

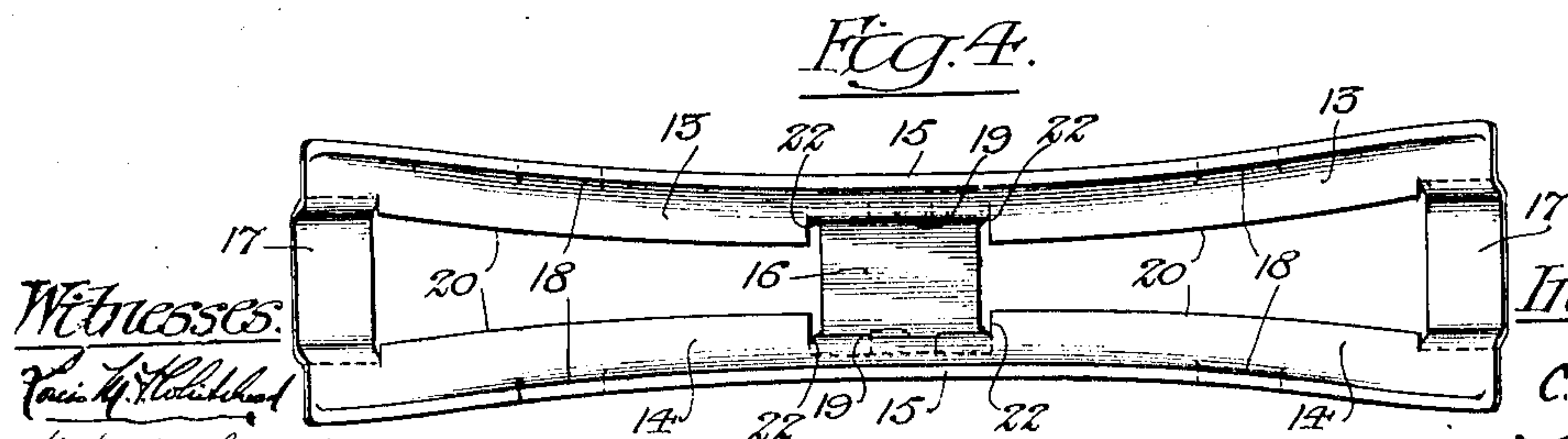
