

No. 837,492.

PATENTED DEC. 4, 1906.

L. NORDLINGER.
FIRE CRACKER AND OTHER PIECE OF FIREWORKS.

APPLICATION FILED JUNE 8, 1903.

8 SHEETS—SHEET 1.

Fig. 1.

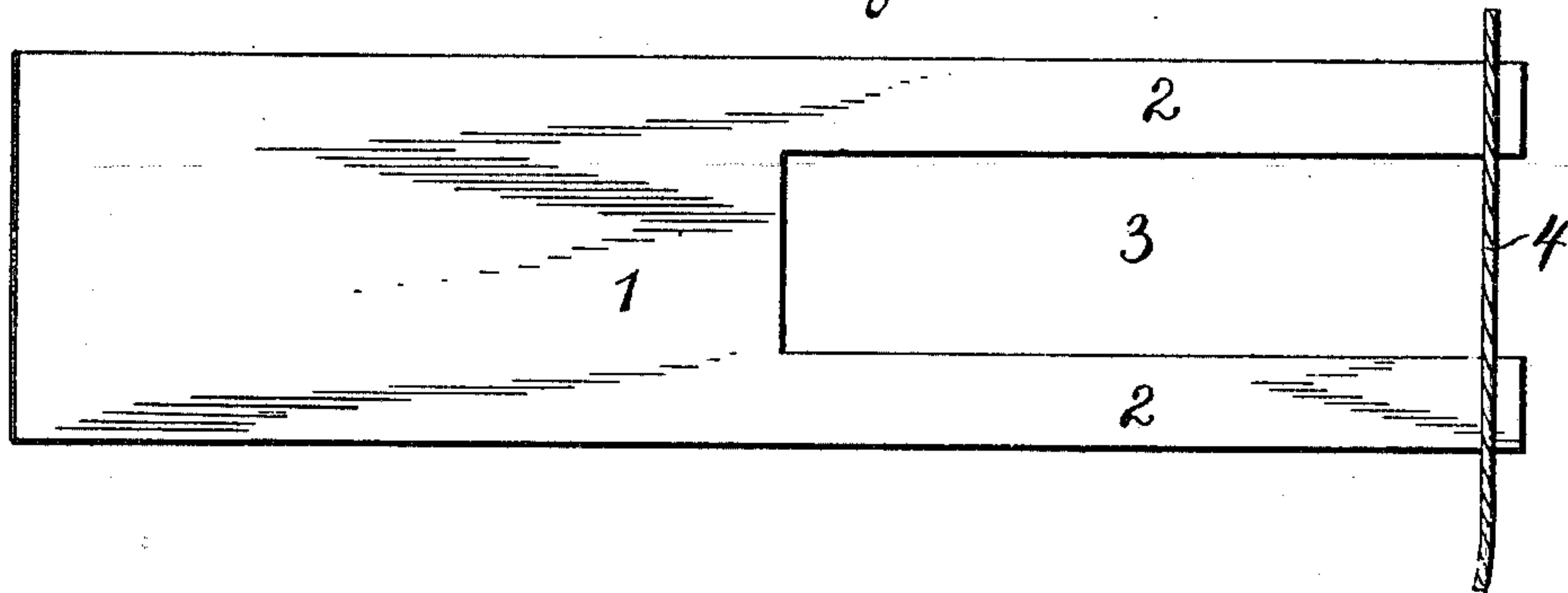


Fig. 2.

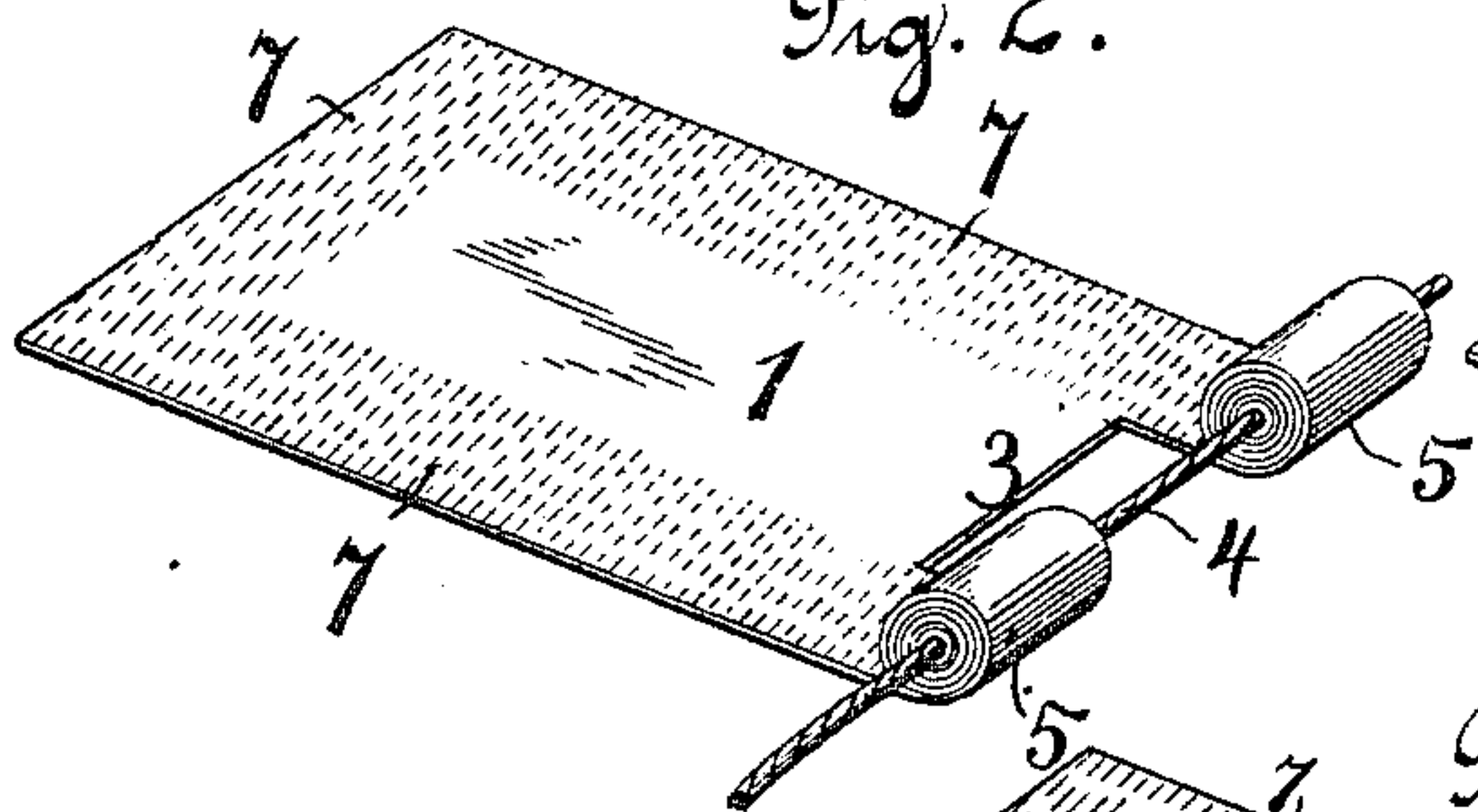


Fig. 3.

