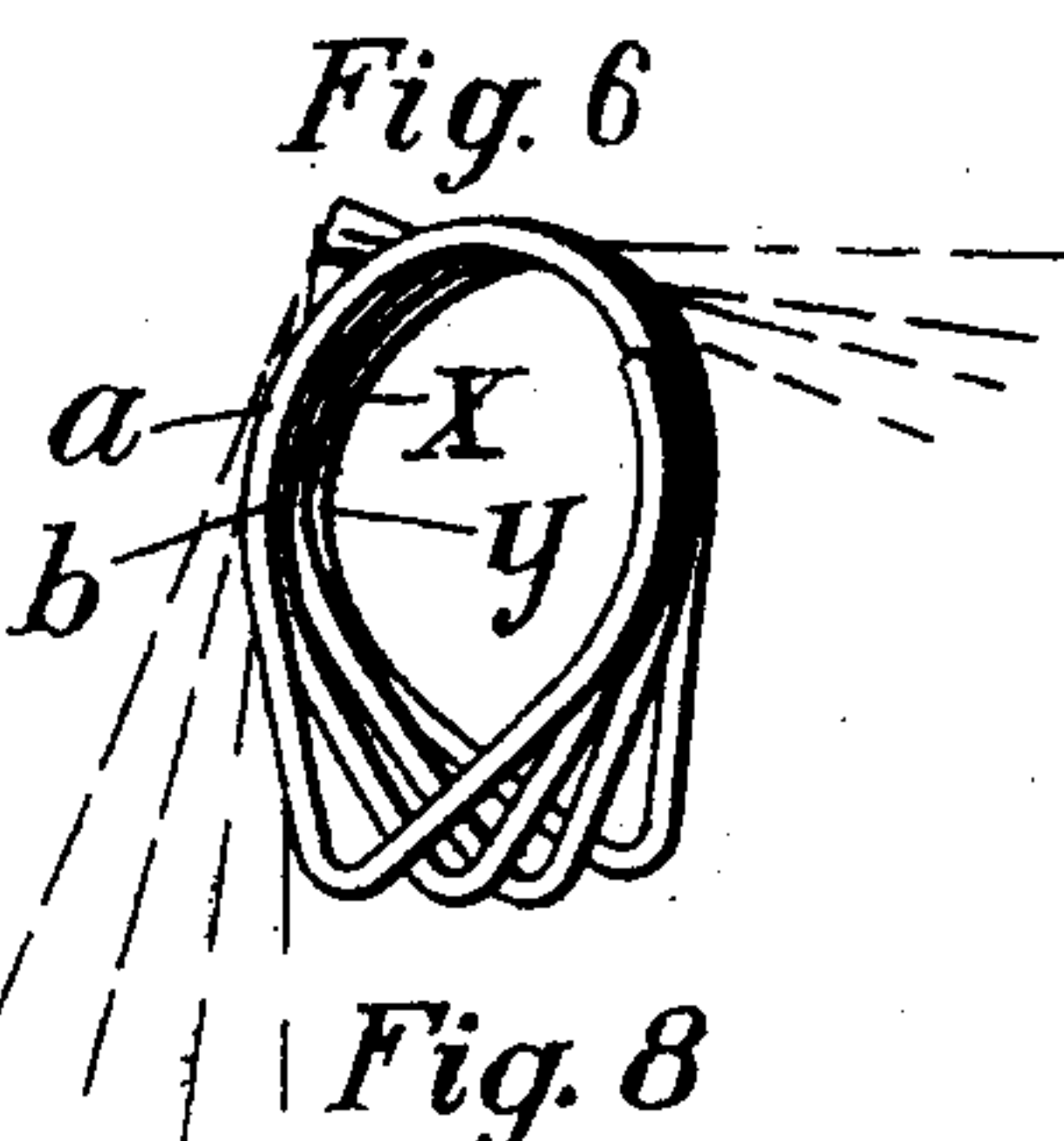
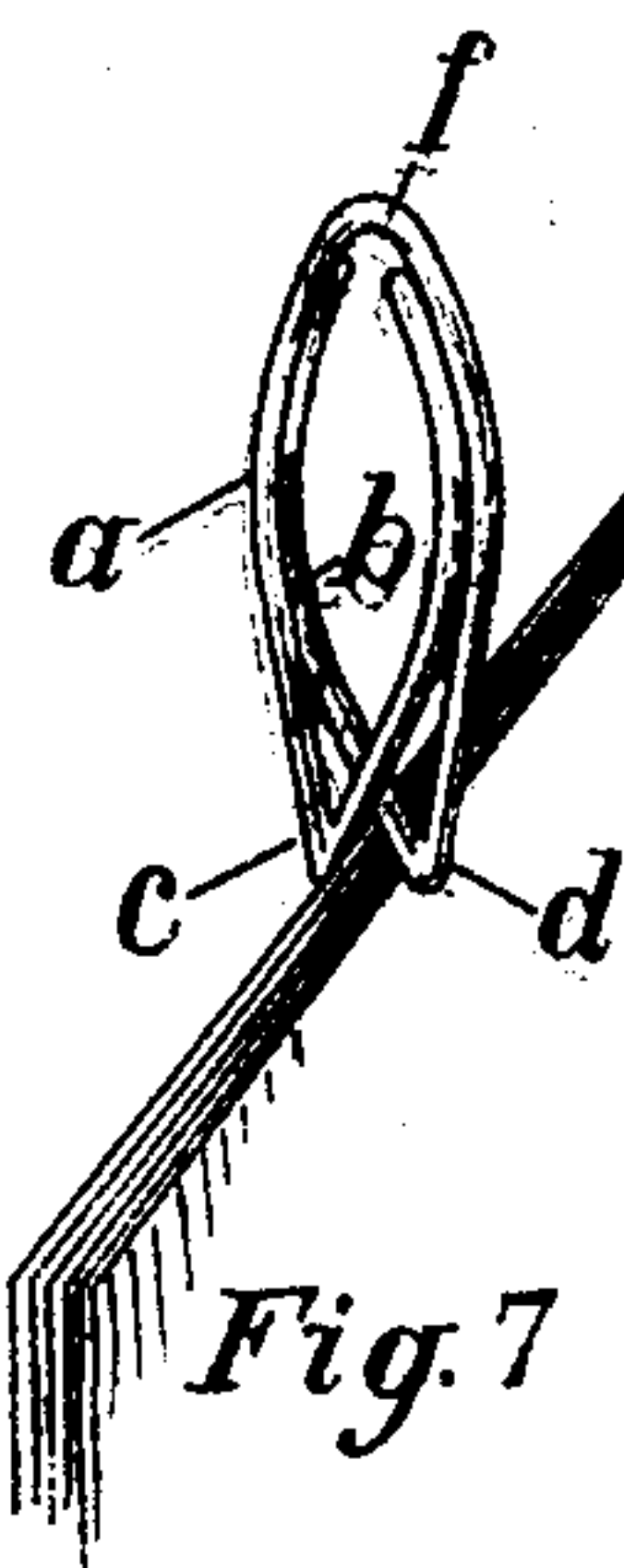