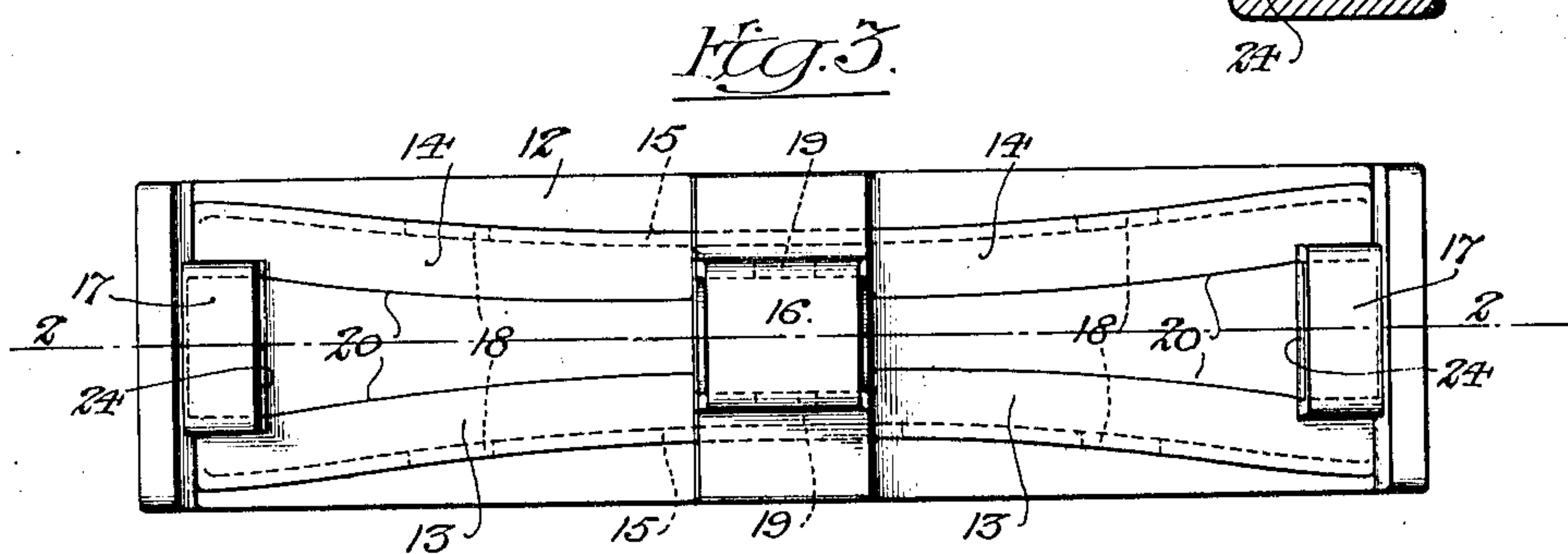
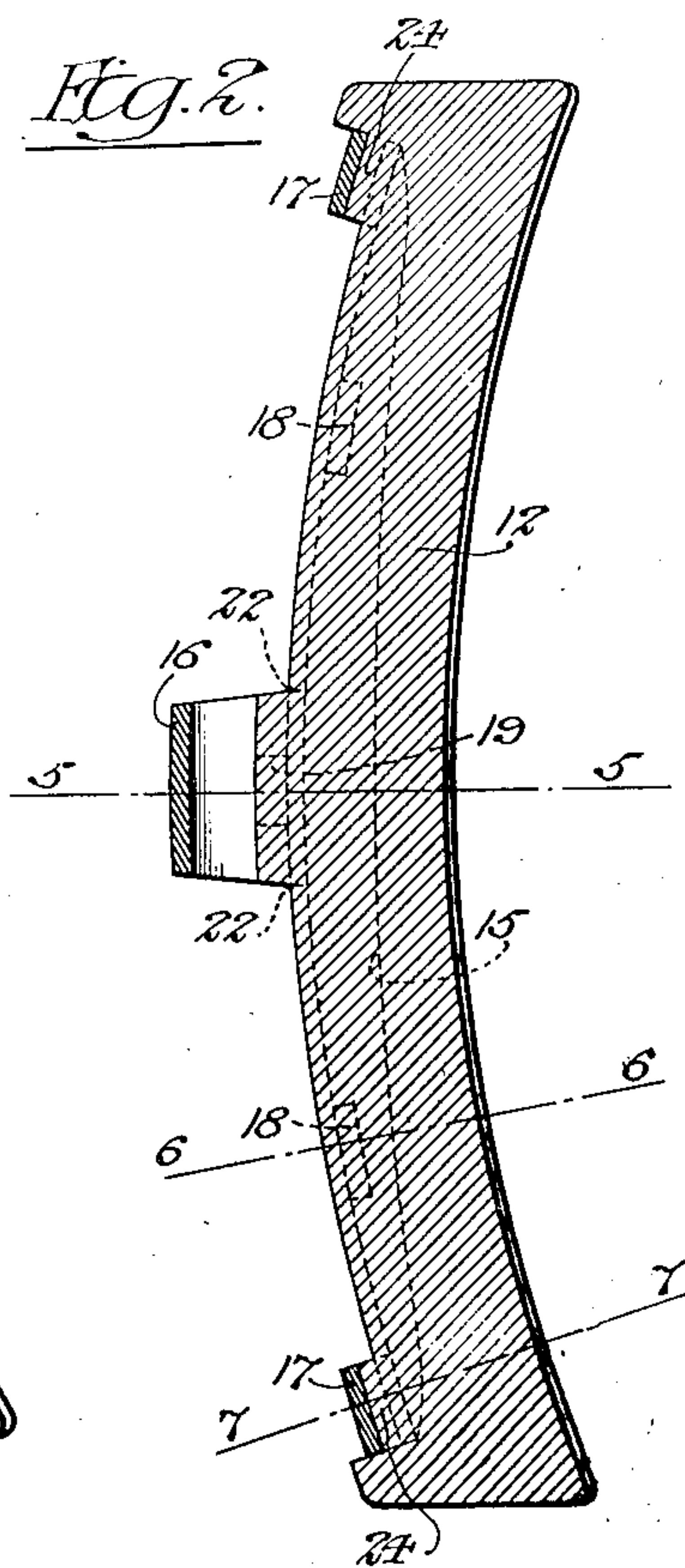