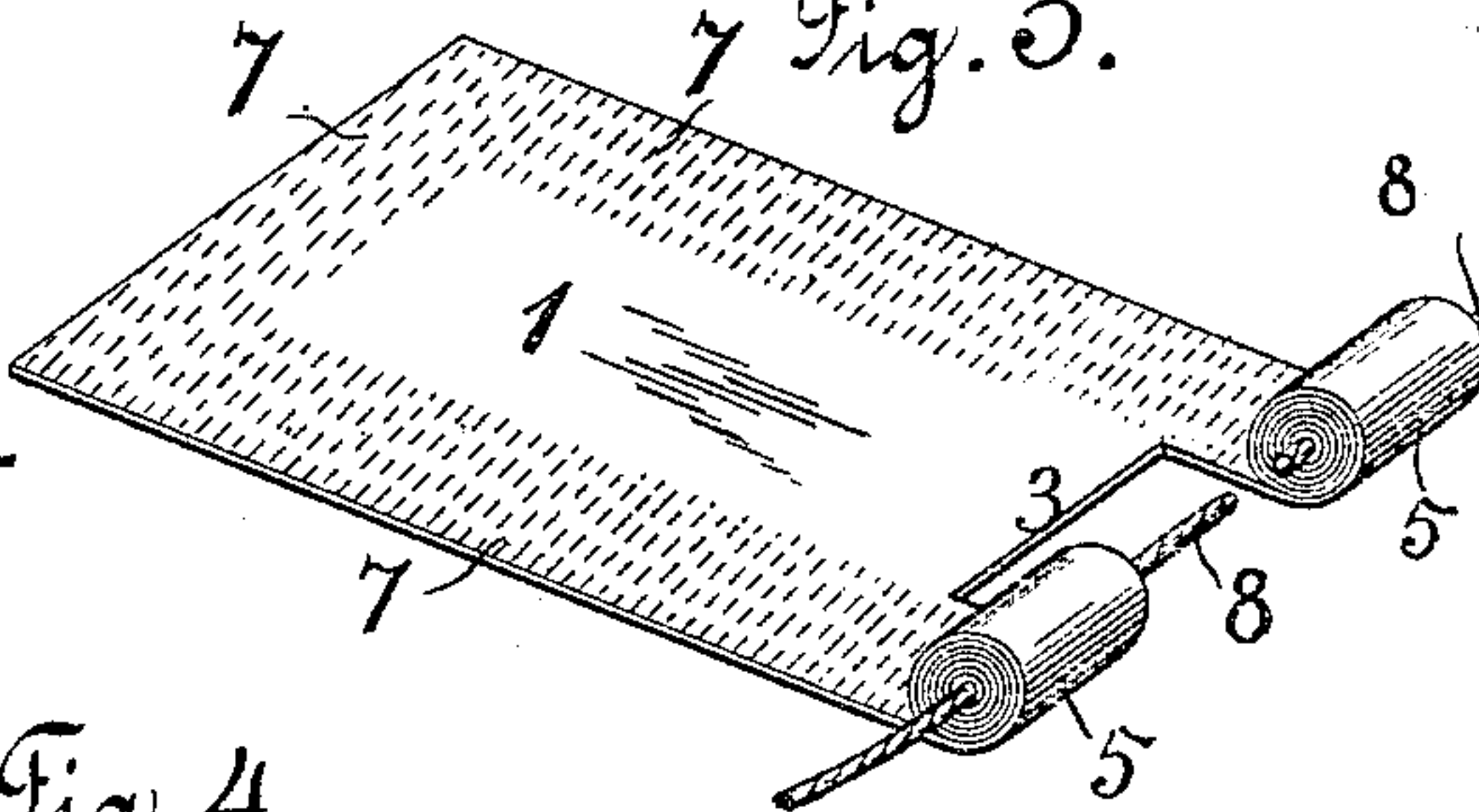


Fig. 4.

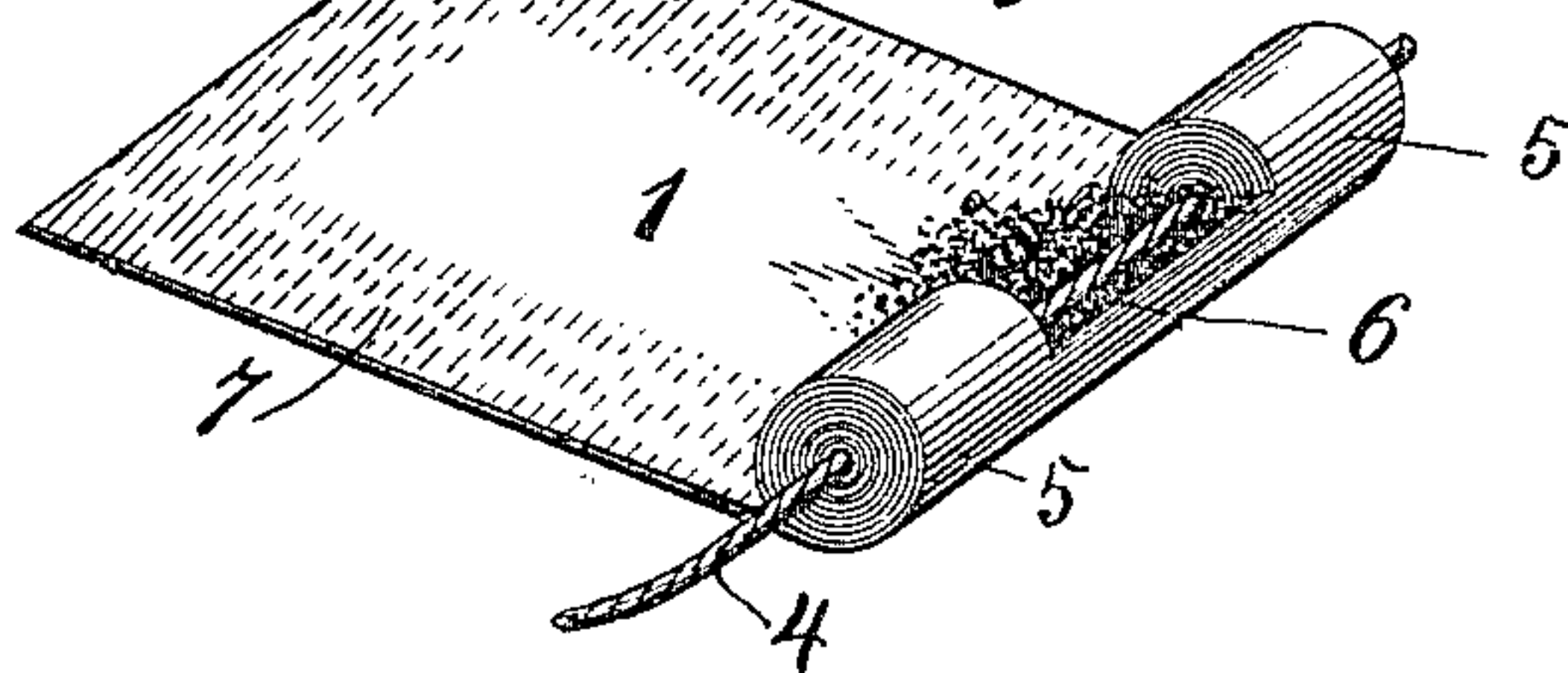


Fig. 5.

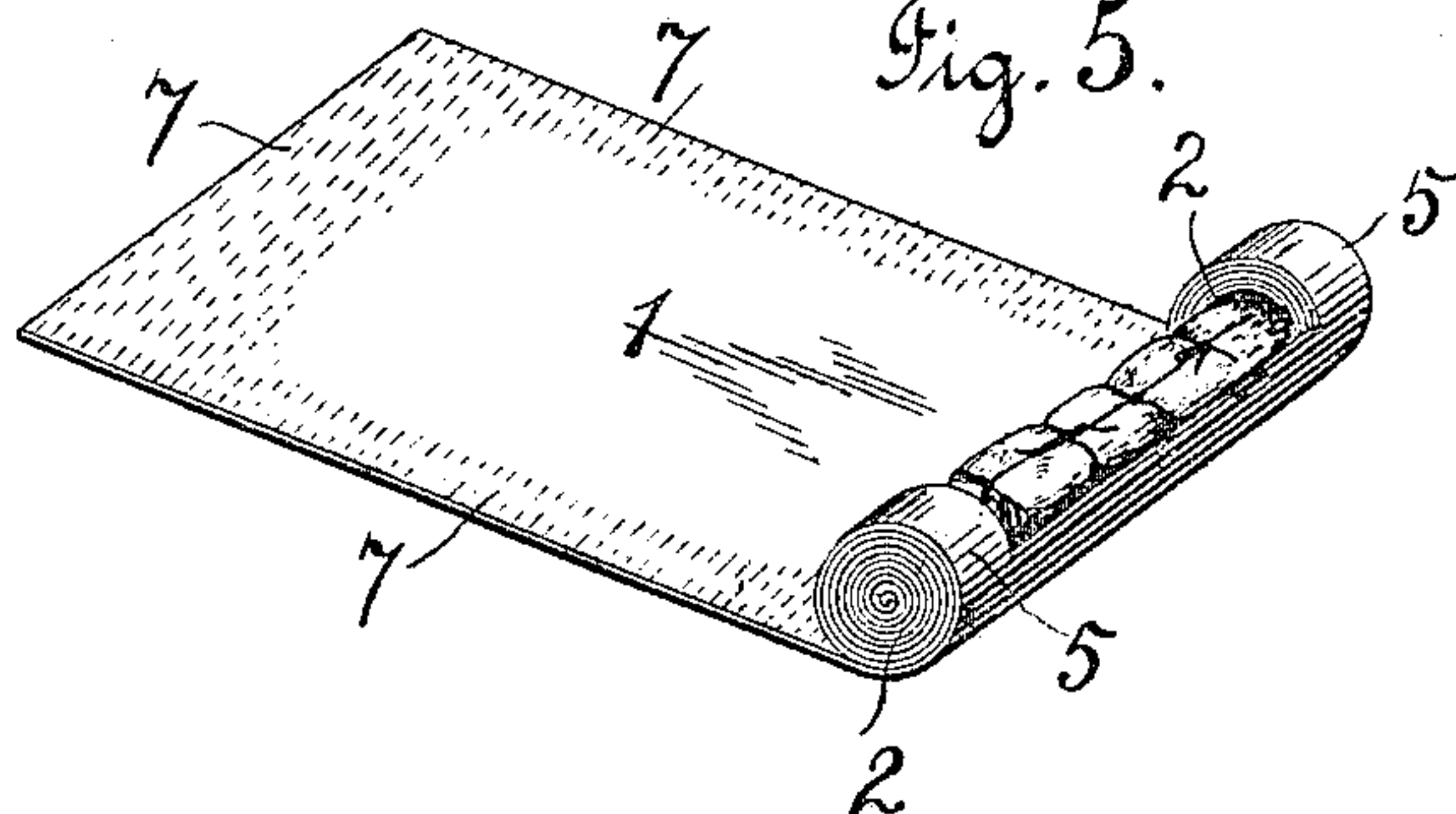
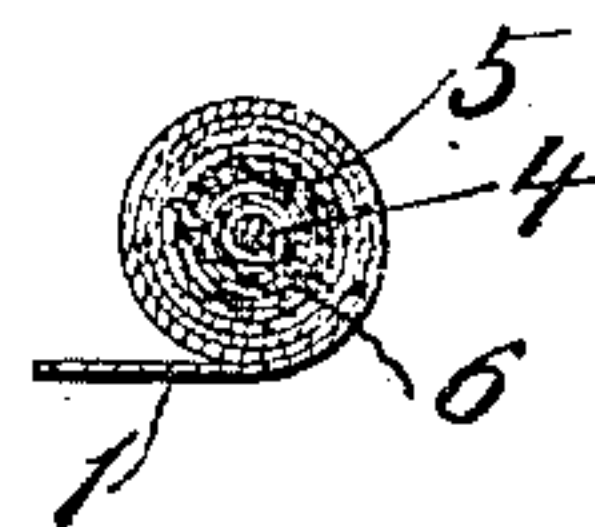