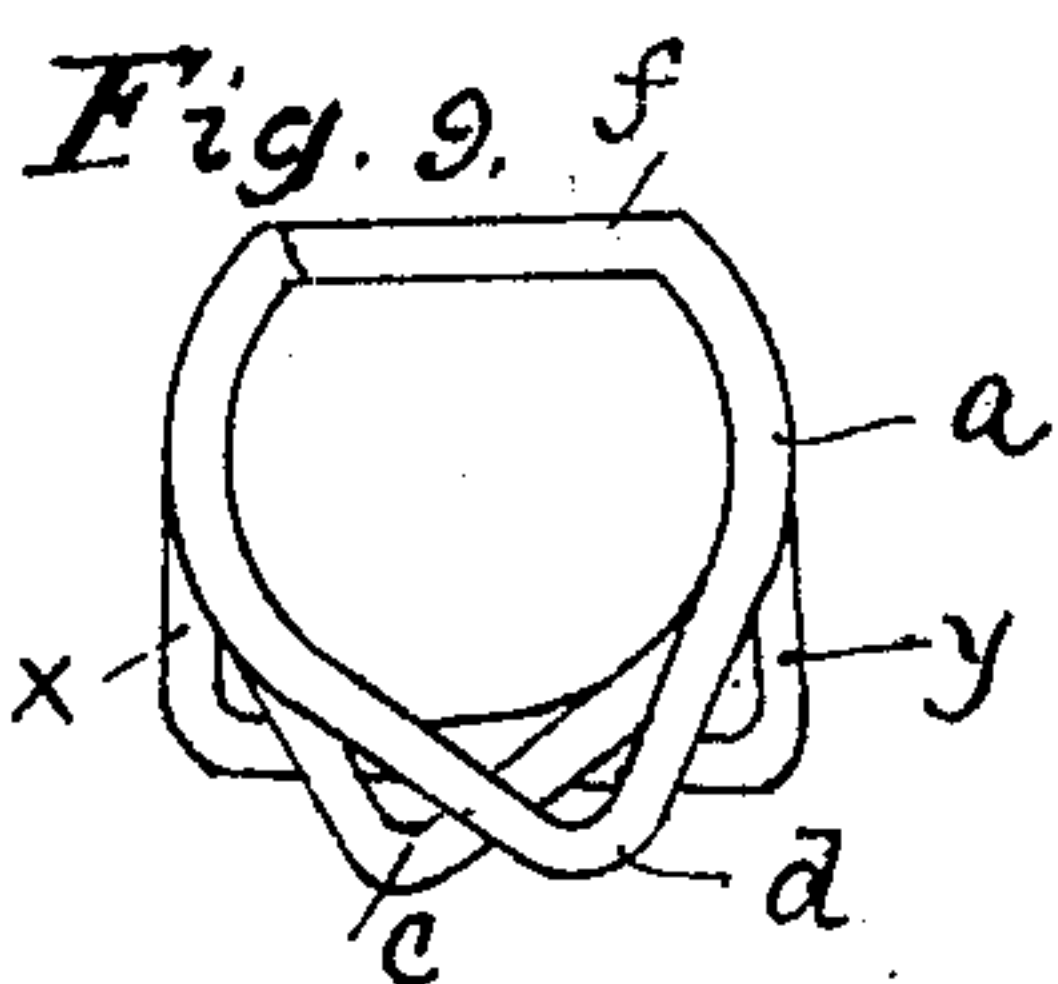
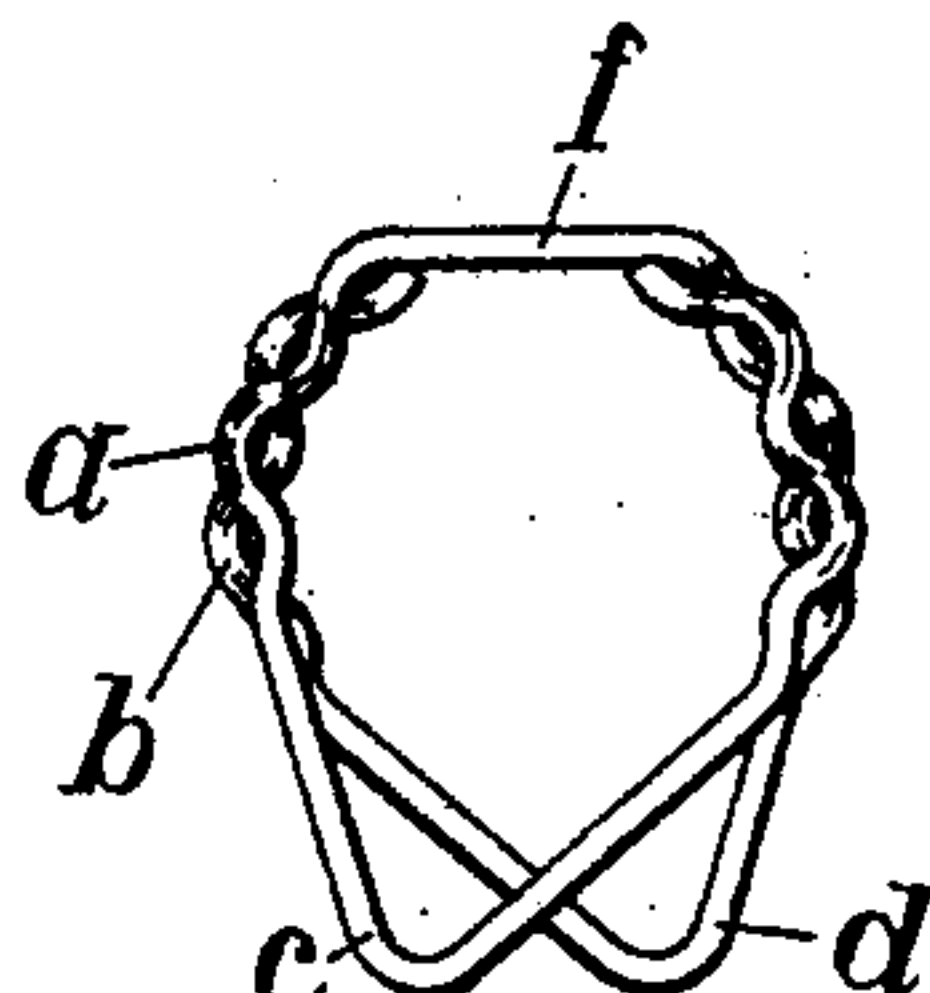
