

No. 736,486.

PATENTED AUG. 18, 1903.

R. S. BROWN.
METALLIC FABRIC.

APPLICATION FILED OCT. 18, 1901.

NO MODEL.

2 SHEETS—SHEET 1.

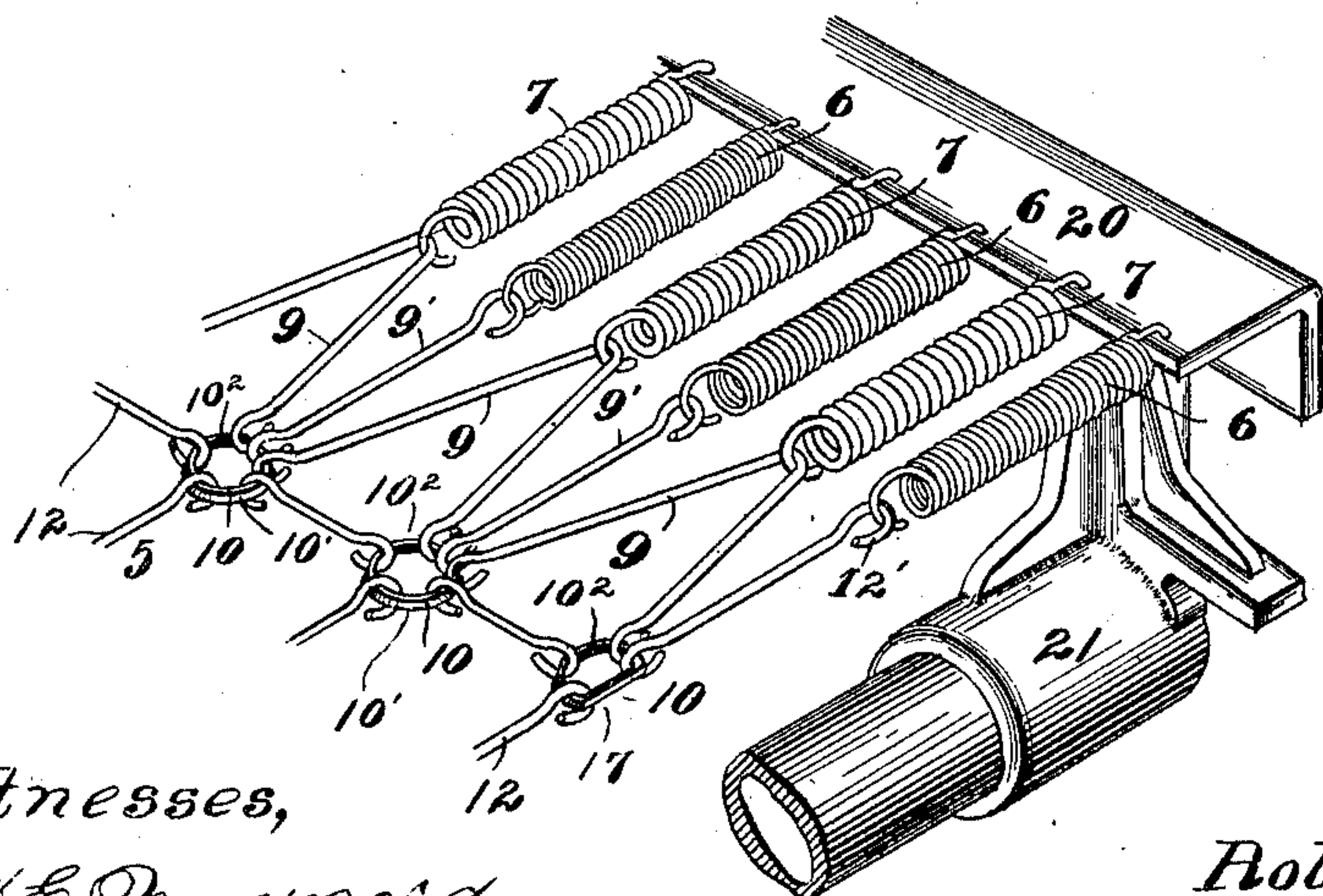
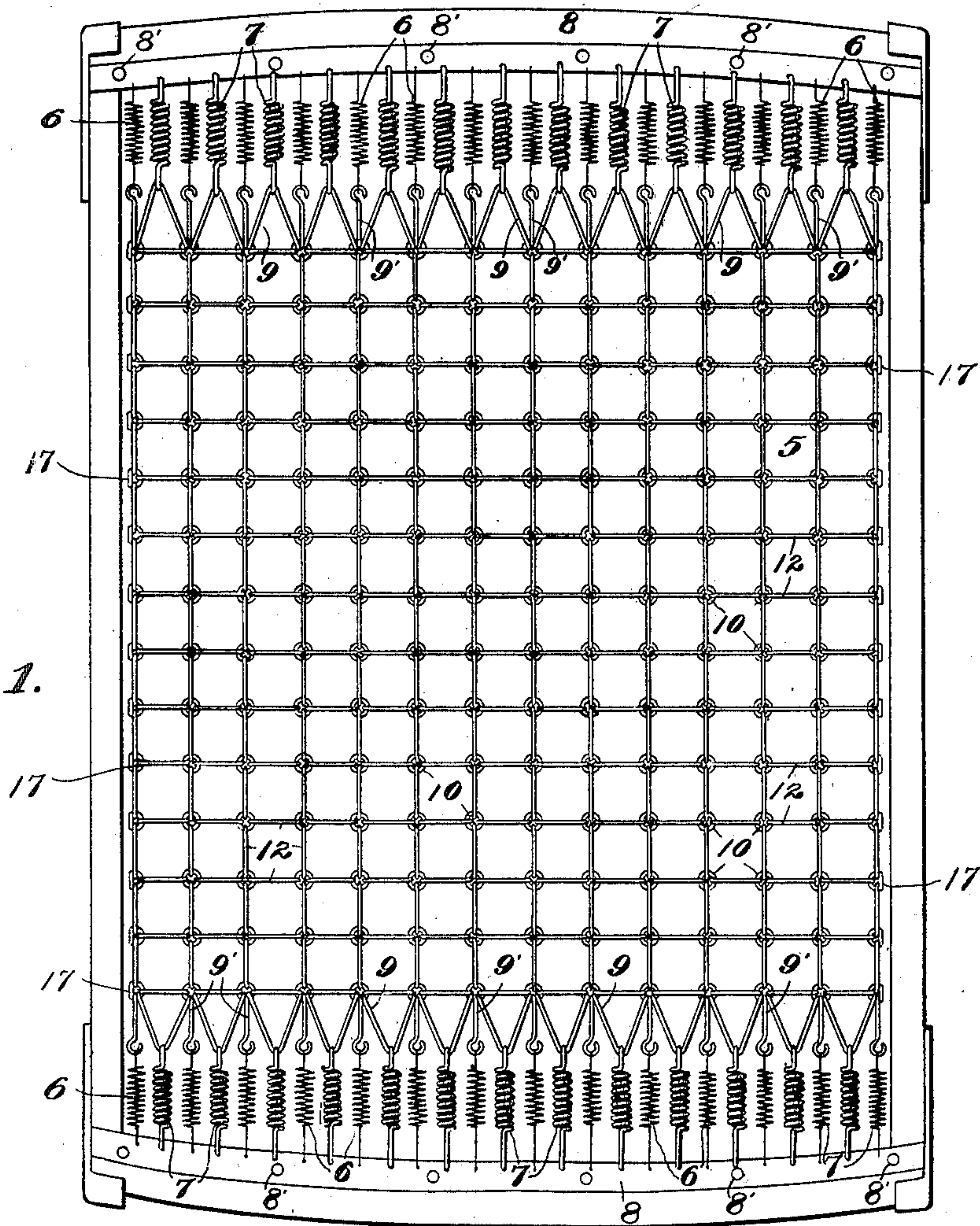



