. D. MACK.

METHOD AND MEANS FOR ATTACHING WIRES TO ONE ANOTHER.

APPLICATION FILED MAR. 11, 1907.

945,401.

Patented Jan. 4, 1910.

2 SHEETS—SHEET 1.

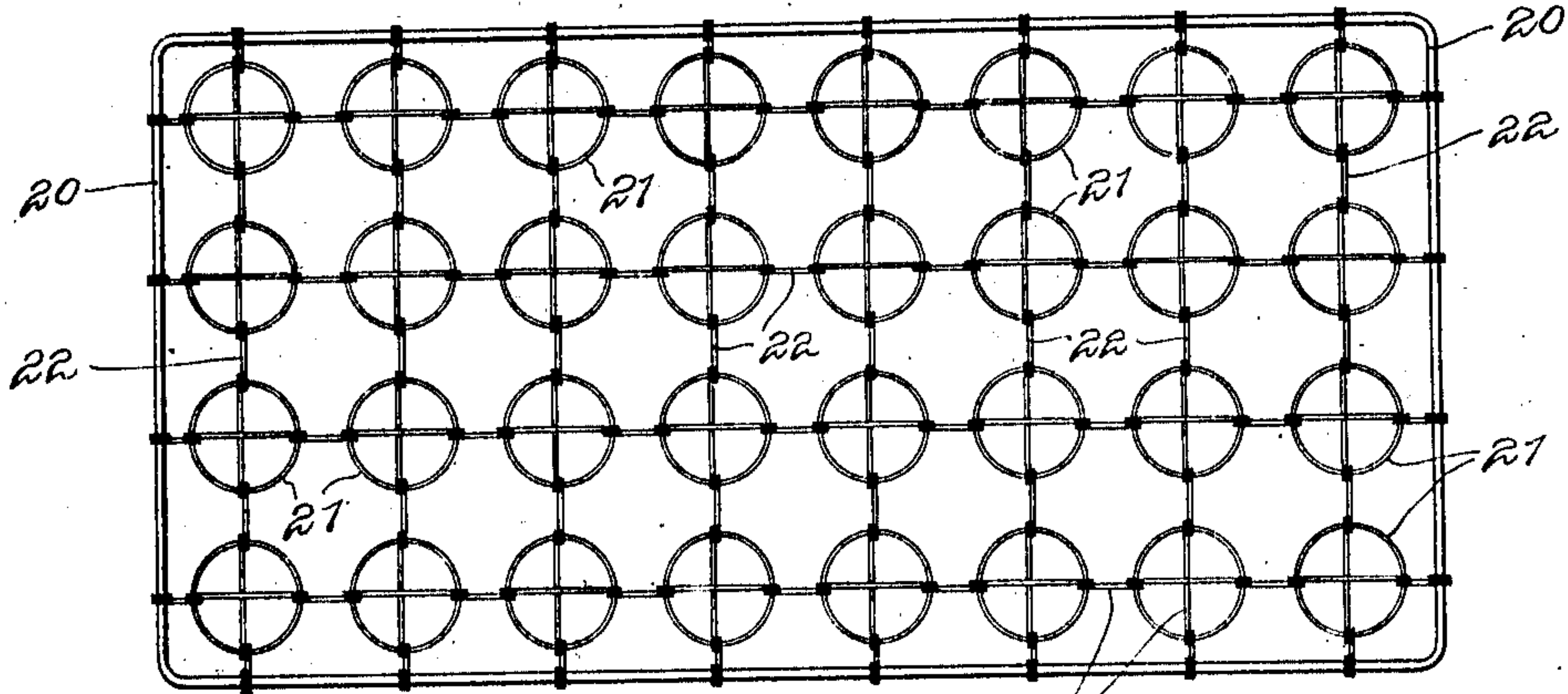


Fig. 1.