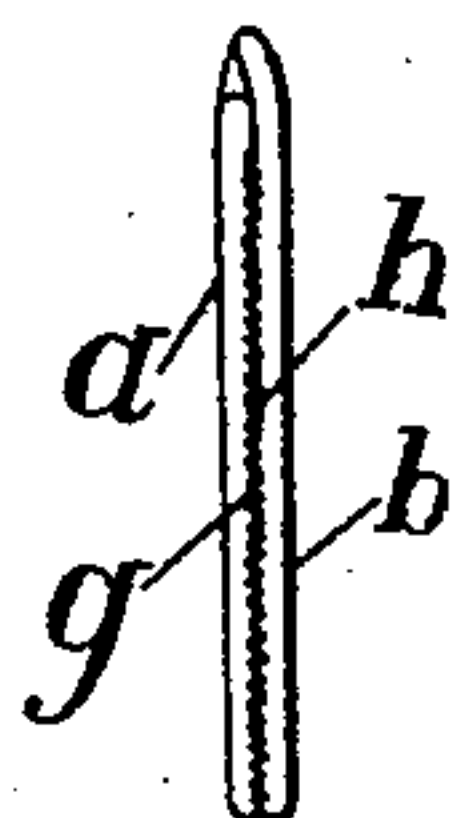
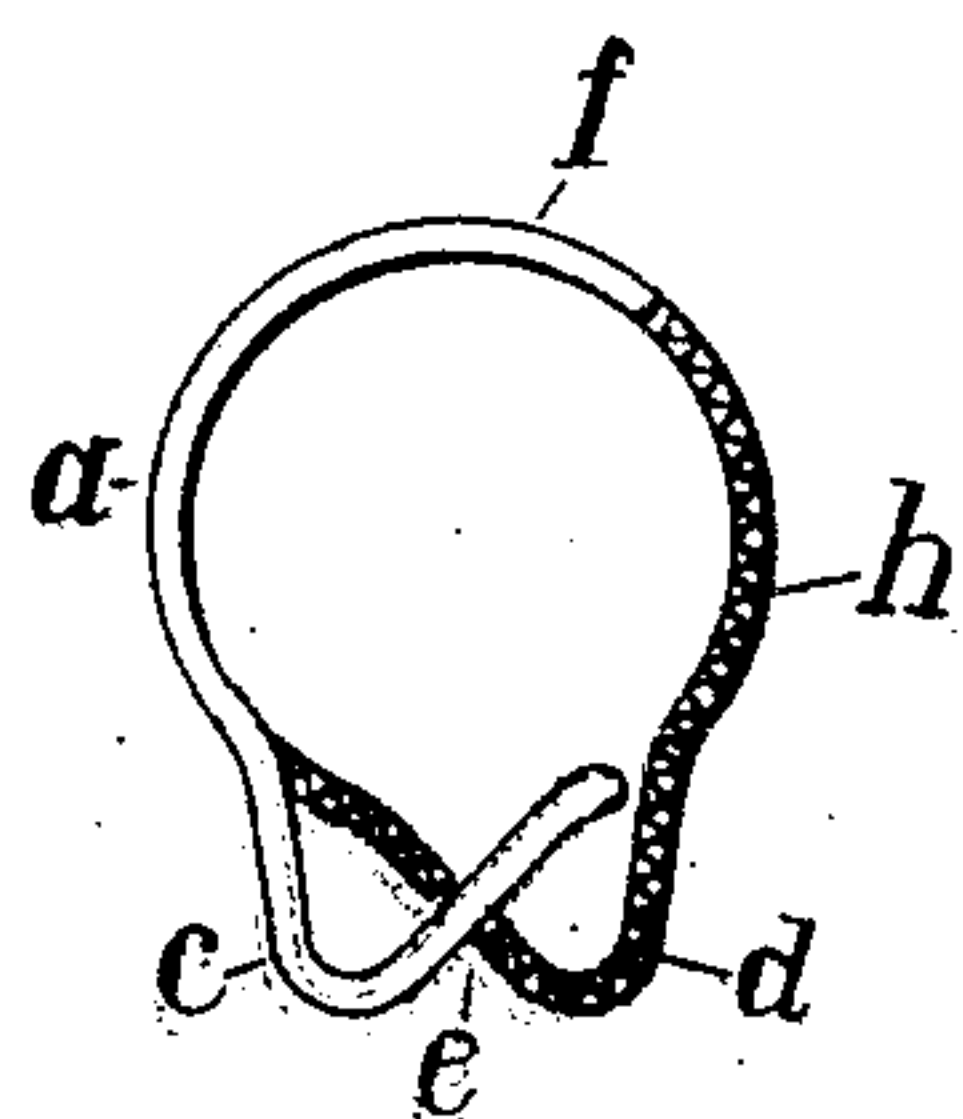