Fig. 2.

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2 SHEETS—SHEET 2.

Fig. 3.

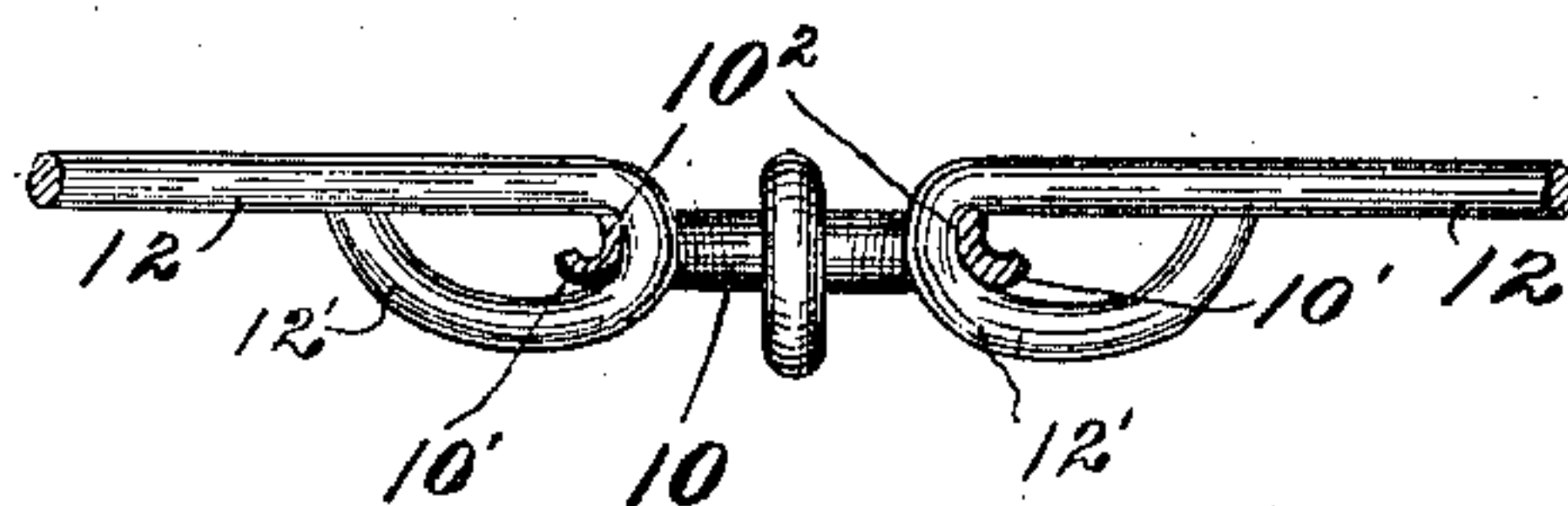


Fig. 4.

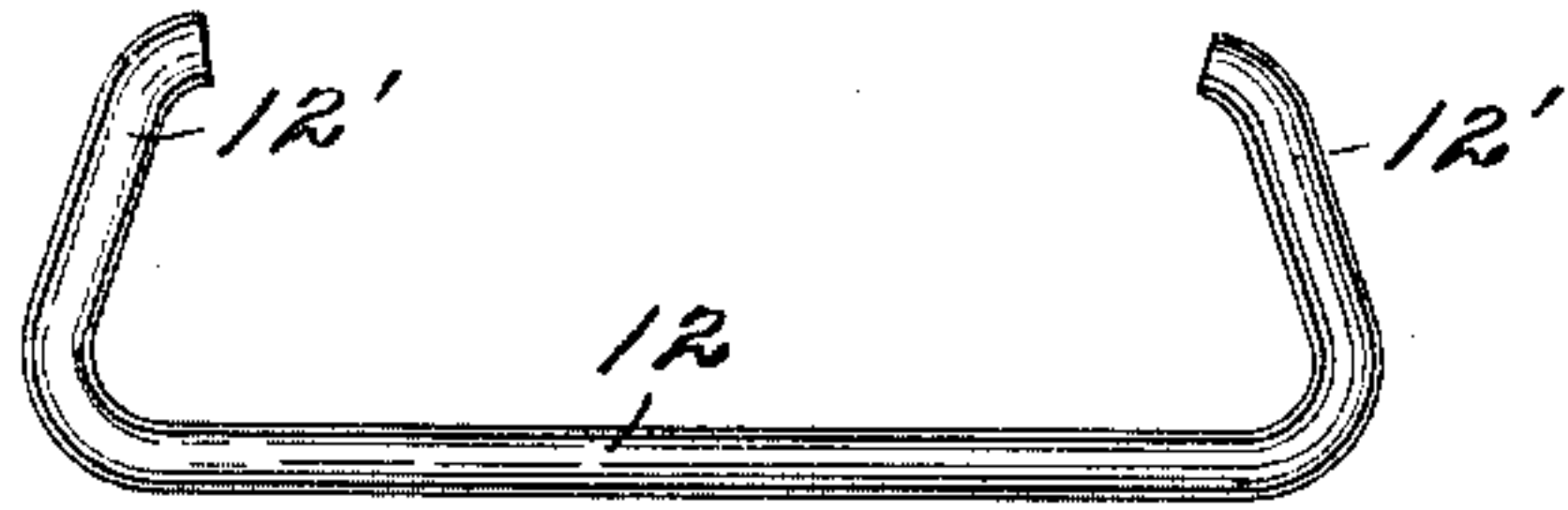


Fig. 5.