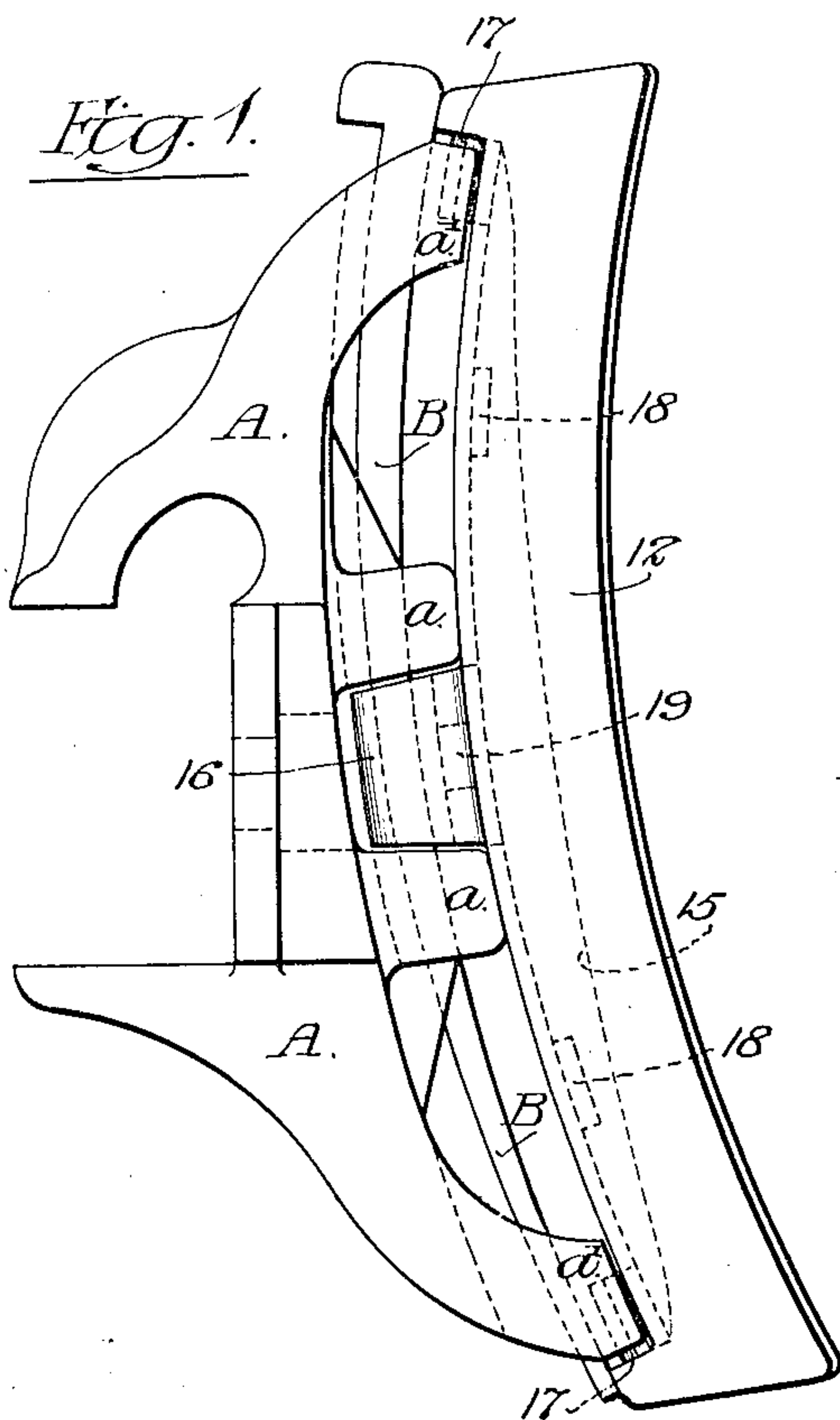
No. 892,883.