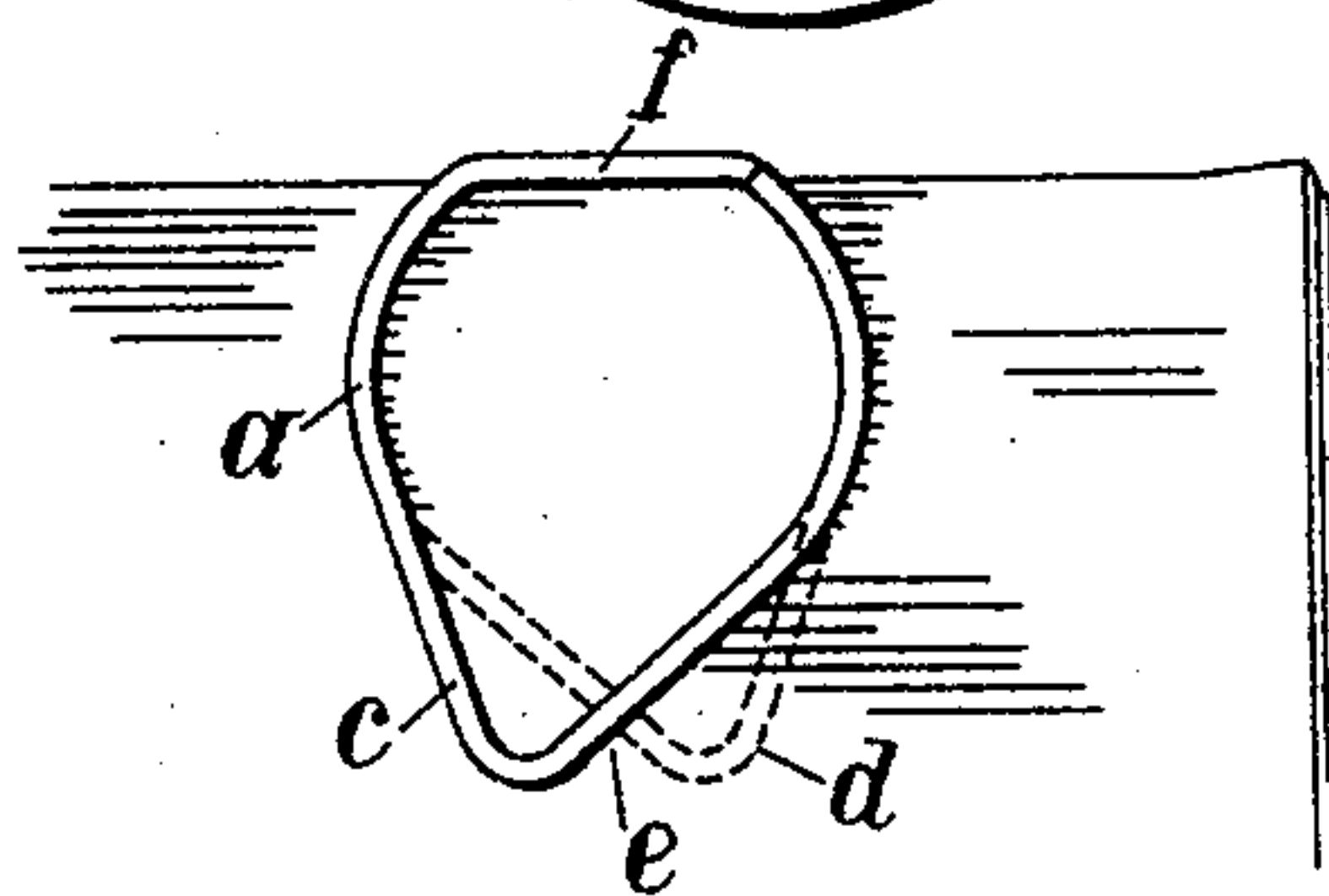