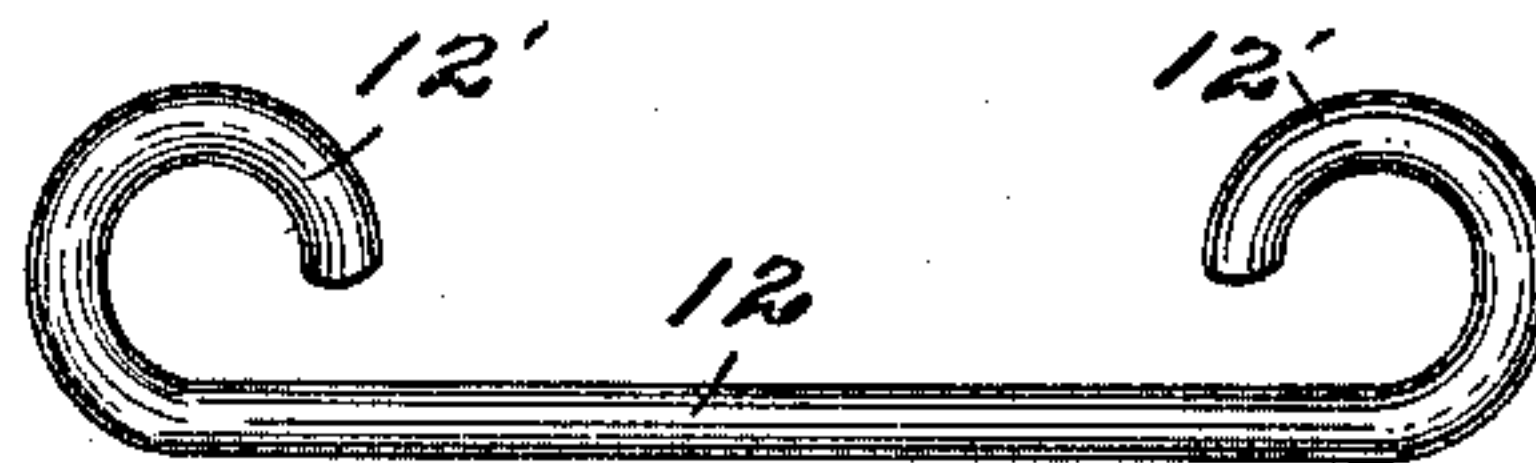


Fig. 7.

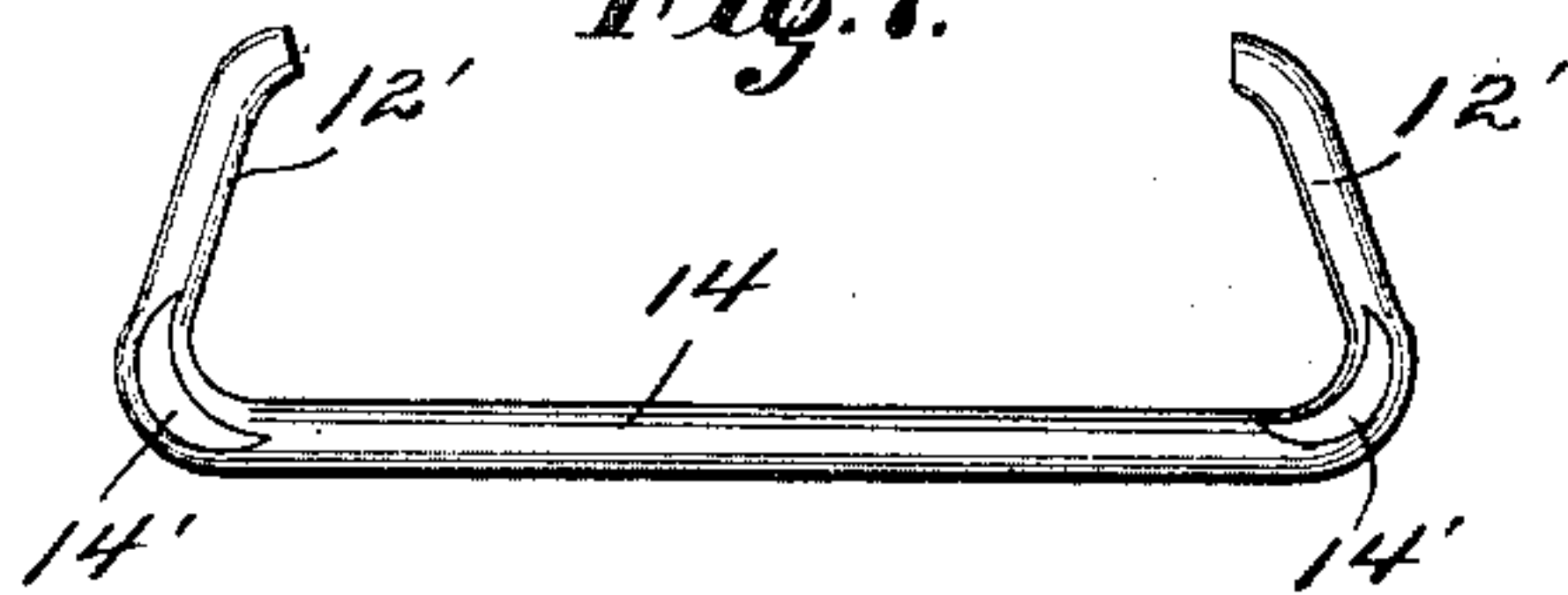


Fig. 8.