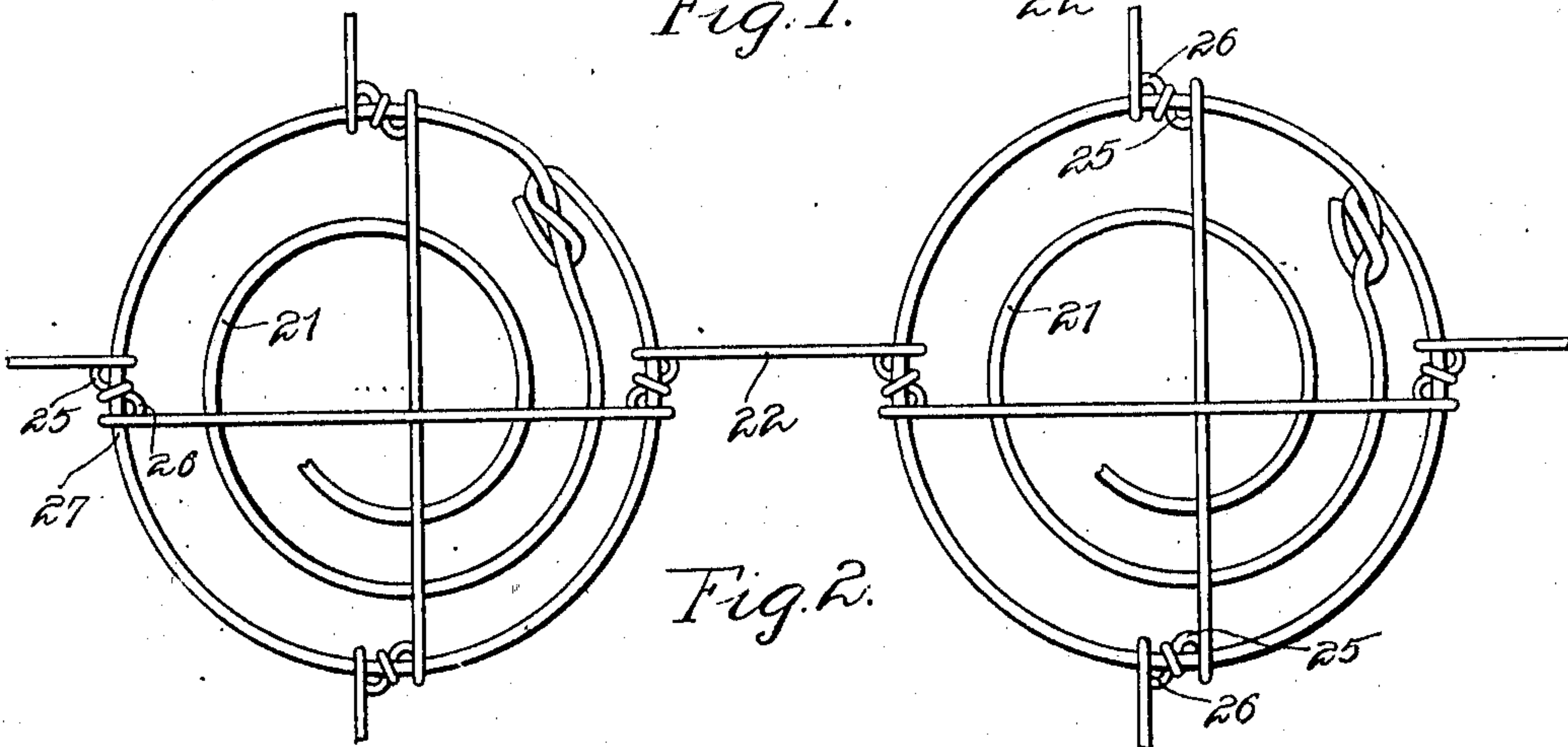


Fig. 2.