PATENTED JULY 7, 1908.

C. D. PETTIS.
BRAKE SHOE.

APPLICATION FILED MAR. 30, 1908.

3 SHEETS—SHEET 1.



Witnesses:

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3 SHEETS—SHEET 2.

Fig. 5.

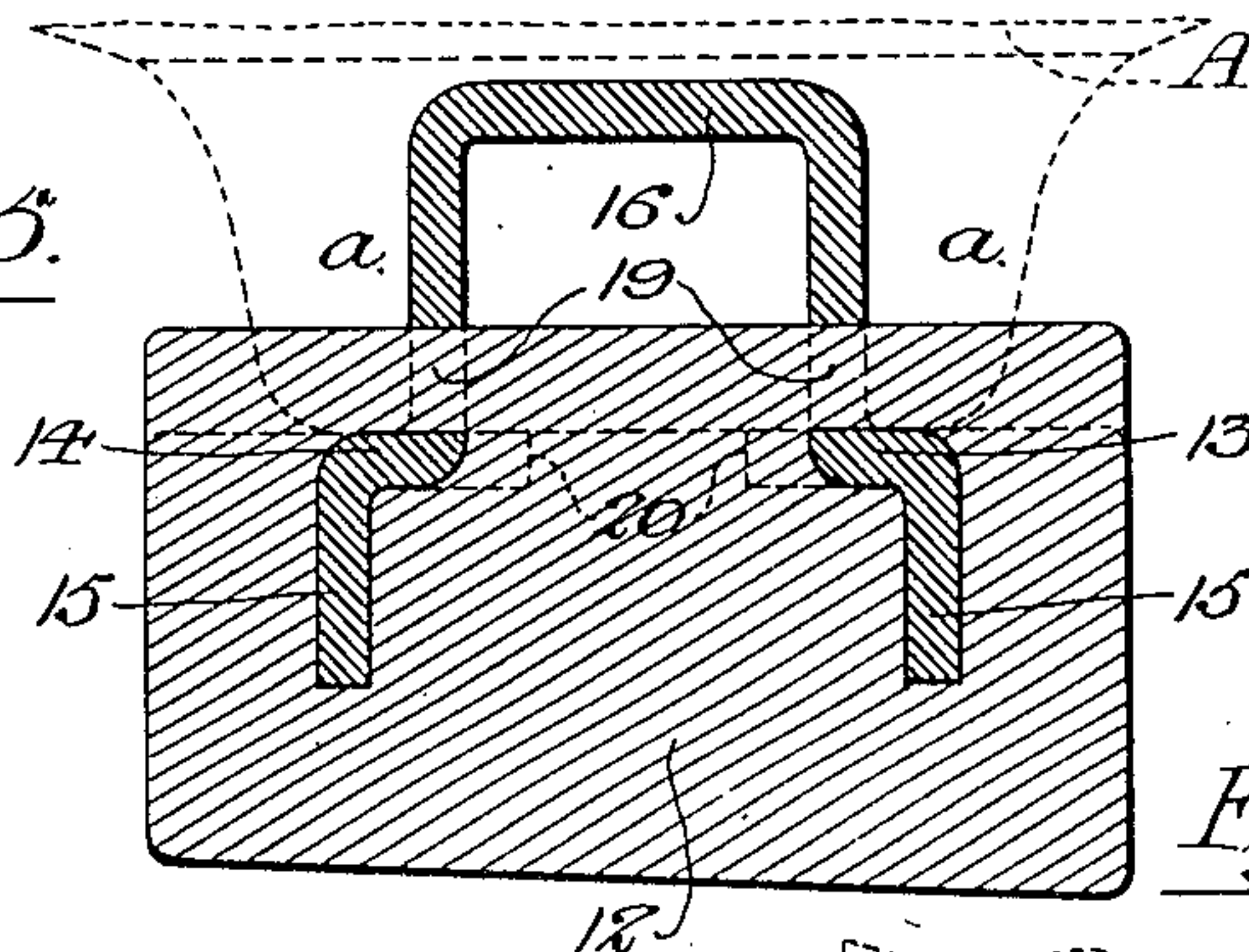


Fig. 6.