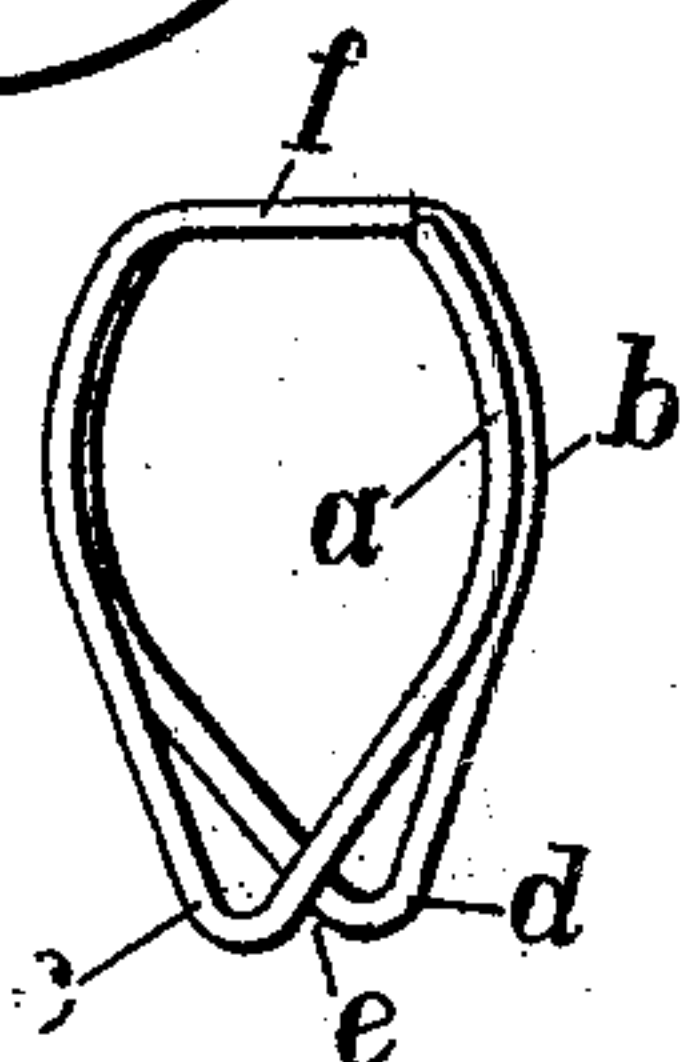
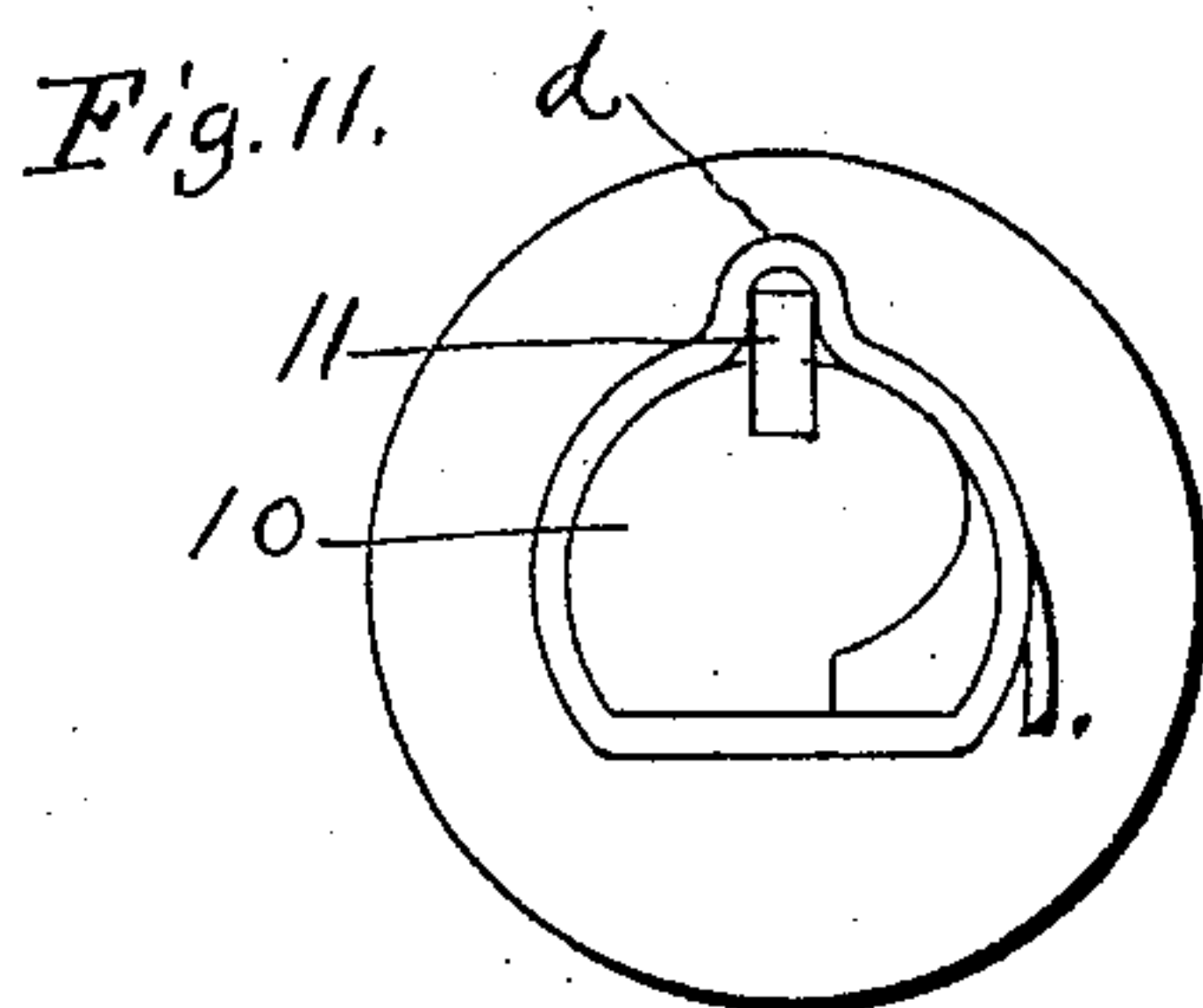