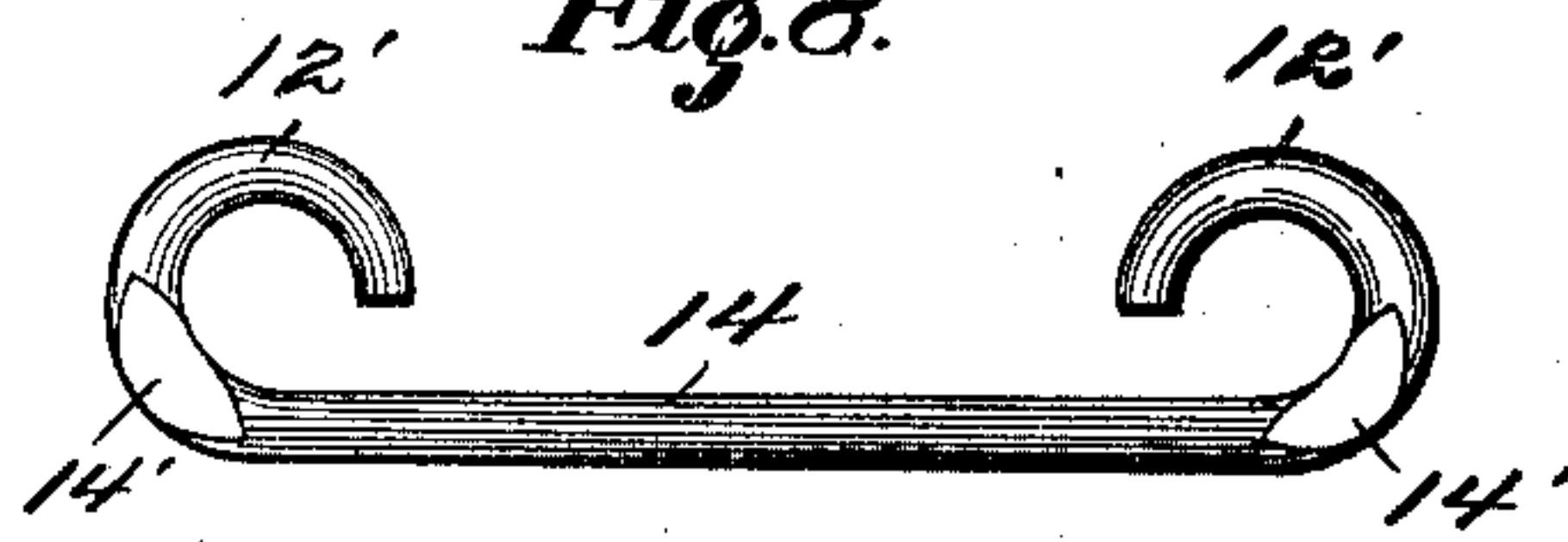
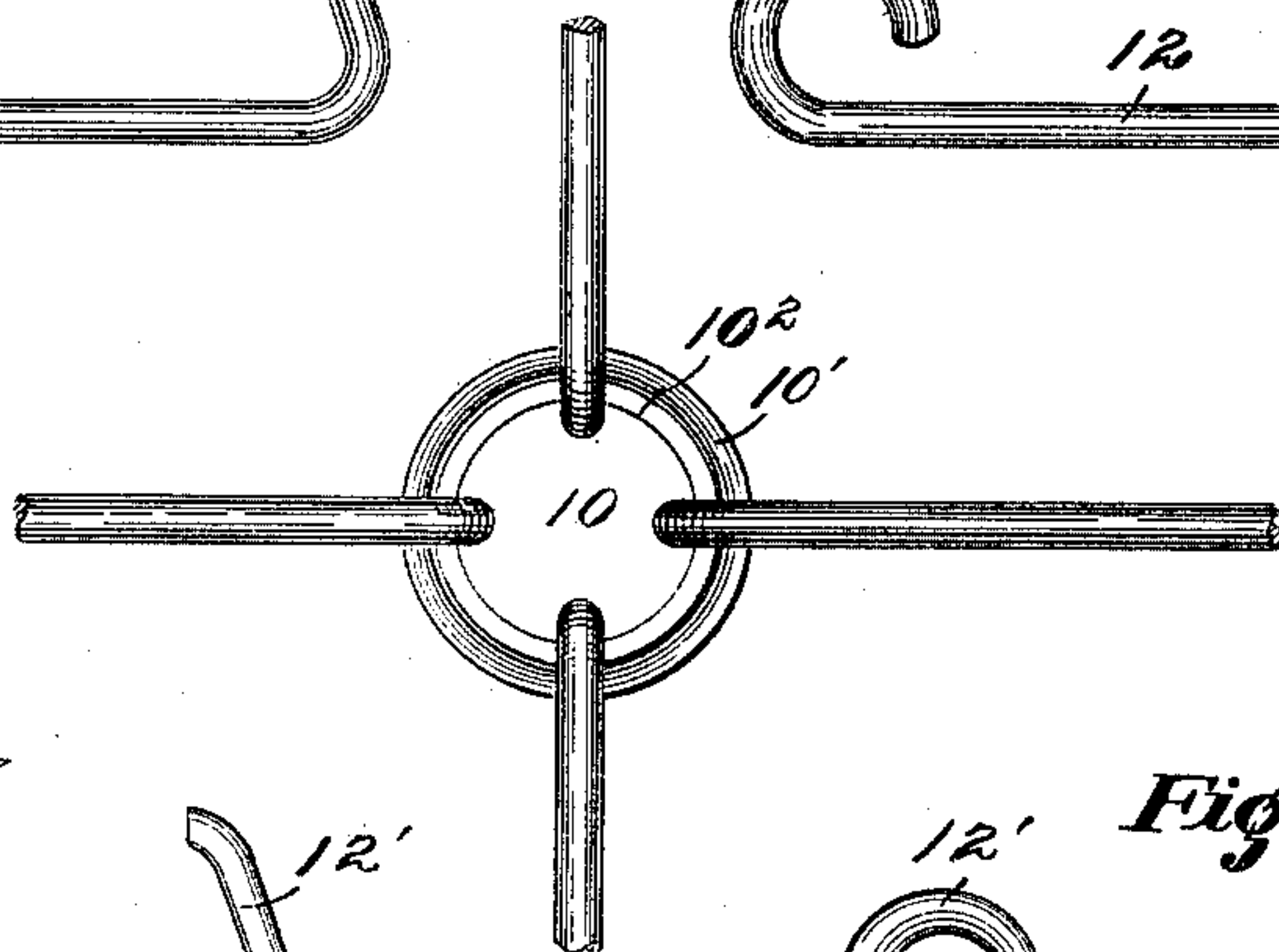