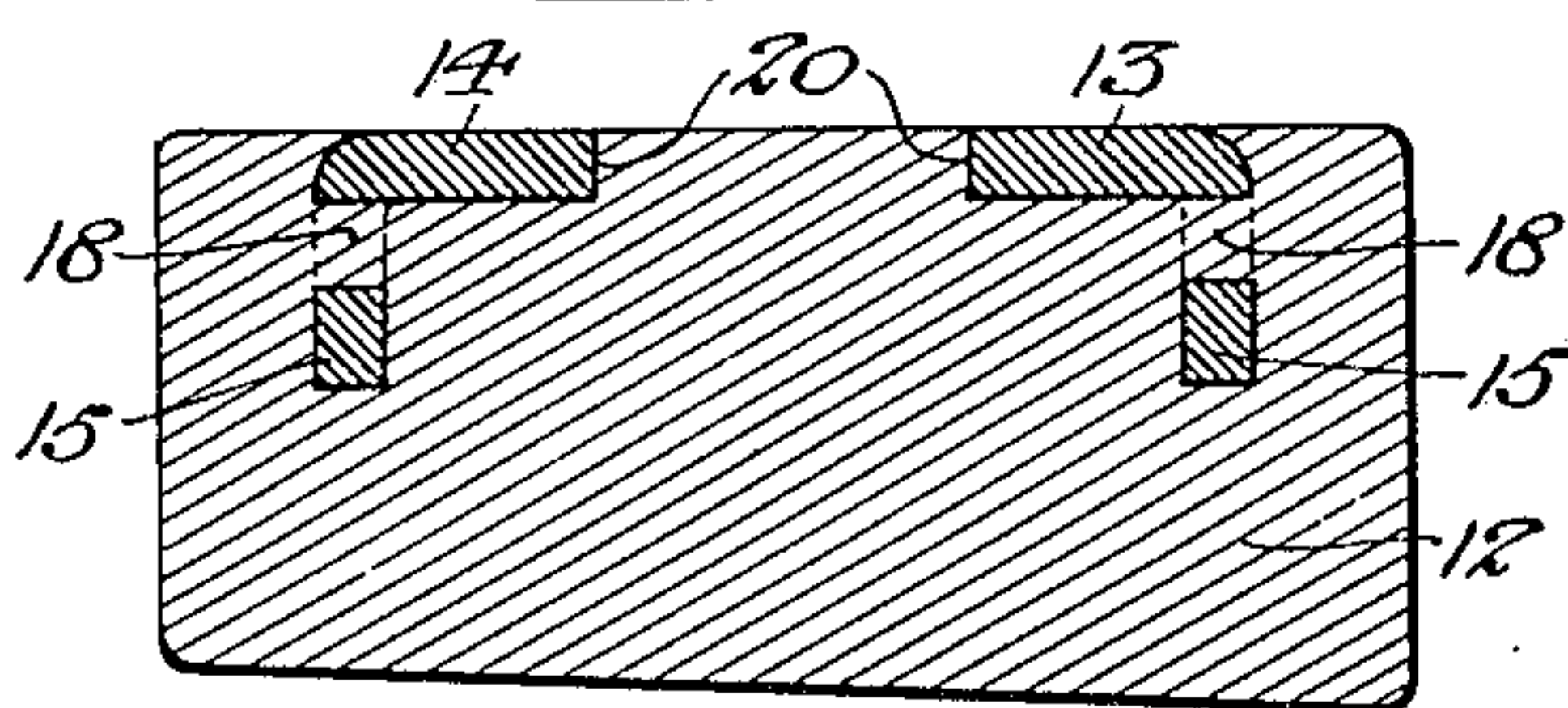


Fig. 7.