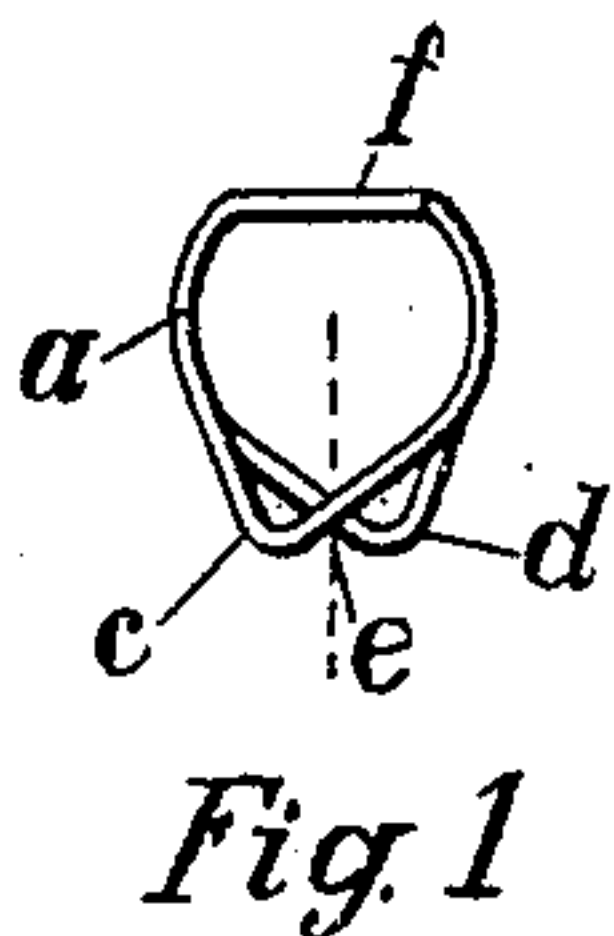
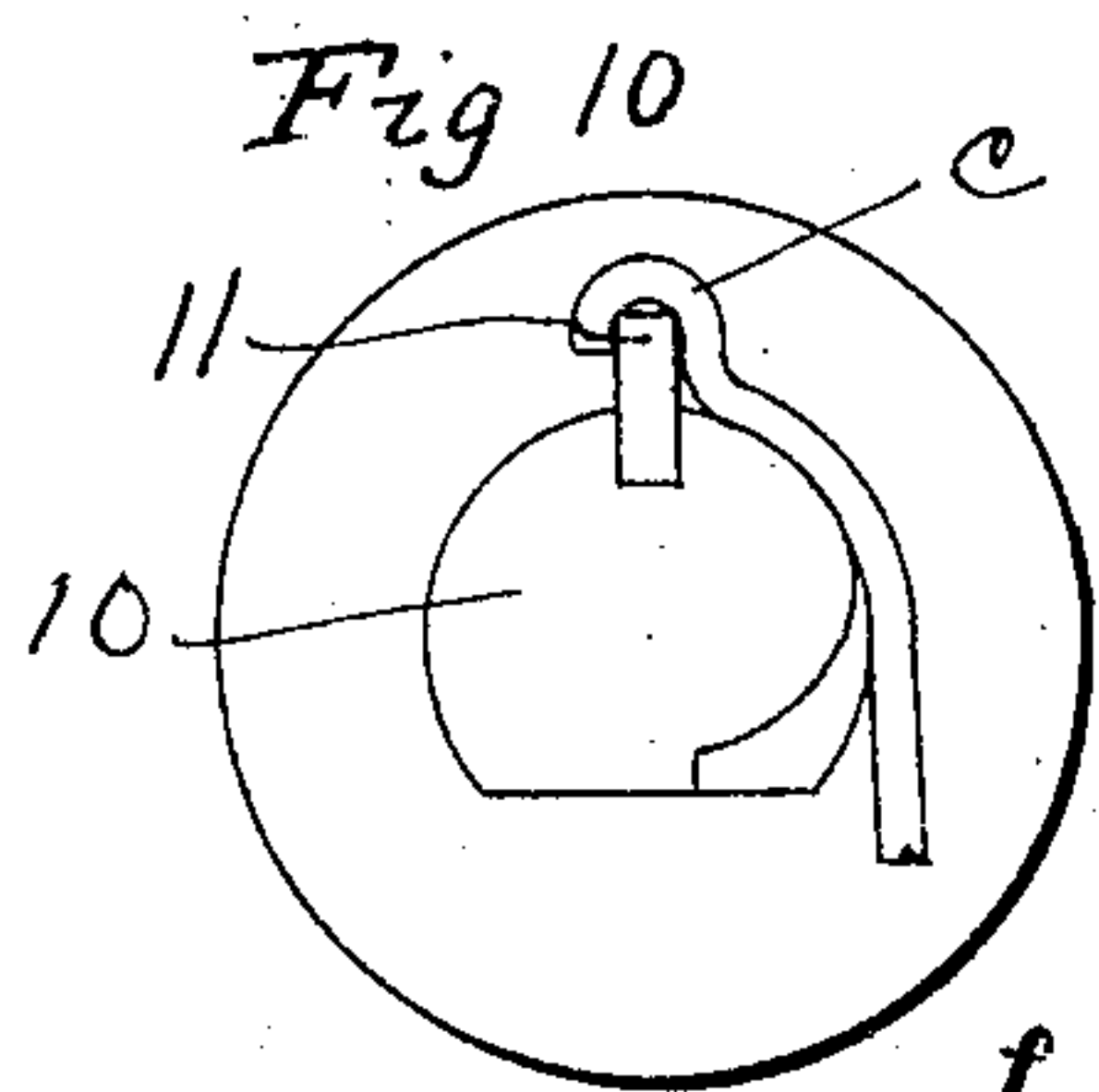