Fig. 6.



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3 SHEETS—SHEET 2.

Fig. 7.

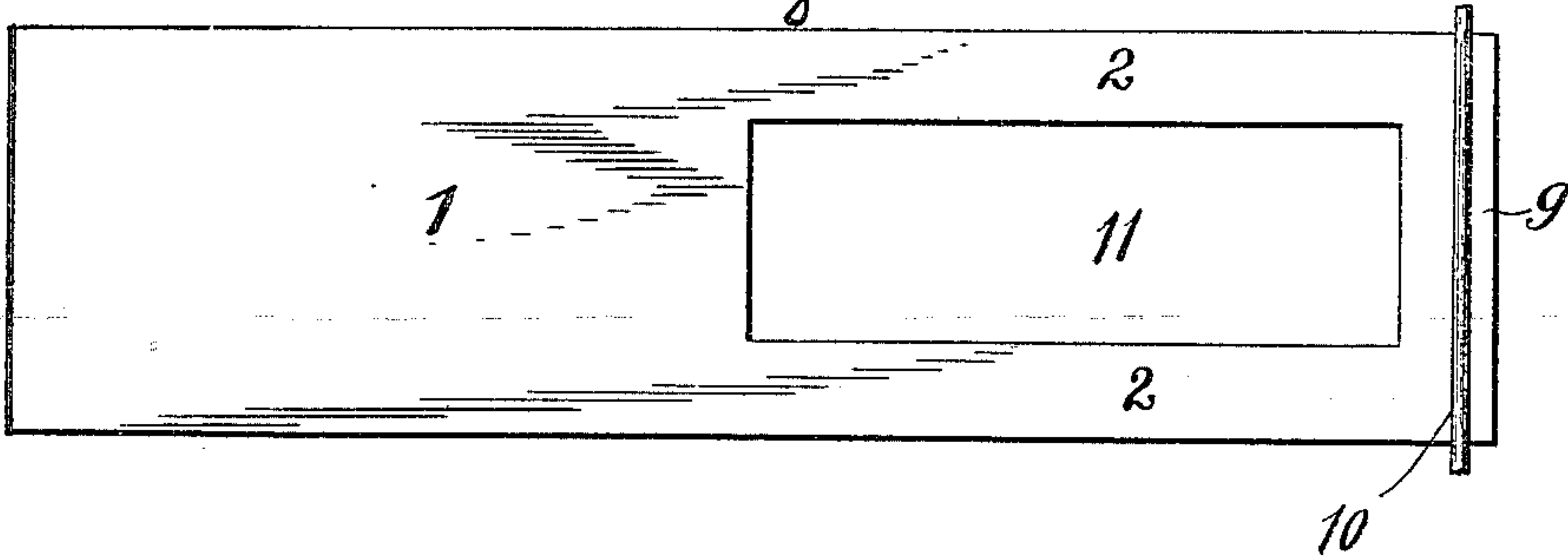


Fig. 8.

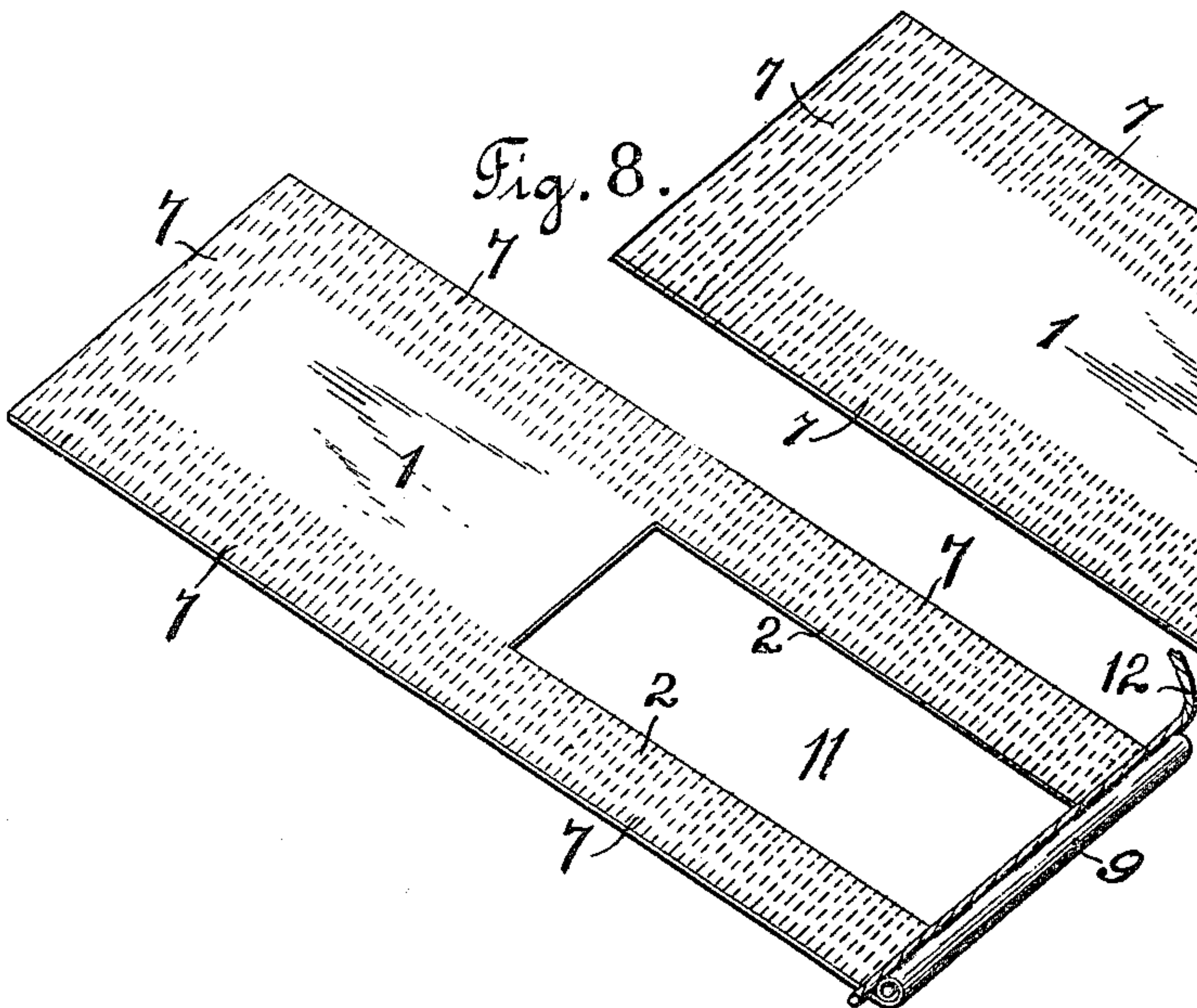


Fig. 9.