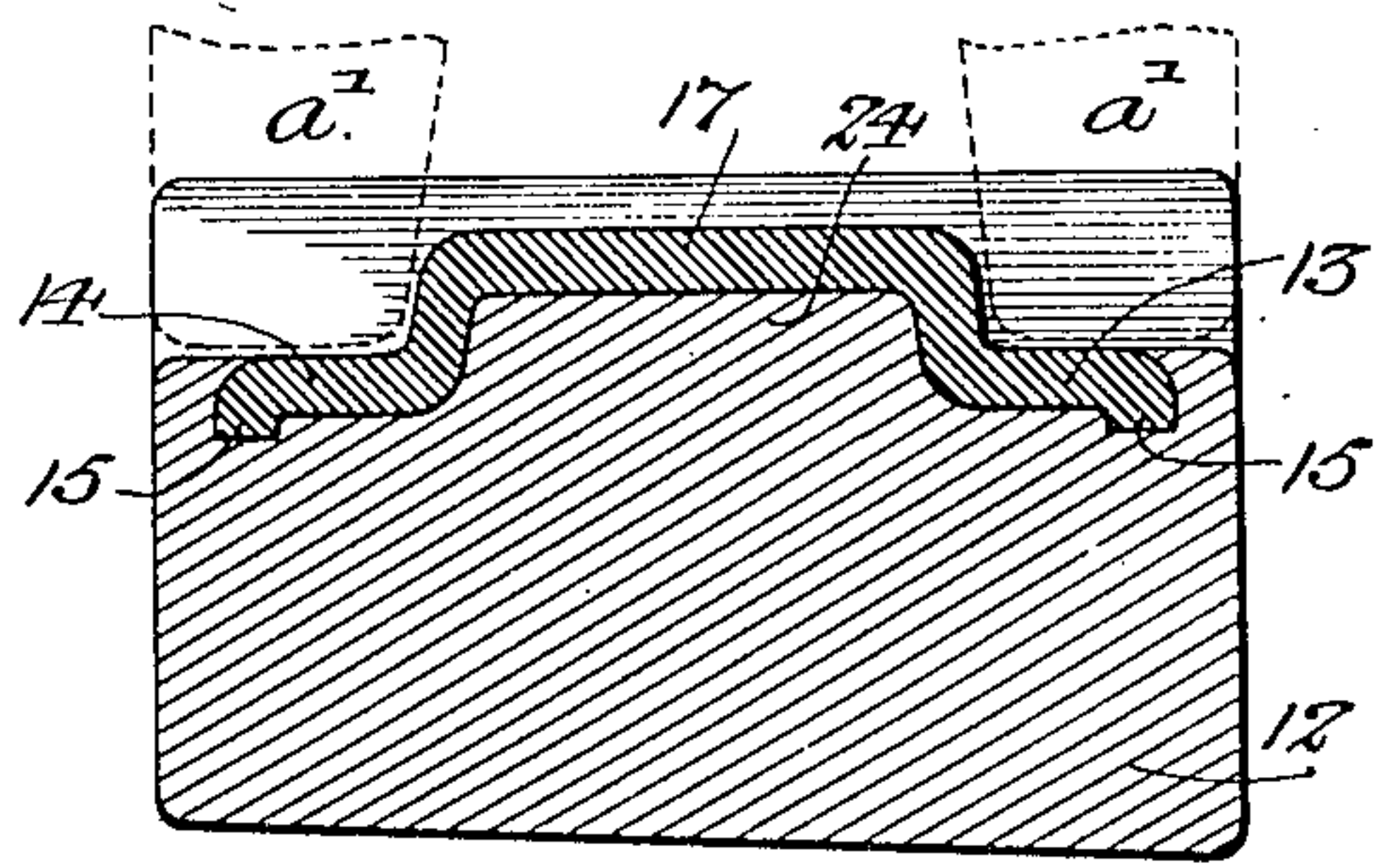


Fig. 8.