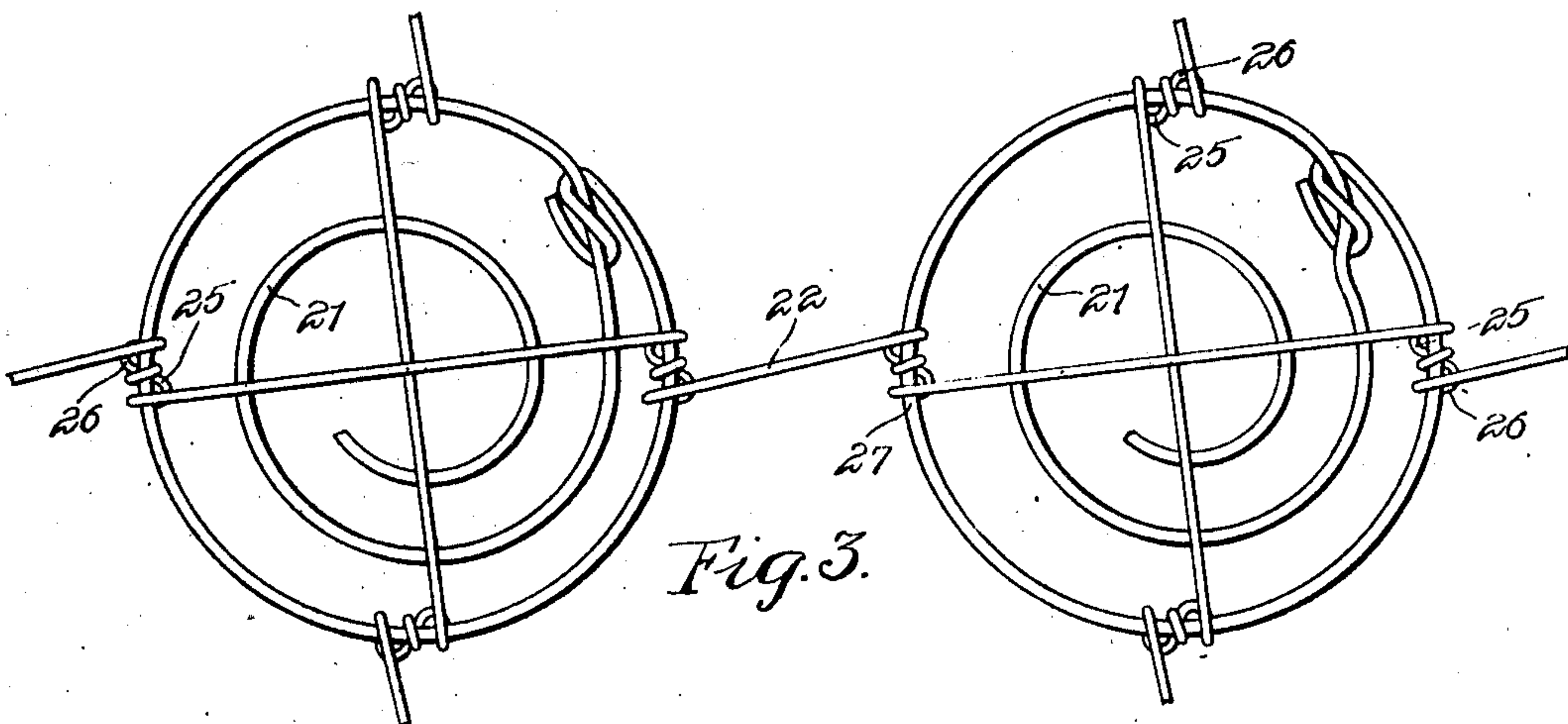


Fig. 3.

Witnesses:

Arthur H. Boettcher,
George C. Higham.

Inventor:

John G. D. Mack.