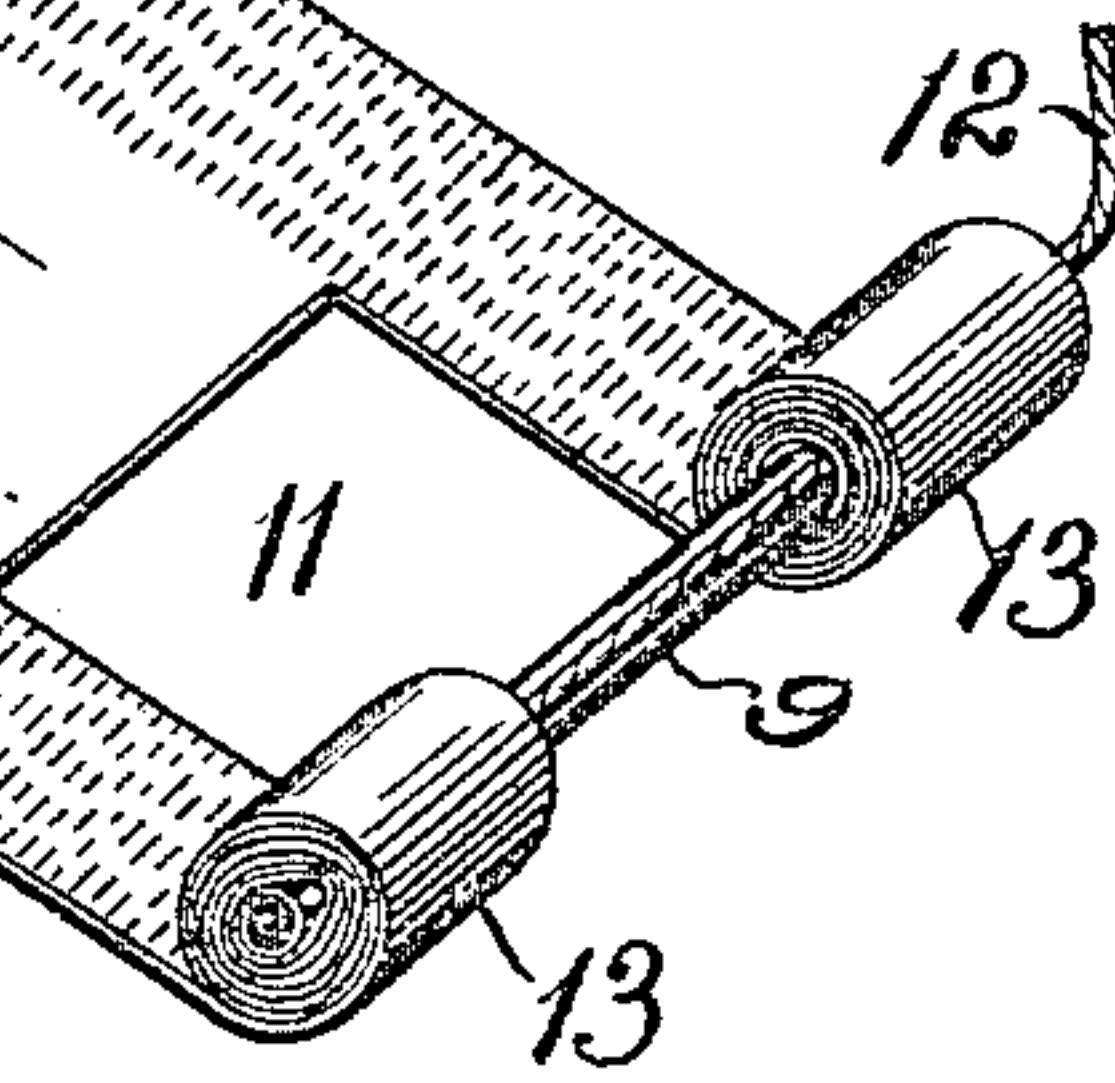


Fig. 10.

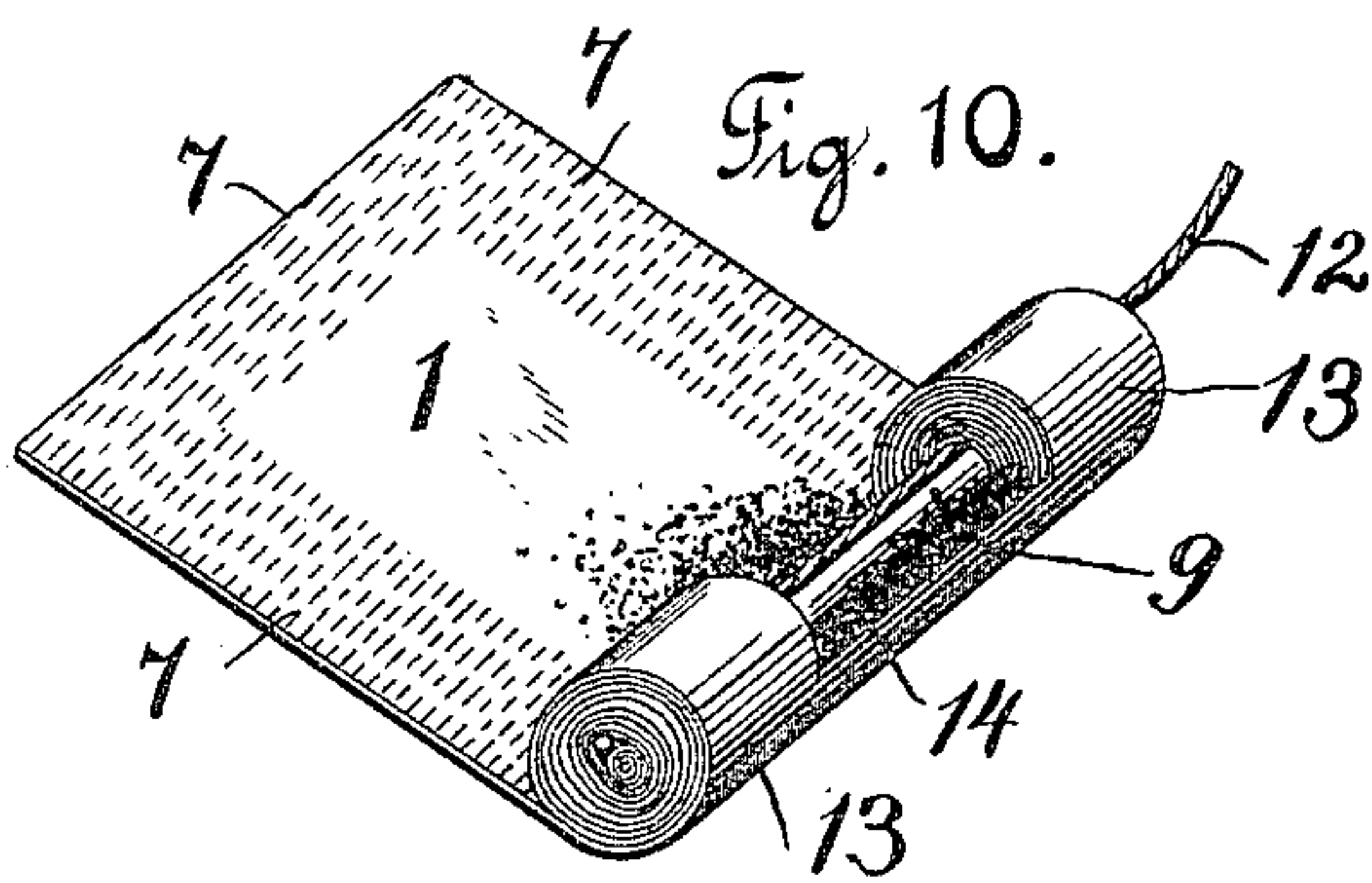
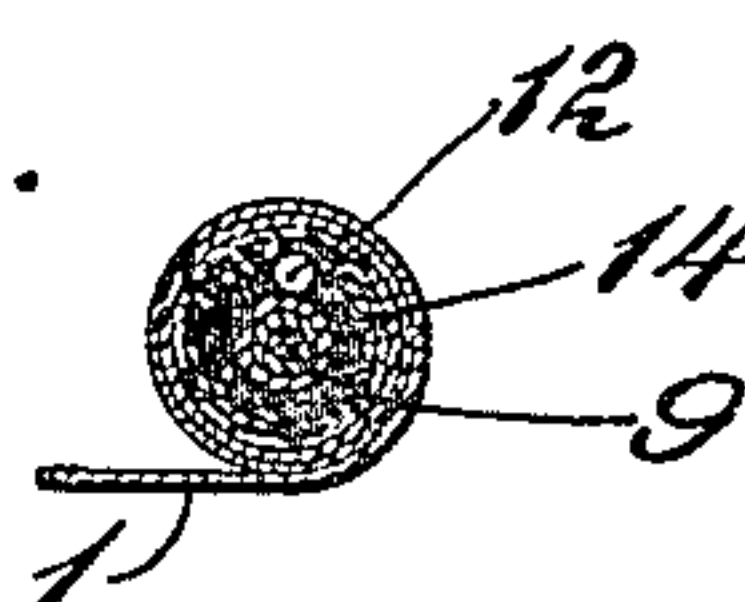


Fig. 11.



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3 SHEETS—SHEET 3.

Fig. 12.