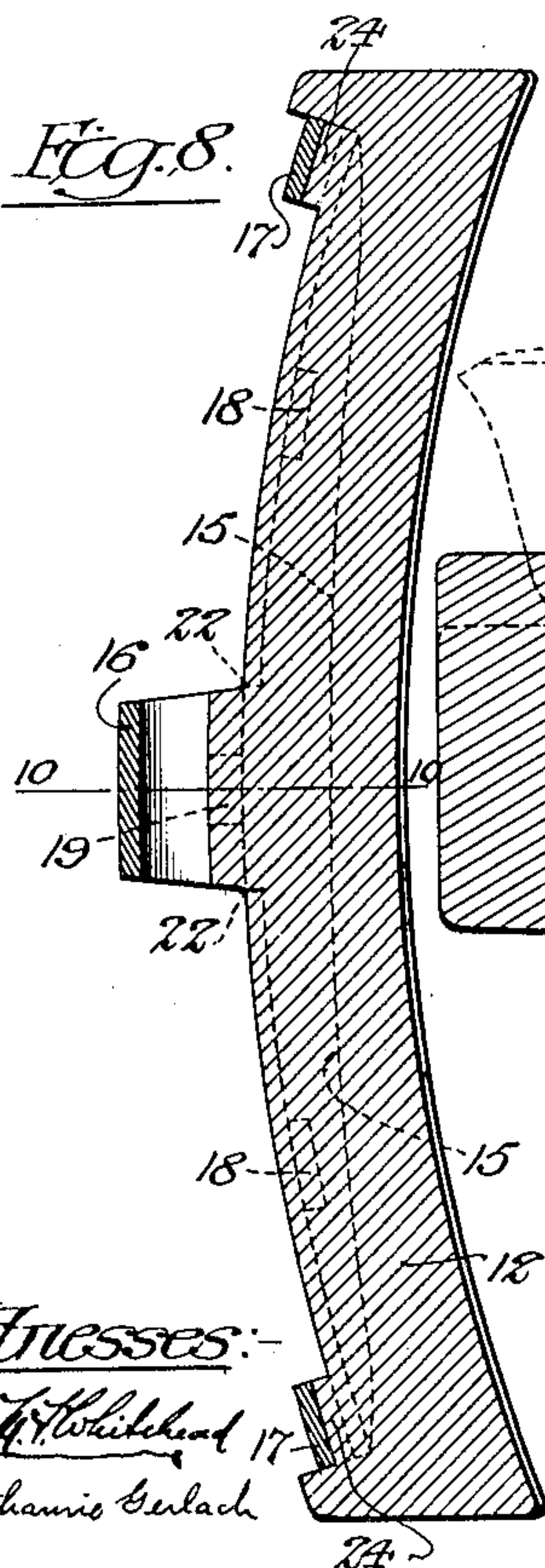


Fig. 10.