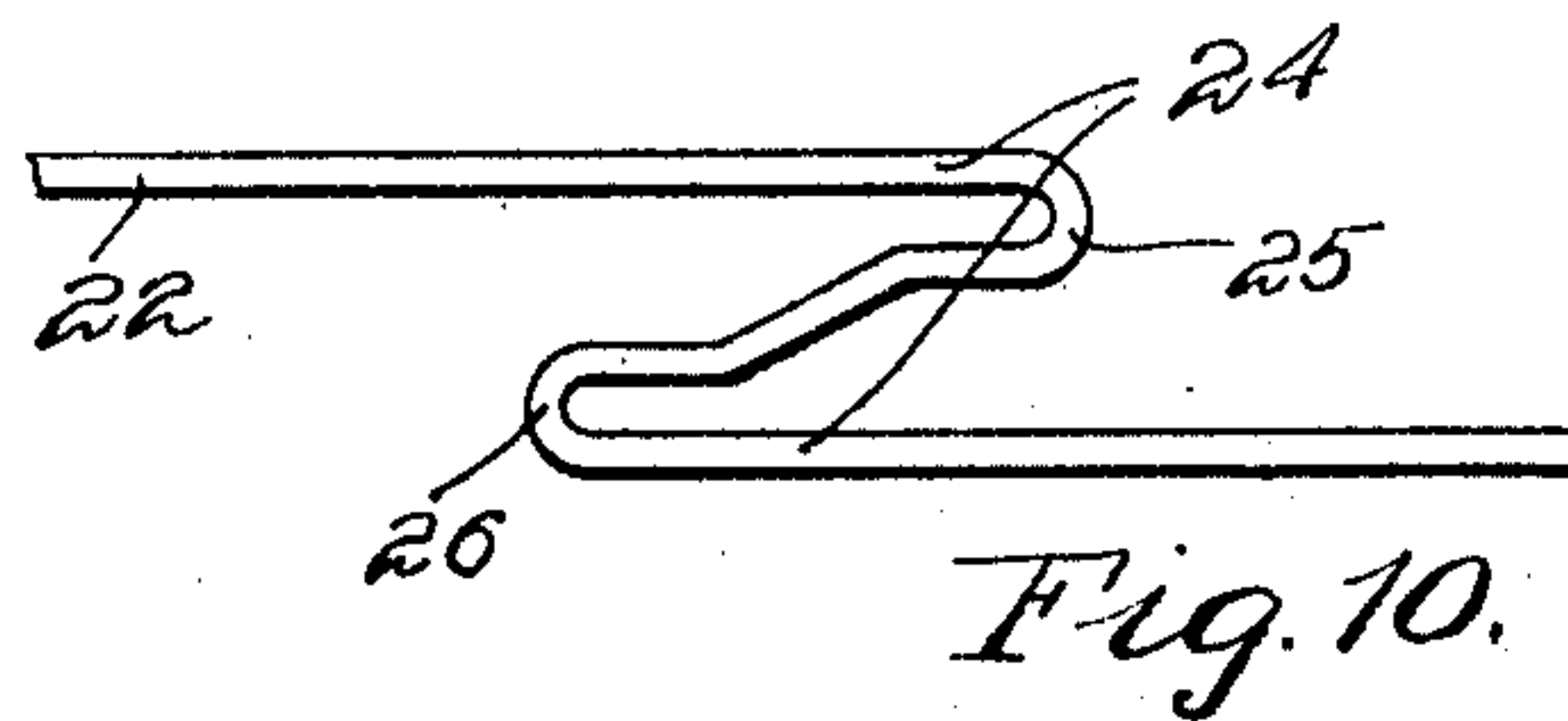
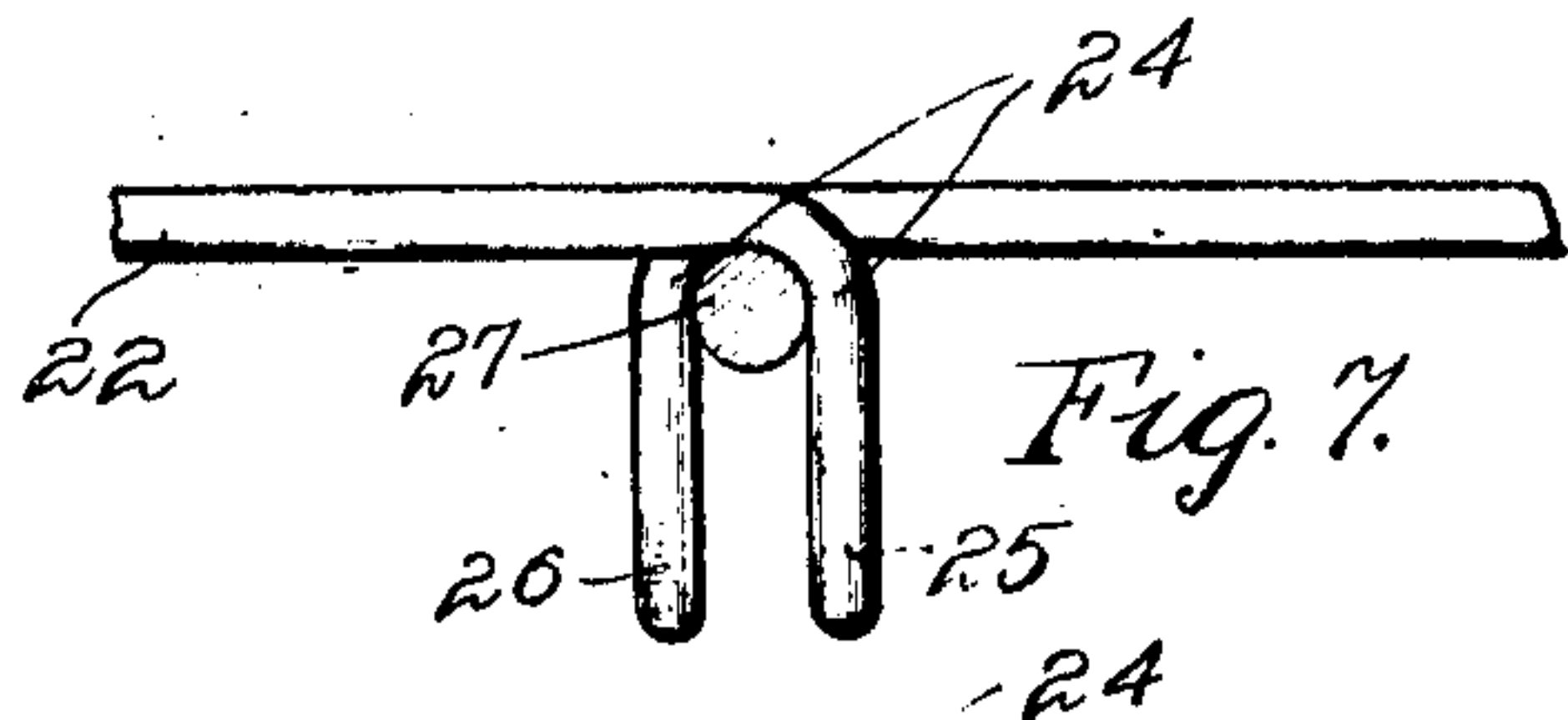