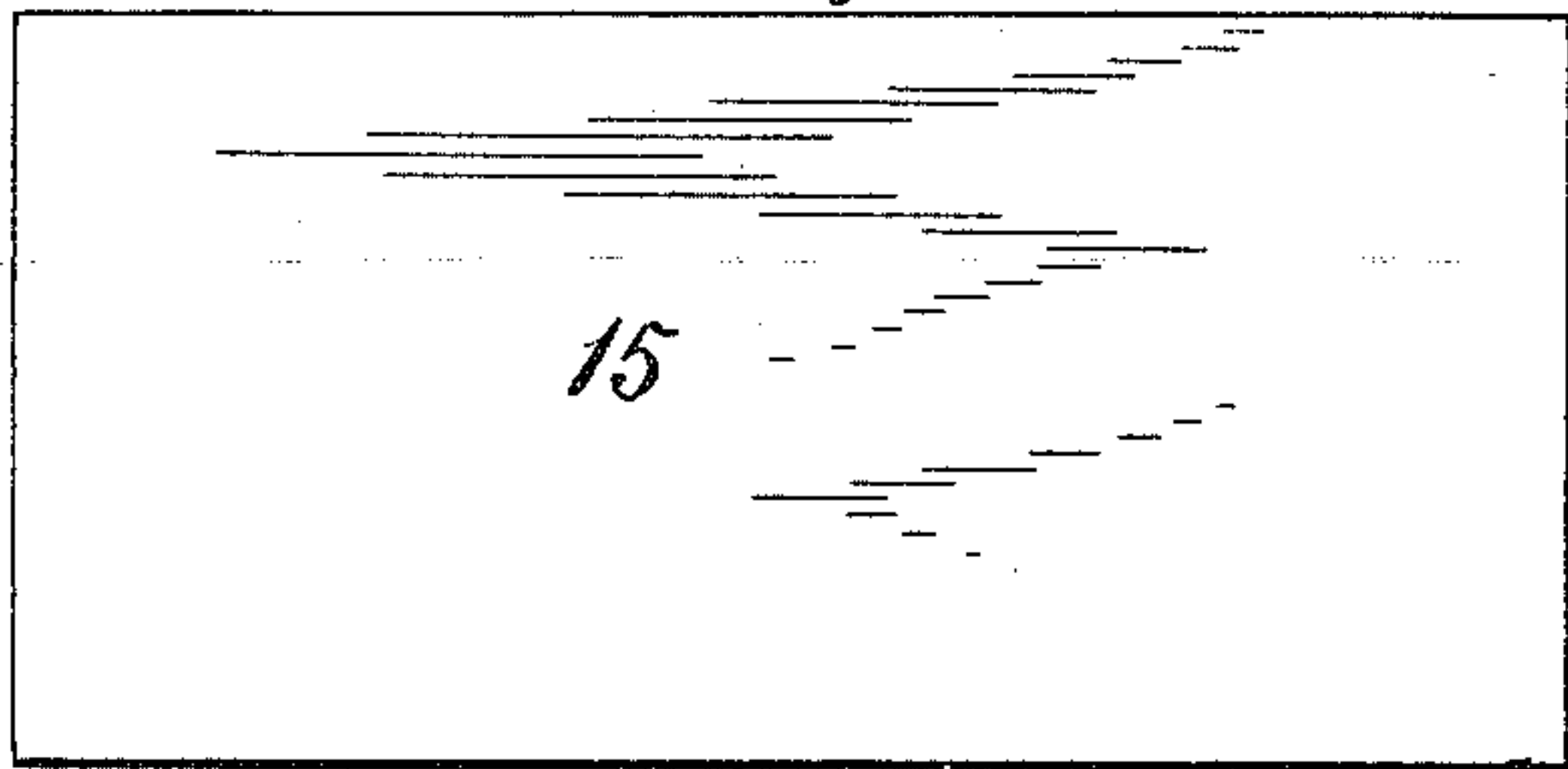


Fig. 13.

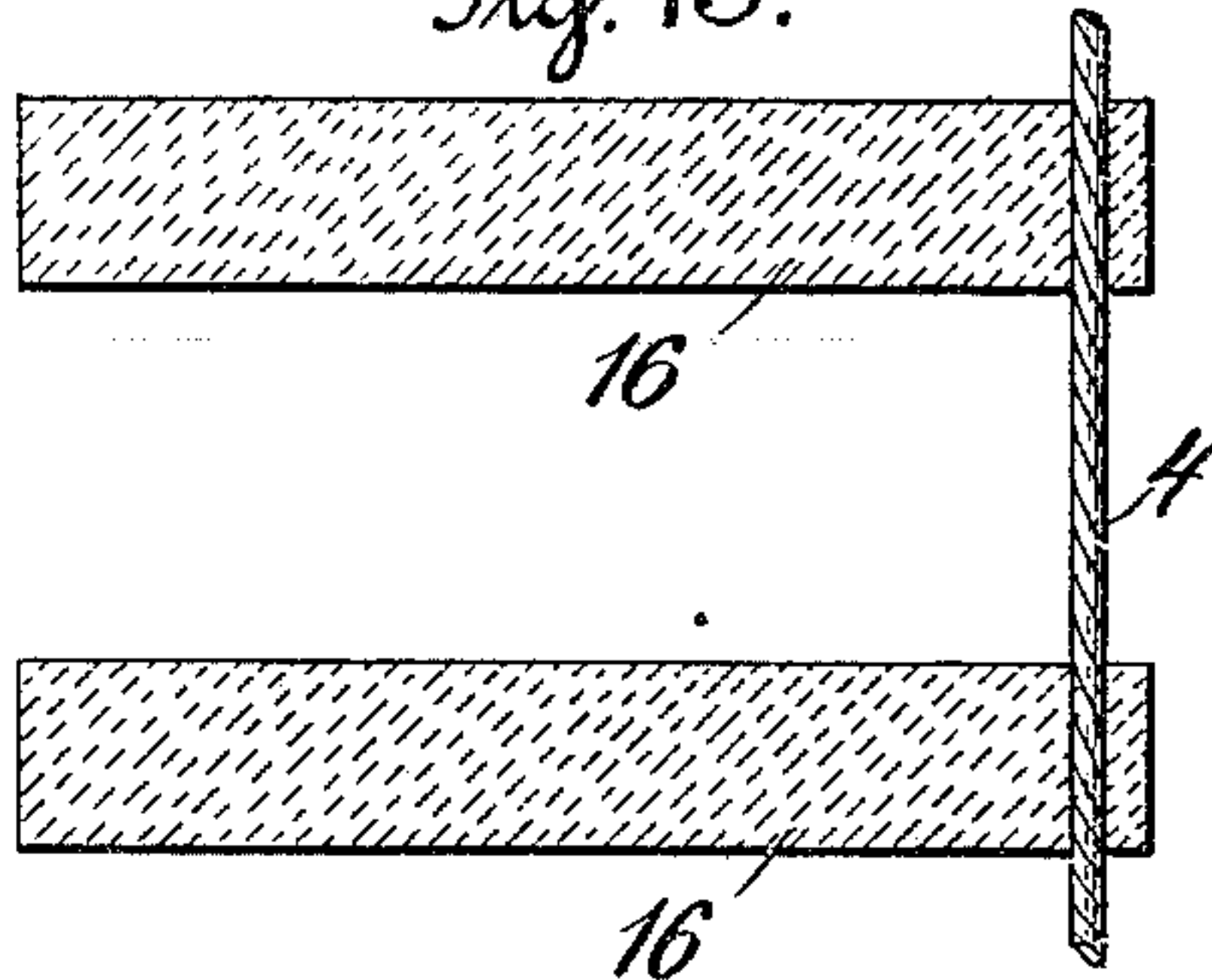


Fig. 14.