No. 803,585.

PATENTED NOV. 7, 1905.

J. B. HALE.
PAPER CLIP.

APPLICATION FILED OCT. 17, 1904.



WITNESSES

Frank A. Foster
E. D. Ogden

Fig. 8

INVENTOR

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UNITED STATES PATENT OFFICE.

JOSHUA B. HALE, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR, BY
MESNE ASSIGNMENTS, TO RING PAPER CLIP COMPANY, A CORPO-
RATION OF RHODE ISLAND.

PAPER-CLIP.

No. 803,585.

Specification of Letters Patent.

Patented Nov. 7, 1905.

Application filed October 17, 1904. Serial No. 228,751.

To all whom it may concern:

Be it known that I, JOSHUA B. HALE, a resi-
dent of the city of Providence, in the county
of Providence and State of Rhode Island, have
invented certain new and useful Improvements
in Paper-Clips; and I do hereby declare that
the following is a full, clear, and exact descrip-
tion thereof, reference being had to the accom-
panying drawings, and to the characters of ref-
erence marked thereon, which form a part of
this specification.

This invention has for its object to provide
a novel, simple, and effective spring-clip made
of a single piece of suitable spring-wire, and
one that may be very readily applied in se-
curing together papers and similar articles.
An essential feature of this device is its par-
ticular construction which enables it to be
manufactured by a rotary process, thereby
greatly increasing the speed of production
and at the same time materially reducing the
cost of the product.

A further object of the invention is to so
form the clip that it will have an extra or in-
creased tendency to grip and hold the papers
or the like from working loose or slipping
from its grasp. This important feature is ac-
complished by simply knurling or corrugat-
ing the wire on the surfaces that engage the
package. This clip has a very neat and at-
tractive appearance, particularly when in po-
sition on the papers, and on account of its
construction it looks the same on both the
front and back of the package. It is so
formed as to remove all danger of defac-
ing, tearing, or abrading the papers or arti-
cles to which it may be applied or of injuring
the fingers in handling. The liability of be-
coming snarled or tangled together in groups
when assembled in commercial packages is en-
tirely obviated.

With these and other objects in view the
invention consists of certain novel features
of construction, as will be more fully described
in this specification, and particularly pointed
out in the appended claims.

The accompanying drawings illustrate the
preferred form of the invention with several
modifications of the same which might be
made without departing from the spirit or
scope of my invention.

Figure 1 is a plan view of the preferred
form of the device, shown actual size. Fig.
2 is an enlarged perspective view of the same.
Fig. 3 is an enlarged plan view of the clip,
shown in position as clamping or holding to-
gether several sheets of paper. Fig. 4 is an en-
larged plan view of a modified form. Fig. 5 is
an edge view of the same. Fig. 6 is a plan view
showing a second modification. Fig. 7 is a
perspective view showing method of attach-
ing clip to papers. Fig. 8 is a perspective
view of a compounded clip having several
coils and a plurality of entrances to said coils.
Fig. 9 is a face view thereof. Figs. 10 and
11 are detail views illustrating the mandrel
upon which my improved clip is formed.

The clip is preferably formed of wire of any
desired size having sufficient temper to provide
a spring element and, as shown more clearly in
Fig. 2, is composed, essentially, of wire heli-
cally wound, forming a plurality of superim-
posed coils *a* and *b*. While I have found for
most purposes that two coils are sufficient,
the clip might be made with any number of
coils to increase the gripping force or to pro-
vide for holding a greater number of papers.
I have shown such a modification in Fig. 8, in
which there are four coils, and the purpose
of this arrangement is more fully described
hereinafter. Each coil has a projection or
ear *c* and *d*, forming an angle whose sides
converge, extending outward from the circle,
which projections are disposed adjacent to each
other, with a portion of the wire of one pro-
jection crossing the wire of the other, form-
ing a V-shaped opening *e* between them. It
is found in practice that the points thus dis-
posed provide for a ready entrance of the pa-
pers between the coils.

The simplest form of the device is shown in
Fig. 1, in which the main body of the clip is
the greater portion of a true circle, compris-
ing two coils or clamping members. The
projections *c* and *d* extend in the planes of
their respective coils, and an essential feature
of my invention is their disposition in rela-
tion to each other and to the coils. The pro-
jections may be of any appropriate form—as,
for instance, angular, as shown in the draw-
ings—and the sides of the angle may join the
circle of the coil tangentially, as in Fig. 1,

or they might take the form shown in Fig. 4; but to secure speed and economy of manufacture the radius of the circle of the coil must bisect the angle or space within the projection. This is true, whether the said projections are made angular or in the form of a loop, that said projection should be disposed radial with the circle of the clip. Other clips have numerous bends and crosses, which must be formed by separate operations; but in my device the clip is completely formed in one operation by a simple rotary process, the resiliency of the body of the clip serving to separate the projections *c* and *d*, the distance of separation being substantially the same as the distance of separation of the free ends of the wire forming the body.

In practice the clip is made by coiling a continuous piece of wire about an arbor 10, which is provided with a suitable anvil 11, which serves to form the ears *c* and *d*. Before leaving the arbor the wire is periodically cut to form the individual clips, and as the several portions leave the arbor the recoil or resiliency of the wire instantly separates the ears *c* and *d* and the severed ends, the clip thus assuming the form shown and described.