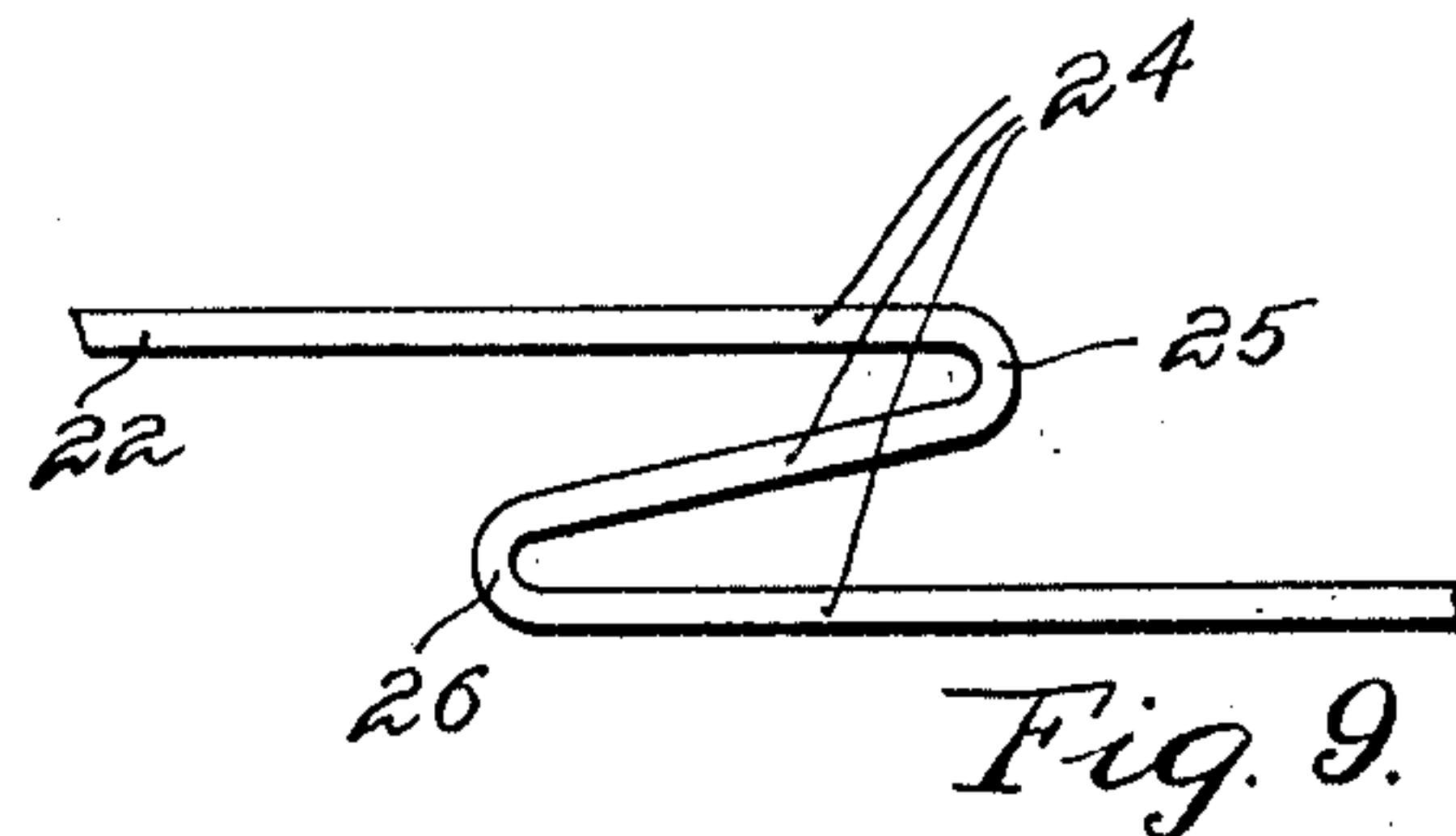
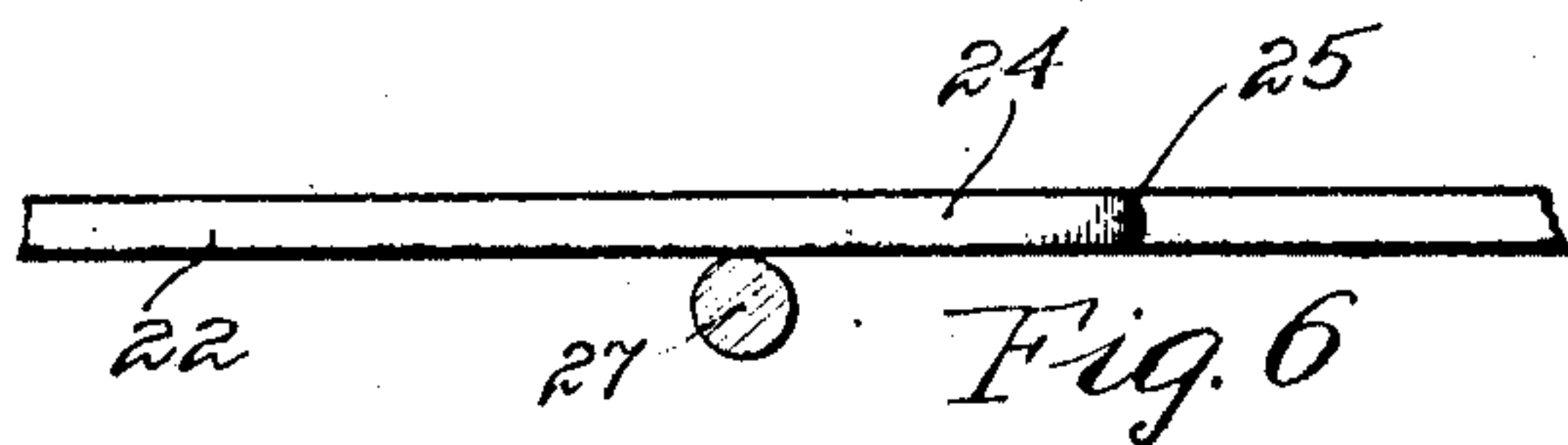
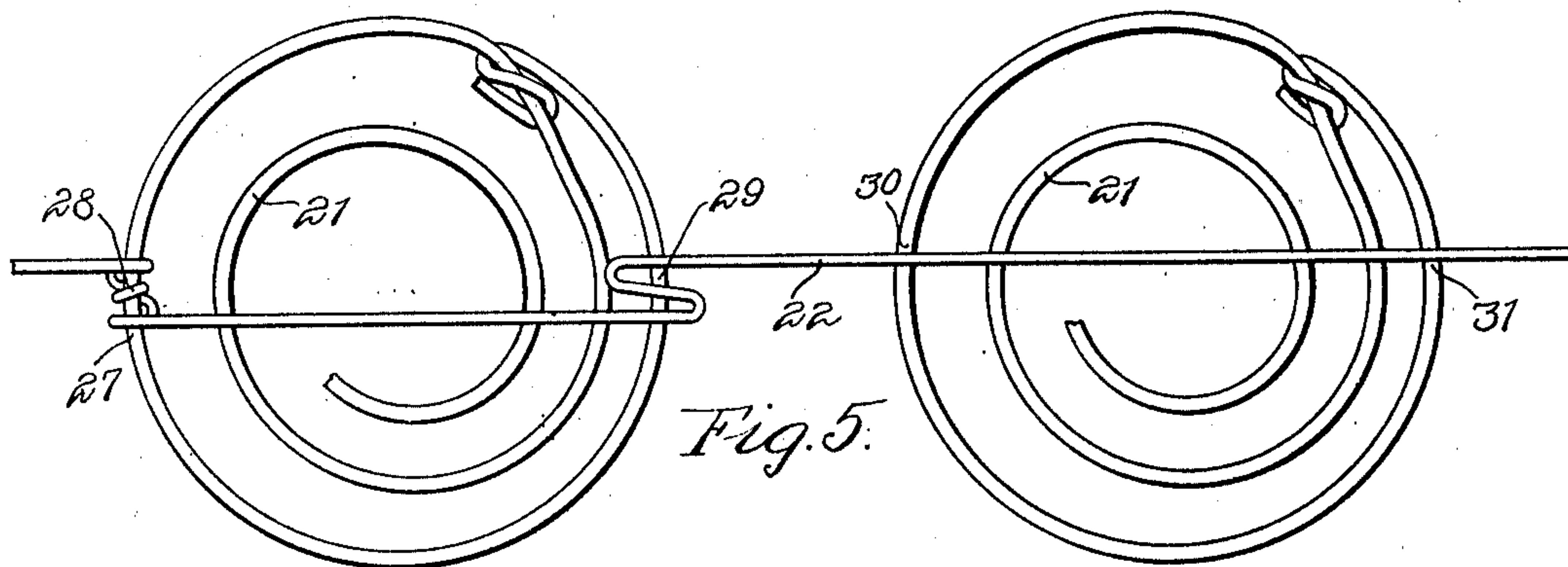