Fig. 6.



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METALLIC FABRIC.

SPECIFICATION forming part of Letters Patent No. 736,486, dated August 18, 1903.

Original application filed November 15, 1900, Serial No. 36,554. Divided and this application filed October 18, 1901. Serial No. 79,078. (No specimens.)

To all whom it may concern:

Be it known that I, ROBERT S. BROWN, 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 Metallic Fabrics, of which the following is a specification.

My invention relates to metallic fabrics, and particularly to the kinds of such fabrics employed as spring bed-bottoms; but it is not limited to this use.

Heretofore some fabrics have proved defective, for the reason that certain elements employed in the construction thereof become disconnected under strain, thereby impairing the efficiency of the structure and causing discomfort and annoyance.

My invention has for its object the provision of an improved fabric composed of links and gromets or washers, the latter being, preferably, of an improved construction and the ends of the links being bent around them in such a way that while having considerable freedom of movement under strain they will embrace the gromets and will freely conform to the various motions of the fabric.

A further object of the invention is the provision in a metallic fabric of gromets or washers each having a stiffened periphery and a convex or rounded inner bearing-surface and in connection with such washers links having their ends bent around and conforming to said convex inner surfaces, whereby the ends of the links will conform to the rounded portions of the washers and will rock and move thereupon as the fabric yields to strains in various directions.

In the accompanying drawings, Figure 1 is a plan view of a metallic fabric involving my invention, said fabric being applied for use as a spring-bed body. Fig. 2 is a detail in perspective of a portion of said fabric, showing the manner in which it is secured in position to the end rails of a bed-bottom frame. Fig. 3 is a detail view of the links and one of the washers or gromets, the latter being in section. Fig. 4 is a side elevation of an incomplete plain link-blank. Fig. 5 is a similar view of a completely-bent blank detached

from the fabric. Fig. 6 is a plan view showing the manner in which the links are connected to each washer or gromet. Figs. 7 and 8 are side elevations, respectively, of a link-blank and link of modified form.

Similar characters designate like parts throughout the several views.

Referring to the drawings, the numeral 5 designates my improved fabric shown applied for use as a bed-bottom and connected by springs 6 and 7, respectively, to curved plates 8, attached to the side bars and end rails of the structure, as at 8', and the numeral 9 designates triangular draw-rods, and 9' links extending from the springs 6 and 7 to the gromets or washers hereinafter described, and around which washers the ends of said rods and links are bent, as illustrated in Figs. 1 and 2. These washers or gromets are designated by the numeral 10 and are shown assembled in Figs. 1 and 2 and detached in the sectional and plan views in Figs. 3 and 6, and each consists of a ring or annulus having a corrugated or otherwise stiffened periphery 10' and a downwardly-curved or convex inner wall 10² over and upon which the ends of the links 12 may be bent by machinery acting through the opening in the center of the gromet, which, as shown in Fig. 6, leaves a considerable opening or working space, the faces 10² constituting formers or anvils around which the links are bent. The bend coming sharply over the edge of the top of the gromet allows the draft to come close to the bend of the hook at a point nearly in line with the straight metal of the link, allowing plenty of room in the center of the ring, which might be termed "working space" for punches to operate. The gromet illustrated is made of a single annular piece of metal, presenting at the inner and lower sides a convex bearing-surface for the eyes or hooks of the links. As seen in Fig. 3, the cross-section of the gromet clearly reveals its shape, and it will be seen that the convex face 10² is of less projection from the perpendicular than would be the radius of a face semicircular in cross-section and having a diameter equal to the chord of the convex