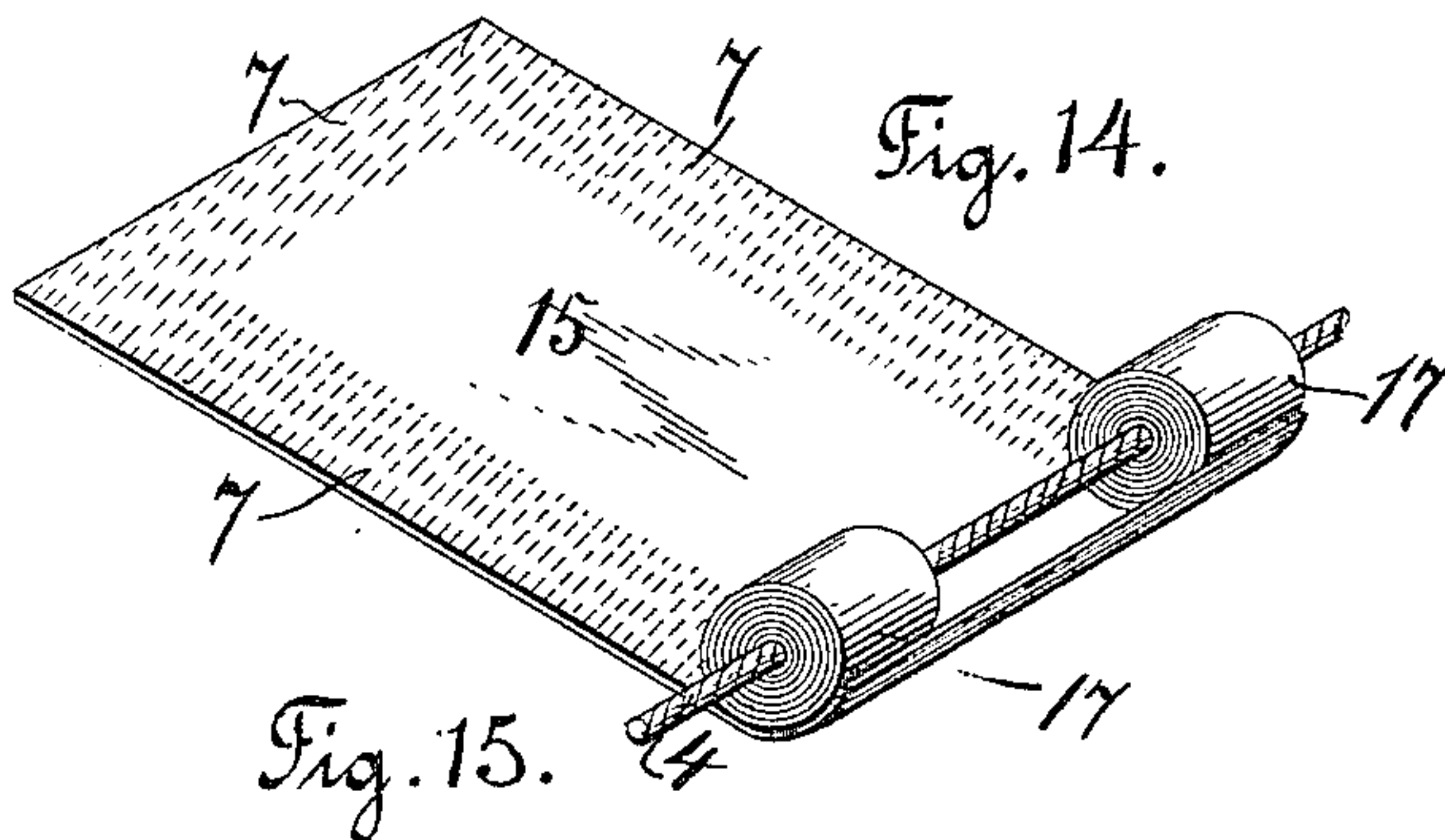


Fig. 15.

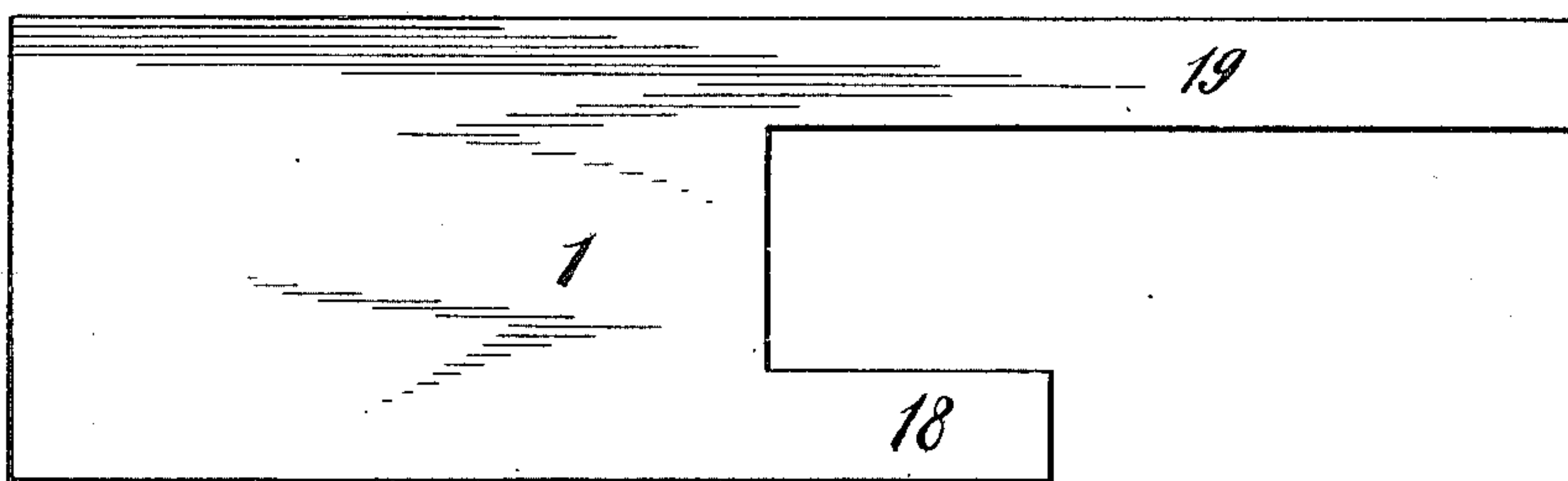


Fig. 16.

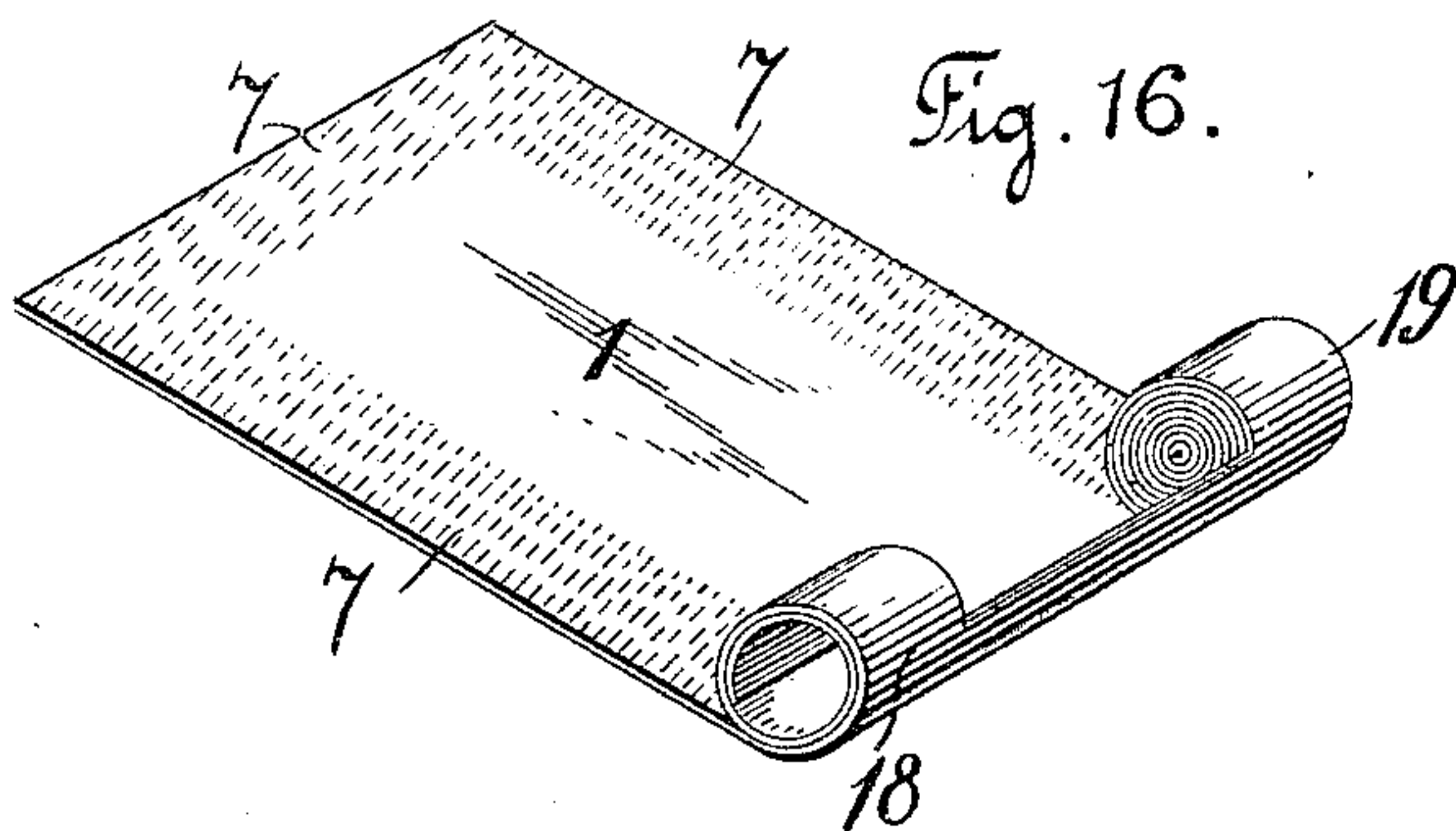
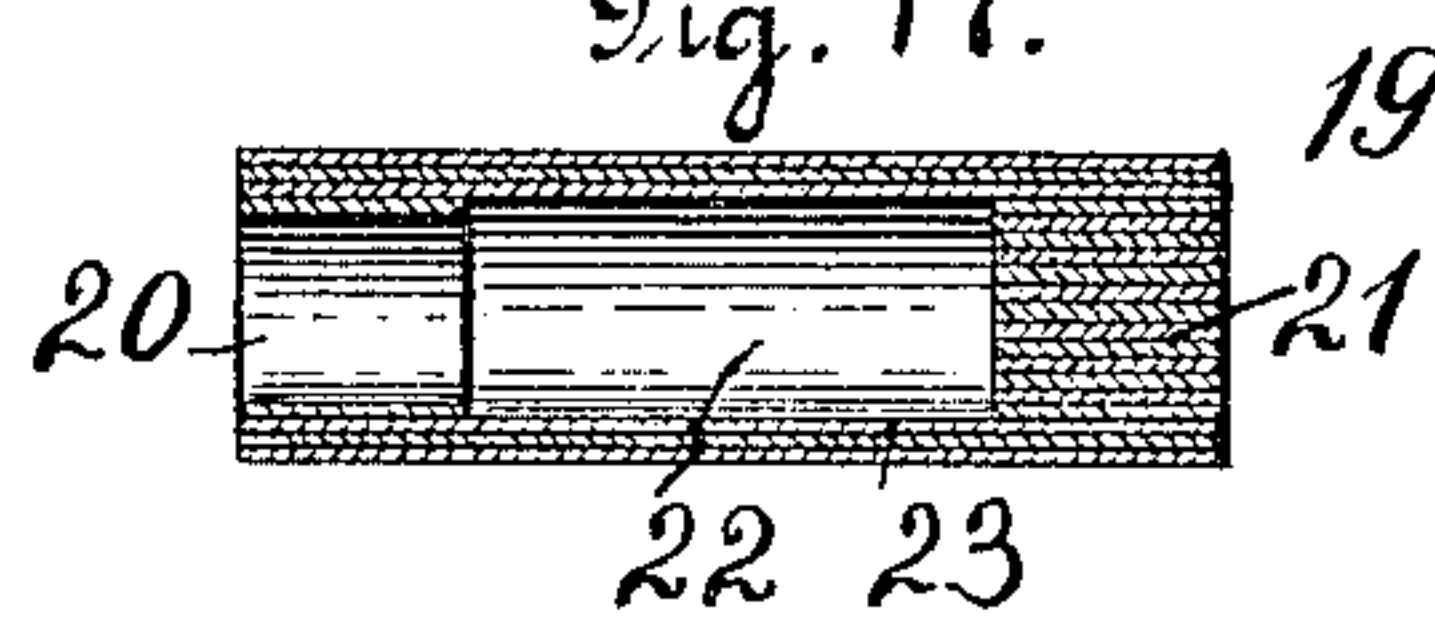