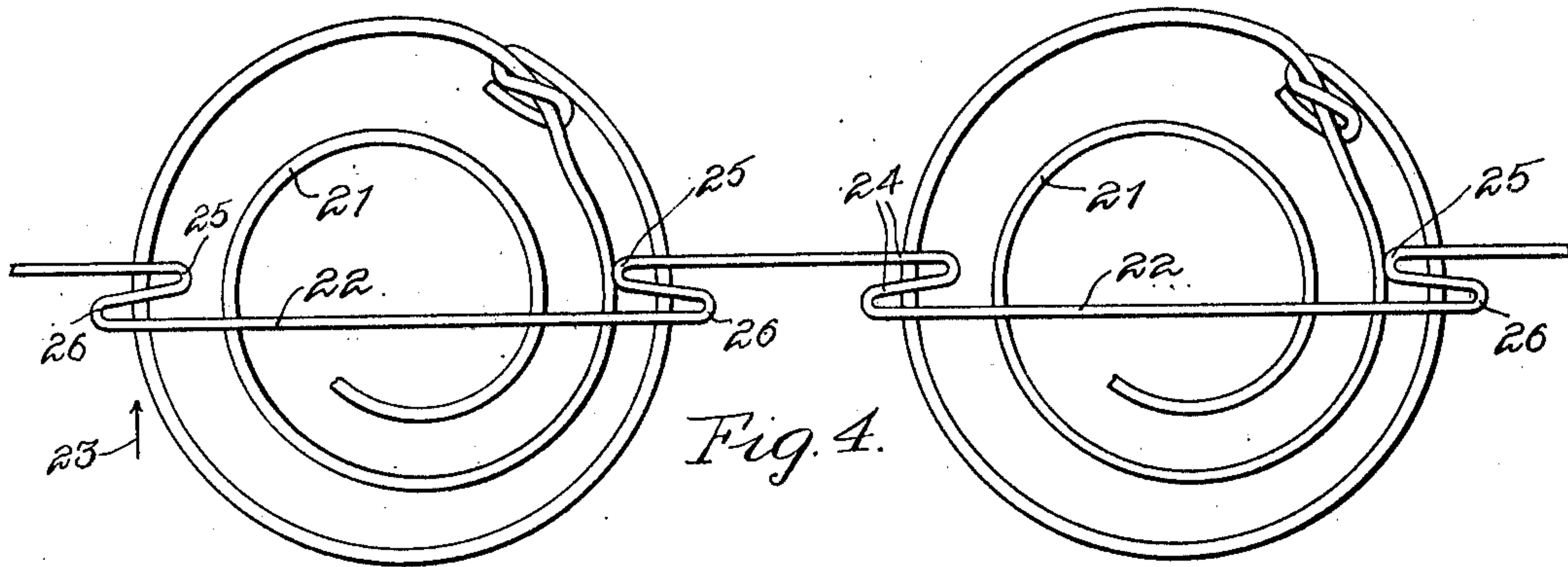
By *Charles A. Brown*
Attorney.