face 10². In the present instance the height of the gromet is about one-half the height it would be were it circular in cross-section and presented a face of equal curvature. The bearing-surface is less than semicircular in contour, as seen by the cross-section in Fig. 3. By this formation of the gromet the fabric may be made comparatively even on its surface, which could not be done by using gromets presenting equal surface of curvature and circular in cross-section. As illustrated, the links are substantially straight up to the point where they bend sharply down inside the gromet. This permits the straight portions of the links to more nearly approach each other at their abutting ends than would be possible with a gromet of equal diameter and of equal curvature in cross-section. Heretofore in this class of metallic bed-bottoms where ordinary rings and links were employed to constitute the structure of the fabric the hooked ends of the links and sometimes the rings have given away under strain and the hooks of the links have not been bent to conform to the outlines of the bearing-surfaces of the rings to which they were coupled, and the consequence has been that they have frequently become detached from the rings, thereby weakening and impairing the efficiency of the fabric. To avoid this difficulty and at the same time produce a link which may be readily united with a stiffened gromet or washer by machinery, I provide each link 12 in blank form, as shown in Fig. 4, with its ends 12' so disposed that when the links are connected with the improved washers or gromets in assembling the fabric they will be bent over and down upon the curved or convex inner surface 10² of the gromets to form hooks which will conform in their bent outline to said inner surfaces and will remain set in their bent positions, so that they will not be pulled out or become deflected under strain. While plain "links" of the character shown—and by this term is meant links in which the metal is in its ordinary condition—are preferably employed, it is distinctly to be understood that links 14 of the character represented in Figs. 7 and 8 in which to afford the most favorable disposition of the metal to resist deflecting strains the body of each link is compressed at the bend thereof, as at 14', may be utilized as substitutes therefor. These links are shown as provided with such flattened portions in the region of the sharp bend, whereby the metal is so disposed relatively to the strain that its greatest efficiency will be had. These washers or gromets and the compressed links just described are fully illustrated and set forth in my application filed November 15, 1900, Serial No. 36,554, of which the present application is a division.

It is particularly to be noted that with either form of link shown the ends thereof are in this invention bent over and down upon and are made to conform to a curved surface

10², of considerable amplitude, around which the hook or curved end of the link may rock and upon which it may slide in conforming to the various tensional strains placed upon the fabric. In other words, in each form of link described the curved hook-shaped ends of the links necessarily fit around the convex surfaces of the stiffened washers or gromets and are allowed considerable play upon and around the same to conform to the various movements of the fabric when it is employed as a spring bed-bottom. In the construction illustrated it will be noted that the fabric is composed of a series of longitudinal links or rods 12, having hook-shaped ends, which are preferably bent down upon the bodies of the blanks, as represented in Fig. 3, but which may be, if desired, left open, as illustrated in Figs. 5 and 8, and that these links and washers or gromets extend both longitudinally and transversely of the fabric to form a multiplicity of yielding squares or sections, the end gromets being connected, by the triangular rods 9, links 9', and spiral springs 6 and 7 described, to the longitudinal curved end plates 8, which may be secured to the frame by screws 8', as illustrated in Fig. 1. In virtue of this construction compensation is permitted for the inward springing of the wooden end bars, and sagging and rolling of the fabric toward the center is prevented, for, as is obvious, the curve of the end plates will cause the tension of the springs 6 and 7 at the middle portions of the ends of the fabric to be somewhat greater than that in said springs located between said middle portion and the terminations of the plates, and to secure the best results the springs 7 may be made of somewhat greater efficiency than the springs 6, whereby lighter and heavier springs are provided, which while permitting the fabric to yield and accomplish its function, yet will prevent undue sagging under any weight applied thereto.

At the sides of the fabric the washers or gromets 10 are flattened at 17, as illustrated in Fig. 1, so that there will be no interference with the side rails 18 18' of the bed-bottom.

In Fig. 2 a section of the fabric is shown connected to an end bar 20, (illustrated as an angle-iron,) a sleeve 21 projecting from said end bar and serving to receive the usual side rail of this form of bed-bottom. While the arrangement of springs shown is preferable, the invention is not limited thereto, for other devices for accomplishing the same purpose may be employed as substitutes for said springs.

In the construction described the various elements are so disposed that a large degree of elasticity and adaptability of the fabric is provided for, and, furthermore, this fabric may be readily rolled into compact form for transportation, and the washers or gromets will not yield or break, as is sometimes the case with the plain rings heretofore employed.