Fig. 17.



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UNITED STATES PATENT OFFICE.

LOUIS NORDLINGER, OF NEW YORK, N. Y.

FIRE-CRACKER AND OTHER PIECE OF FIREWORKS.

No. 837,492.

Specification of Letters Patent.

Patented Dec. 4, 1906.

Application filed June 8, 1903. Serial No. 160,512.

To all whom it may concern:

Be it known that I, LOUIS NORDLINGER, a citizen of the United States, and a resident of the city, county, and State of New York, have invented certain new and useful Improvements in Fire-Crackers and other Pieces of Fireworks, of which the following is a specification.

My invention relates to fire-crackers, fireworks, or other articles for explosive purposes.

Heretofore such articles have usually been made first by forming a completed tube and afterward inserting the combustible or explosive between two plugs in said tube, the fuse passing through one plug and with a portion of it in contact with the explosive or combustible. This mode of manufacture takes considerable time and necessarily includes several steps and necessitates the use of several machines and different materials.

By my invention also fire-crackers and similar fireworks and articles for explosive purposes may be readily and quickly made from the least possible number of parts and with the fewest possible steps and in a remarkably short time.

My invention consists in the articles and devices, parts, and combinations of parts herein described and set forth and as shown in the drawings.

In the accompanying drawings, Figures 1, 2, 3, 4 illustrate one embodiment of my invention, in which Fig. 1 illustrates a plan view of the means for making the improved tube or receptacle for use in fire-crackers, fireworks, or other articles for explosive purposes and also illustrates the first step of the process of making said receptacle. Fig. 2 illustrates in perspective the same means shown in Fig. 1, showing the second step of the method of making the said tube or receptacle. Fig. 3 is a similar figure to Fig. 2, except that the core is shown in two parts. Fig. 4 is a similar figure to Fig. 2, except that it shows the added steps of making the receptacle and of depositing the material to be inclosed in the receptacle. Fig. 5 is a similar view to Fig. 4, showing the formation of the receptacle without a core. Fig. 6 is a transverse section through the receptacle and the inclosed substance or material just before the receptacle in the process of the construction of Fig. 4 has been finally completed. Fig. 7 is a similar view to Fig. 1, but showing a slightly-different form of blank from which

the receptacle is to be made and showing the position of the core at the first step of the method of making the receptacle. Fig. 8 illustrates the second step of making a receptacle from the means shown in Fig. 7 when said receptacle is to be formed into a fire-cracker or similar firework. Fig. 9 illustrates the same means that are shown in Fig. 8, but giving one more step of the manufacture of the piece of fireworks. Fig. 10 illustrates the same means, but showing two different steps in the manufacture of the piece of fireworks. Fig. 11 illustrates a transverse section of the fire-cracker or other article just before it has been finally completed. Figs. 12, 13, and 14 show slightly-different means of the steps for forming a receptacle from that shown in the preceding figures, Fig. 12 illustrating the blank for forming the outer covering of the receptacle. Fig. 13 is a plan view of parts of the receptacle and also shows the first step of forming said receptacle. Fig. 14 is a perspective of the parts shown in Figs. 12 and 13 and also showing the second step in the method and manufacture of making the receptacle. Figs. 15, 16, and 17 illustrate a slightly-different means for making a receptacle from that shown in the other figures and also showing a slightly-different receptacle from those shown in the other figures, Fig. 15 being a plan view of the blank from which the receptacle is made. Fig. 16 illustrates said blank in the course of making the receptacle or tube. Fig. 17 illustrates a longitudinal section of the completed tube.

Similar numbers represent like parts in all the figures.

Referring now to Figs. 1 to 6, inclusive, 1 is a strip or piece of flexible material, preferably paper, provided with two tongues 2 2, extending in the same general direction to the main body of the strip 1, to which they are united or form parts, and said tongues separated by a recess 3. This recess is shown three-sided, although that is not necessary. 4 is a core, a part or the whole of which, if the fire-cracker or other article is to be constructed, may be the fuse; otherwise it may be a string, piece of paper, or core of any other form. The tube or receptacle is made by winding or rolling the two tongues 2 2 on the core 4, starting the rolling out or near the outer ends of the tongues 2 2 about at the places indicated in Fig. 1, and rolling said tongues on the core 4, as shown in Fig. 2. When any substance or article is to be in-

closed within the tube, it is deposited between the wound or rolled tongues 2 2, which constitute formers 5 5 on the inner surface of the piece 1 between said formers 5 5, as shown at 6, Fig. 4. The main body of the strip 1 is then wound upon the formers 5 5 by the formers rolling over the inner surface of the strip 1. The entire tube or receptacle is then completed and closed with the substance 6 between the formers 5 5 and surrounded by the piece 1, as shown in Fig. 6. If the tube or receptacle be intended to be used as a fire-cracker or article for explosive purposes, as above stated, the core or part of the core should be the fuse and the interior substance 6 should be the powder or other combustible.

To make the receptacle entirely practicable, so as to keep the tube in its tightly-wound closed position, the inner surfaces of the strips 2 should be coated with adhesive material, and also the outer end of the main body of the piece 1, and such portions of said piece that would be wound upon the tongues 2 2 when made into formers 5 5, as shown at 7 7 7, Figs. 1, 2, 3, 4, and 5. This adhesive material should of course be made moist or sticky when the tube or receptacle is being formed. Such adhesive material also has the purpose of making the formers 5 5 more compact and solid and more impervious to moisture. In Fig. 3 I have shown a core made in two parts instead of one, as shown at 8 8. If a fire-cracker is to be made, each of these parts may be a fuse, or only one may be a fuse and the other be anything on which the adjacent part of the strip may be wound, so as to facilitate the winding of the entire strip and preferably make the two ends when wound uniform. If desired, one of said parts may be omitted, and if said part is the fuse it will be just as practicable for a piece of fireworks.