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2 SHEETS—SHEET 2.



Witnesses:

Arthur H. Boettcher,
George C. Higham

Inventor

John G. D. Mack

By *Charles A. Brown*
Attorney

UNITED STATES PATENT OFFICE.

JOHN G. D. MACK, OF MADISON, WISCONSIN, ASSIGNOR TO JOSEPH M. DAVIS, OF CINCINNATI, OHIO.

METHOD AND MEANS FOR ATTACHING WIRES TO ONE ANOTHER.

945,401.

Specification of Letters Patent.

Patented Jan. 4, 1910.

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To all whom it may concern:

Be it known that I, JOHN G. D. MACK, a citizen of the United States, residing at Madison, in the county of Dane and State of Wisconsin, have invented a certain new and useful Improvement in Methods and Means for Attaching Wires to One Another, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to metallic construction, and is particularly applicable where it is necessary to join or connect wires or metallic ribbons for structural purposes.

More specifically my invention contemplates a method and means for attaching wires or ribbons to one another at their points of intersection or junction.

While my invention is thus applicable to many structures of various kinds, its utility will be apparent when considered in connection with the manufacture of bed springs.

I shall therefore describe a novel form of bed spring in the construction of which my invention is involved.

The form of bed spring to which my invention is particularly applicable is that in which a large number of upholsterers' springs are connected or joined together in such a way that they stand vertically beneath the mattress which is to be supported. In a bed spring of this general description it is generally necessary to tie the individual upholsterers' springs to prevent relative motion in either a lateral or longitudinal direction, at the same time permitting, of course, such vertical movement as the weight upon the springs may require. It has been the custom to cross-tie the springs at top and bottom by means of wires attached in one way or another to the upper and lower convolutions of the helical springs. When applied to the construction of bed springs of this character my invention has particularly to do with the method and means by which these tie-wires are attached to the springs.

So far as I am aware, the methods and devices of the prior art have been defective from a mechanical standpoint, or are so designed that they must be applied by hand, as opposed to purely machine operations.

It is an especial object of my invention to provide a construction in which the tie-wires may be applied by the operation of

machines of various kinds, and in this connection it may be remarked that no continuously twisting or weaving operations are required in the application of my invention in the attachment of tie-wires to a great number of upholsterers' springs so arranged as to form a completed bed-spring.

The objects of my invention may be accomplished by running tie-wires across the top or bottom of a set of upholsterers' springs properly arranged in place, whereupon the tie-wires are formed into a double crook at each of the points where it is desired to connect the tie-wire with a spring or another wire. The two loops of the double crook are then bent or twisted around the intersecting wires at the junction point, one loop being twisted in one direction and the other in the reverse direction.

As there are many modifications of the details of the method and means of my invention, I can, perhaps, best explain its essential features by reference to the accompanying drawings, in which—

Figure 1 represents a small bed spring cross-tied in accordance with my invention; Fig. 2 is an enlarged view showing more clearly the manner in which the tie-wires are connected at their points of intersection; Fig. 3 is another enlarged view showing a slightly modified way of applying the tie-wires; Fig. 4 illustrates an intermediate step in the formation and application of tie-wires; Fig. 5 shows various steps in the method, while Figs. 6, 7 and 8 show in side elevation the various steps involved in the application of my invention, and Figs. 9 and 10 illustrate two of the various modifications of the double crook which is formed in the tie-wire as one of the steps in carrying out my invention.

In Fig. 1 I have indicated an outer framework 20, the construction of which is immaterial to the use of my invention but which in a general way serves to support in position the upholsterers' springs indicated at 21, 21. In this figure I have illustrated tie-wires 22, 22, running across the tops of the springs, some longitudinally and others laterally with respect thereto.

The manner in which the tie-wires are attached to the outer convolutions of the springs is illustrated in Figs. 2 and 3, where again the upholsterers' springs are represented at 21, 21, while the tie-wires as a

whole are shown at 22, 22. It will be apparent from an inspection of these drawings that at each point of junction of a tie-wire with the wire of a spring the tie-wire is
 5 twisted over the wire of the spring in one direction where the wire is reversed to form a loop, which is then bent or twisted back over the spring in a reverse direction for some distance where again the wire is re-
 10 versed upon itself to form another loop, where again the wire is twisted around the wire of the spring in the same direction as at first, whereupon it is continued across a series of springs, preferably, though not
 15 necessarily, in a given general direction. It may be noted that in Fig. 2 the formation of the crooks and loops is first in one direction and then in the reverse direction, while in Fig. 3 the crooks and loops are
 20 formed in the same general direction wherever the tie-wire is to form a junction with the outer convolution of a helical spring. It is obvious that the tie-wires may be joined together at their points of intersection
 25 in the same manner as that in which the tie-wires are attached to the springs themselves.

The method in which the tie-wires are joined to the springs at their junction points is best illustrated in the second sheet of the
 30 drawings.