It will be noticed that the washer 10 is in

the form of a flanged hoop, the hoop portion, which is engaged directly by the links, being marked 10² at Figs. 3 and 6 and the flange portion 10', the latter contributing strength and reliability to the washer. It will be perceived that the hoop portion may be readily formed upon a metallic washer of ordinary type. The links, as at Fig. 3, are preferably bent abruptly down over the hoops, the upper edges of the latter being contiguous to the straight body portions of the links, whereby the pull upon the links comes at points nearly in line with said straight portions, thereby avoiding bending of the links when in use and also minimizing the tendency of the bends to open under the pull of the links, while at the same time there is freedom of pivotal action in up-and-down direction between the links and the washers. I am enabled to reduce the size of the wire used in the links, because the pull comes substantially in line with the body of the link, and hence a much weaker wire successfully withstands both the tendency to bend the link-body and also the tendency to open the hook, and the advantages gained by using thinner wire include not only the reduction in the cost of the wire, but also the greatly-increased facility with which the thinner wire may be formed into the required shapes. A further advantage is gained in that the metal of the thin wire can be bent much more sharply than thick wire by tools adapted to the manufacture of this class of fabric. Moreover, the weight of the mattress as a whole is reduced, which is a matter of considerable importance. It will also be seen that each link comprises a straight portion (marked 12 at Fig. 3) and a curved bow 12' at each end thereof, the bows being formed upon the under side of the links and, moreover, being bent abruptly down over the hoops, both the hoop and the flange portions of the washers being confined within said bows. It will be further observed that the links, which may be of various forms, are preferably spread, pressed out, or flattened at 14', so as to give the wire increased thickness in the planes of the hooks—that is to say, in vertical planes, this thickness occurring at the junction of the hooks with the body portions of the links, so as to increase the resistance offered by the bends to the longitudinal tension put upon the links when in use, thus reducing the liability of the bends to open, to which fault links used in wire mattresses are peculiarly liable. By reason of this widening and consequent stiffening of the bends it is possible to use even smaller wire than could otherwise be employed, and in view of the advantages above pointed out in regard to reduction in size of the wire it will be seen that the spreading of the metal at the bends confers many advantages.

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

Having thus described the invention, what I claim is—

1. The improved metallic fabric herein described, consisting of the combination of sets of links and washers or gromets, the latter having concave peripheries and convex inner walls, and each link consisting of a blank bent into hook form at its ends and stiffened at the bends and assembled in interlocking engagement with the washers, whereby the link stress is taken directly by the stiffened bends of the links, and said links are afforded a sliding and rocking motion upon the washers, substantially as set forth.

2. A metallic fabric composed of washers or gromets having wide convex inner surfaces of less curvature than a circle having a diameter equal to the chord of such convex surface, and links the ends of which are bent around such surfaces to form concaved engaging surfaces conforming to such convex surfaces throughout a considerable area thereof, whereby such links have several points of contact with such convex surfaces, the construction being such that said links may slide and rock upon such surfaces when strain is applied to the fabric, substantially as described.

3. A metallic fabric composed of washers or gromets having inner surfaces differing in formation from the outer opposing surfaces thereof and of contour in cross-section a segment of a circle less than a semicircle, and links the ends of which are bent around such inner surfaces, the construction being such that said links engage such inner surfaces on a curve of less projection than a circle having a diameter equal to the chord of such curve, substantially as described.

4. A metallic fabric composed of washers or gromets, having convex inner surfaces in cross-section less than a semicircle and concaved outer opposing surfaces, and a stiffening-flange; and links the ends of which are bent around such inner surfaces and at such bend inscribe a curve less than a semicircle.

5. The combination in a metallic fabric, of rings and links, the links having sharp bends over the rings and all of the bends being upon the under side of the links, whereby the draft upon the links will come close to the bends and at a point nearly in line with the straight metal of the links.

6. The combination in a metallic fabric, of a plurality of rings and links, each link comprising a straight portion and a hooked portion at each end, said hooked portions being bent sharply from said straight portion, and the ring comprising a portion for engaging the sharp bend of the link at a point nearly in line with the straight metal of the link.

7. A metallic fabric comprising washers connected by straight links, each washer being in the form of a flanged hoop; the links bending abruptly down over the hoops, and the upper edges of the hoops being contiguous

ous to the straight portions of the links, the draft upon the links coming at points nearly in line with said straight portions, to avoid bending of the hooks when in use.

- 5 8. A metallic fabric comprising washers connected by wire links, each washer being in the form of a flanged hoop, each link comprising a straight body portion bent at its ends upon its under side to form bows; the
10 bows being bent abruptly down over the hoops, and the upper edges of the washers

being contiguous to the unbent portions of the links, so that the draft upon the links may come at points nearly in line with said unbent portions, and both the hoop and flange 15 portions of the washers being confined within said bows.

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