In Fig. 5 I have shown a tube or receptacle as made without any core whatever, the strip 2 2 being wound onto formers 5 5 without any interior core. Such construction is very appropriate for a portable receptacle or tube for any desired substance except for the purpose of a piece of fireworks.

Referring now to Figs. 7 to 11, inclusive, the piece of flexible material for forming the receptacle when made without a core forms a substantial part or whole of the receptacle, as in the preceding figures, except that the two tongues 2 2 are united by a transverse strip 9 at the opposite end from the main portion 1.

The core 10 may be of string or any appropriate material. The cross-strip 9 and the tongues 2 are wound upon said core, said cross-piece being wound longitudinally upon the same and the tongues 2 transversely. Fig. 7 shows the position of the core 10 at the beginning of the winding. Fig. 8 shows the

same parts in the second position, with the flexible piece covered with the adhesive 7. There will of course be a space 11 between the tongues 2 2 and the main body 1 of the flexible piece and the cross-strip 9.

Figs. 8, 9, 10, and 11 show the receptacle in the form of a fire-cracker or other article for explosive purposes, and in this case a fuse 12 is laid across the tongues 2 2 between the cross-piece 9 and the main body 1, and said fuse is wound into the tongues 2 2, which constitute the formers 13 13. The winding is continued of said formers, the core 10 being in the center, the piece 9 wound directly around said core, and the fuse 12 between said wound strip 9 and the main body 1 of the flexible piece. About the time that the main body 1 is beginning to be wound or about to be wound upon the formers 13 13 the powder or other combustible 14 is deposited on said body 1 between the formers 13 13, and said body 1 is wound around said formers, so as to inclose and surround the combustible or explosive material 14. Said combustible or explosive material is also in contact with the fuse 12, as shown. The receptacle if not to be used as a fire-cracker or piece of fireworks would be made by omitting the fuse 12, and said receptacle could also be made by omitting the core 10, simply rolling the piece 9 upon itself and the tongues 2 2 upon said wound strip, which wound strip would form a nucleus for the entire tube or receptacle.

In Figs. 12, 13, and 14 the main body 15 of the flexible piece and the two tongues 16 16, corresponding to the two tongues 2 2, are made separate. Such tongues will then have to be first wound either upon themselves or upon core 4, as shown in Figs. 13 and 14, and the piece 15 is then wound upon the formers 17, made from said tongues 16, Fig. 14 showing the beginning of said operation.

The receptacle (shown as completed in Fig. 17 and in process of construction in Fig. 16) is made from a piece of flexible material, such as is shown in Fig. 15, which is like the piece shown in Fig. 1, except that one of the tongues 18 is shorter than the other tongue 19. The tongues 18 and 19 should be so rolled as to have the same external circumference, as shown in Fig. 16, and during such rolling the outer end of the strip 19 constitutes a core on which the rest of the strip is wound. When so made, a tubular box or vial will be formed with one end closed—that is, the end that is made by the tongue 19—and the other end open—that which is made by the tongue 18. Such a construction would be very appropriate for mailing or otherwise transporting precious stones or other similar articles, and the articles could be inserted through the open end 20 after the box or vial has been completed. Said open-

ing 20 could afterward be covered in any way desired—as, for example, by a strip of paper or by a plug or stopper. The receptacle or vial, such as shown in Fig. 17, is preferably
 5 made by having the tongue 19 wound upon a core and the tongue 18 wound upon a mandrel having an exterior circumference of the interior circumference desired of the opening and then the rest of the piece wound upon
 10 said rolled or wound tongues and then the mandrel withdrawn after the vial is completed. It is not necessary, however, to use a core to wind the tongue 19 upon, and this may be omitted. The vial (shown in Fig.
 15 17) when completed is formed of a bottom 21, made from the wound tongue or former 19, the interior chamber 22, having the surrounding wall 23, made from the part 1 of the flexible piece, and the mouth 20, formed
 20 from the wound tongue 18, through which the mandrel had passed.

With a flexible piece of paper or similar material, such as 1 2 2, (shown in Fig. 1,) 2 2 9, (shown in Fig. 7,) or with such flexible
 25 pieces as are shown by 15 16 16, Figs. 12 and 13, and with or without the use of a core, it will be readily seen that if such pieces are coated with adhesive, as shown and described, any substance, substances, or article
 30 that can be introduced between the strips which extend in the same direction can be readily inclosed in a casing and such casing can be made to conform to a great extent to the thickness or width of the inclosed sub-
 35 stance or article.

If it be desired to use the receptacle with a fuse and to inclose a combustible or explosive in order to make a fire-cracker or other
 40 piece of fireworks, it will be readily seen that it can be made as quickly and with as little trouble as possible and by simply the operation of winding the piece on the fuse, depositing the combustible or explosive, and completing the winding if the construction
 45 shown in Figs. 1 to 6 is used, or if the construction shown in Figs. 7 to 11 be used by the additional step of first winding the core. The steps required to make the fire-cracker or a piece of fireworks shown in Figs. 12, 13,
 50 and 14 are the same as those shown in Figs. 1 and 6.

Although I have shown my invention made in a cylindrical form or wound round, it will be evident that it may be elliptical, angular,
 55 or any shape in cross-section.

I do not limit myself to the precise construction and method herein described and shown, as many changes other than those suggested may be made without departing
 60 from the main principles of my invention or sacrificing its chief advantages.

What I claim as new, and desire to secure by Letters Patent, is—

1. A tube or receptacle for use in fire-
 65 crackers, fireworks, or other articles for ex-

plosive purposes consisting of a strip or piece of flexible material wound upon a plurality of formers, with a space between said formers.

2. A tube or receptacle for use in fire- 70
 crackers, fireworks, or other articles for explosive purposes consisting of a strip or piece of flexible material wound upon a plurality of formers, with a space between said formers, and said formers connected together. 75

3. A tube or receptacle for use in fire-
 crackers, fireworks, or other articles for explosive purposes consisting of a strip or piece
 of flexible material, and a plurality of formers attached to said strip but separated from 80
 each other, whereby the strip may be wound around the formers and said strip and formers constitute the walls of a closed chamber.

4. A tube or receptacle for use in fire-
 crackers, fireworks, or other articles for ex- 85
 plosive purposes comprising a plurality of wound strips separated from each other, and a strip of flexible material wound around said strips.

5. The improved means for forming a re- 90
 ceptacle for the purpose described, consisting of a piece of flexible material having a plurality of strips or tongues extending in the same general direction, and said pieces and
 tongues capable of being wound. 95

6. The improved means for forming a receptacle for the purpose described, consisting
 of a piece of flexible material having a plurality of strips or tongues extending in the
 same general direction, and connected at the 100
 opposite end, and said strip and tongues capable of being wound.

7. A tube or receptacle for use in fire-
 crackers, fireworks, or other articles for explosive purposes comprising a plurality of 105
 formers consisting of strips of flexible material wound upon a core, and a strip of flexible material wound upon said formers with space between the same.

8. A tube or receptacle for use in fire- 110
 crackers, fireworks, or other articles for explosive purposes consisting of a strip or piece of flexible material wound upon a plurality of formers, with a space between said formers, and one of said formers being tubular. 115

9. The improved means for forming a receptacle for the purpose described, consisting
 of a piece of flexible material having two tongues extending in the same general direc- 120
 tion, one of said tongues being shorter than the other, and said pieces and tongues capable of being wound.

10. A receptacle or tube for use in articles for explosive purposes comprising a piece of
 flexible material wound upon a plurality of 125
 formers, and one of said formers consisting of a wound strip of flexible material, in combination with a substance inclosed in said receptacle between the formers.

11. A receptacle or tube for use in articles 130

for explosive purposes comprising a piece of flexible material wound upon a plurality of formers, and one of said formers consisting of a strip of flexible material wound upon a core, in combination with a substance inclosed in said receptacle between the formers.

12. The combination of a plurality of formers and a piece of flexible material wound thereon, the flexible material wound along one of its edges in contact with one of the formers and along the other of its edges in contact with the other former, whereby a receptacle for use in articles for explosive purposes is formed between the said two formers and the wound portions of the flexible piece lying between the said formers.

13. A tube or receptacle for use in firecrackers, fireworks, or other articles for explosive purposes consisting of a piece of flexible material having extensions from two of its edges extending in the same general di-

rection and integral with the said edges and forming prolongations of the same, the said extensions being wound upon themselves to constitute formers, and the strip of flexible material being wound on said formers to form the tube or receptacle with a space between the formers.

14. The improved piece of fireworks comprising a plurality of formers consisting of wound strips of flexible material, a piece of flexible material wound upon said formers with space between the same, a fuse passing through the center of a former and into said space, and a combustible inclosed in said space and in contact with the fuse.

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

LOUIS NORDLINGER.

Witnesses:

PENNINGTON HALSTED,
EDWIN SEGER.