In Fig. 4 I have illustrated the tops of two adjacent springs 21, 21, across which the tie-wire 22 has been run. At the junction points this tie-wire is formed into
 35 double crooks, as shown. As clearly shown in the drawings, the loops of the S-shaped crook are all formed in a common plane. This uni-planar formation of the crooks is of very material advantage in simplifying
 40 the requirements of a machine for forming them. It is a much simpler and easier matter to devise a machine for bending the wire in one plane than it is to devise a machine for bending the wire into more complicated
 45 shapes. These crooks may be formed in the tie-wire in advance of its application to the set of upholsterers' springs, the double crooks being spaced so as to fall directly above the spring wires to which the tie-
 50 wire is to be attached.

In Fig. 6 I have indicated the relations between the wire of the spring and the tie-wire, this view being taken in the direction of the arrow 23, as found in Fig. 4. In Fig.
 55 6 the fully formed double crook is shown at 24. The crook is laid flat upon the outer convolution of the spring, the plane in which this convolution is formed coinciding substantially with that in which the entire
 60 uni-planar crook is formed and laid.

In Fig. 7 the two loops 25 and 26 are shown in the process of being bent about the spring wire 27. In Fig. 8 these loops are shown sufficiently bent or twisted around
 65 the spring wire 27. This process of bend-

ing or twisting the loops of the double crook about the spring or other intersecting wire may be applied to each double crook separately or to several of them at once, as may be desired. The amount of metal which is
 70 concentrated at the junction points is unobjectionably small. The attachment is, however, firm and unyielding, and free from slippage.

In Fig. 5 I have indicated a modification
 75 of the process of cross-tying in which the loops of each double crook are bent or twisted about the intersecting wire before another double crook is formed. Thus, at the junction point 28 a completed joint is
 80 shown. At the junction point 29 the tie-wire 22 has been formed into the double crook but the loops have not as yet been bent about the wire of the spring 21. At the junction points 30 and 31 the tie-wire
 85 has not even been formed into the double crook, and in accordance with this modification of my invention the double crook at the point 30 may be formed after the bending of the loops at the junction point 29, or
 90 substantially simultaneously therewith. So also the two loops at each junction point may be bent or twisted about the spring wire either successively or simultaneously, although for most purposes I consider it
 95 preferable to bend the two loops simultaneously.

It is important that there shall be no interference between the loops as they are bent around the spring or other cross wire.
 100 To avoid such interference I have found it desirable to connect the two loops of a double crook by a staggered or offset piece of wire as indicated in Figs. 9 and 10. It will be apparent that the loops of these for-
 105 mations may be bent or twisted about a cross wire without causing the loops to interfere with one another at the under side of the cross wire. These figures will illustrate also the manner in which the tie wire is formed
 110 into crooks having intermediate sections substantially parallel in a general way with the balance of the tie wire. The three substantially parallel sections of each crook all
 115 lie in a common plane, and the tie wire is not bent or crossed upon itself at any point.

It will be apparent to those skilled in the art of machine construction and operation that this method of cross-tying bed springs is one which can be accomplished by auto-
 120 matic machinery of some form. My invention provides also a strong and durable means of attachment at the junction points and one which is at the same time inexpensive and generally satisfactory.
 125

While I have herein shown and described the preferred embodiments of my invention, it will be apparent that many modifications of my invention may be made without departing from the spirit thereof. I do not,
 130

therefore, wish to limit myself to the precise methods and constructions shown, but

Having described these forms of my invention I claim as new and desire to secure
5 by Letters Patent:

1. In combination, a plurality of upholsterers' springs having their outer convolutions alined in a common plane, and a tie wire passing diametrically across the outer
10 convolutions of said springs and having a plurality of S-shaped uni-planar crooks each composed of three substantially parallel sections, but with a deflected intermediate section for offsetting the two loops of each
15 crook with respect to one another, one of said crooks being formed at each junction point of the tie wire with an outer convolution of a spring, one loop of each crook being bent about the engaging spring wire in
20 one direction, and the other loop of each crook being bent about the engaging spring wire in the reverse direction, thereby attaching the tie wire to the outer convolutions of the springs, substantially as described.
25

2. A tie-wire for upholsterers' springs, said tie-wire having an S-shaped crook at each junction point with said springs, each crook being composed of three substantially

parallel sections all lying in a common plane, 30 each intermediate section being connected with one outer section at one end and with the other outer section at the other end but with one loop of each crook offset with respect to the other loop of the same crook, 35 whereby one loop may be bent around a cross-wire in one direction and the other loop in the other direction without interference between the two loops, said tie-wire adapted to be laid substantially diametric- 40 ally across the outer convolutions of said springs and to secure said springs together by bringing the three sections of each crook into contact with the outer convolutions of the spring and then bending one loop of 45 each crook about the associated spring wire in one direction and bending the other loop of the crook about the associated spring wire in the reverse direction while maintaining the engagement of all three sections 50 of each crook with the spring wire.

In witness whereof, I hereunto subscribe my name this sixth day of March A. D. 1907.

JOHN G. D. MACK.

Witnesses:

ADOLPH H. GLENZ,
HERMAN J. GRIMM.