The extent of the opening between the points may be controlled by regulating the length of the saddle or by regulating the tension of the wire while being wound on the arbor. It will be noted, however, that the free end and projection of each coil or clamping member are arranged on opposite sides of a diameter passing between said projections.

The free ends of the wire terminate adjacent the top of the main body of the clip on opposite sides, leaving a single bridge or saddle-piece *f*. I have found it preferable to make this saddle-piece straight, as the chord of a circle, for the following reasons: If formed as an arch in the continuation of the circle, a longer spring element is furnished and the clip is not as stiff; but where the saddle-piece is straight there is less resiliency to the clip and a greater gripping force is obtained, the wire only springing or twisting in the saddle between the bends at the ends thereof. Therefore the shorter the saddle the stiffer and more binding the grip.

The operation of the device is further described as follows: The main portion of the clip is held between the thumb and forefinger, the ring form of the clip being particularly adapted for such a grasp, and the edges of the papers to be clamped are then presented to the opening *e* in the manner shown in Fig. 7. By simply forcing the clip down upon the papers a slight twist is given to the clip, and the coils or clamping members adjust themselves flat against either side of the package, effecting a bind which retains the sheets against displacement.

The ring form of the clip provides a sort of thumb-and-finger indenture, and this is again convenient in withdrawing the clip from the papers.

It will be seen that the ends of the wire are not forced against the paper in placing the clip on the package. Therefore there is no tendency to tear or injure its surface. This is an important advantage, for the extremities of the wire unless carefully smoothed and rounded up by a special operation are liable to be sharp and abrasive. In most other devices the ends are exposed and the paper is liable to be punctured or its surface scratched. Further, these ends normally lying in close proximity to the body of the clip prevent tangling when several of the clips are thrown together or packed in commercial cartons or placed in desk-receptacles. This feature also guards against injury to the fingers or the catching of the clip upon papers not within its grip.

The considerable length of the portions of wire which overlap each other gives an extensive grasping-surface in this form of clip and provides a greater efficiency than has heretofore been attained. Again, the ring shape of the clip and the very slight projection of the ears provide a structure of maximum strength not liable to be damaged or bent out of shape, so that my clip is particularly durable and indestructible.

The ease and rapidity with which it can be manufactured is a particularly strong feature in the construction of this device.

In Figs. 4 and 5 is shown a method of adapting the clip for still greater efficiency by knurling or scoring the portions *g* and *h* of the wire that oppose each other. While a clip may be made of sufficient torsional strength to hold the mass of papers together quite firmly, I have found in practice that if the engaging portions of the wire are left smooth the outside sheets are sometimes liable to slip out more easily than the interior ones. When the wire is knurled, as shown, the outside sheets are slightly indented, and therefore held more firmly, and it is impossible to displace them in ordinary handling.

Fig. 6 shows a modification in which the coils are slightly crimped or scalloped, and these scallops may be bent or formed up from the plane of the coil to overlap each other, so that there is a slight tendency to indent the paper and form a more secure bite or grip on the same.

In Fig. 8 a form of clip is shown having several coils, four in this instance, *a*, *b*, *x*, and *y*, and these coils add strength to the spring element of the clip and increase its range of utility. By this latter construction several packages of papers may be gripped separately between the pairs of coils, thereby retaining the individuality of the groups and at the

same time binding them all together in a convenient form, or the groups may be arranged with the edges out of alinement, so that the written or printed surfaces are exposed for ready reference to any one group. This arrangement would be useful for single sheets as well.

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

1. A paper-clip formed of a single piece of wire coiled upon itself to form a plurality of clamping members each of said members having a projection, each projection and the end of the wire nearest to said projection as measured along the wire, lying on opposite sides, respectively, of a diametrical plane bisecting the distance between the free ends of the wire.

2. A paper-clip formed of a single piece of wire coiled upon itself to form a plurality of clamping members, each of said members having a projection, each projection and the free end of the wire nearest to said projection as measured along the wire, lying on opposite sides, respectively, of a diametrical plane bisecting the distance between the free ends of the wire, said clamping members being connected by a chordal bridge forming a stiffening saddle-piece.

3. A paper-clip formed of a single piece of wire coiled upon itself to form a plurality of clamping members, each of said members having converging tangentially-arranged portions forming a projection, each projection and the free end of the wire nearest to said projection as measured along the wire, lying on opposite sides, respectively, of a diametrical plane bisecting the distance between the free ends of the wire.

4. A paper-clip formed of a single piece of wire coiled upon itself to form a plurality of clamping members, each of said members having converging tangentially-arranged portions forming a projection, each projection and the free end of the wire nearest to said projection as measured along the wire, lying on opposite sides, respectively, of a diametrical plane bisecting the distance between the free ends of the wire, said clamping members being connected by a chordal bridge forming a stiffening saddle-piece.

5. A paper-clip formed of a single piece of wire coiled upon itself to form a plurality of clamping members, each of said members having a projection, each projection and the free end of the wire nearest to said projection as measured along the wire, lying on opposite sides, respectively, of a diametrical plane bisecting the distances between the free ends of the wire, said clamping members being each provided with irregular or indenting portions.

6. A paper-clip formed of a single piece of wire coiled upon itself to form a plurality of clamping members, each of said members having a projection, each projection and the free end of the wire nearest to said projection as measured along the wire, lying on opposite sides, respectively, of a diametrical plane bisecting the distances between the free ends of the wire, said projections being provided with oppositely-arranged knurled or indenting surfaces.

In testimony whereof I have hereunto set my hand this 15th day of October, A. D. 1904.

JOSHUA B. HALE.

In presence of—

HOWARD E. BARLOW,
E. I. OGDEN.