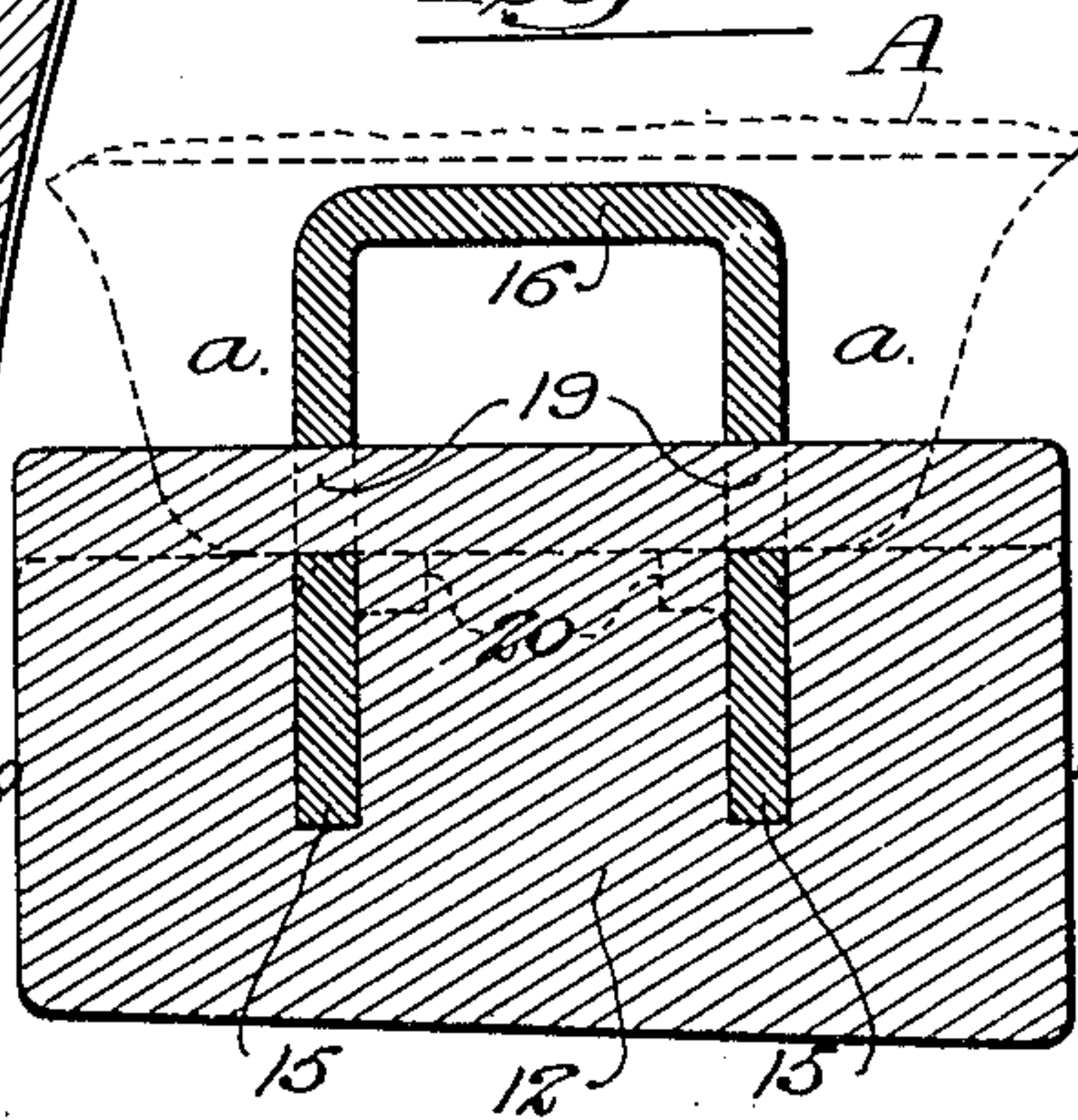
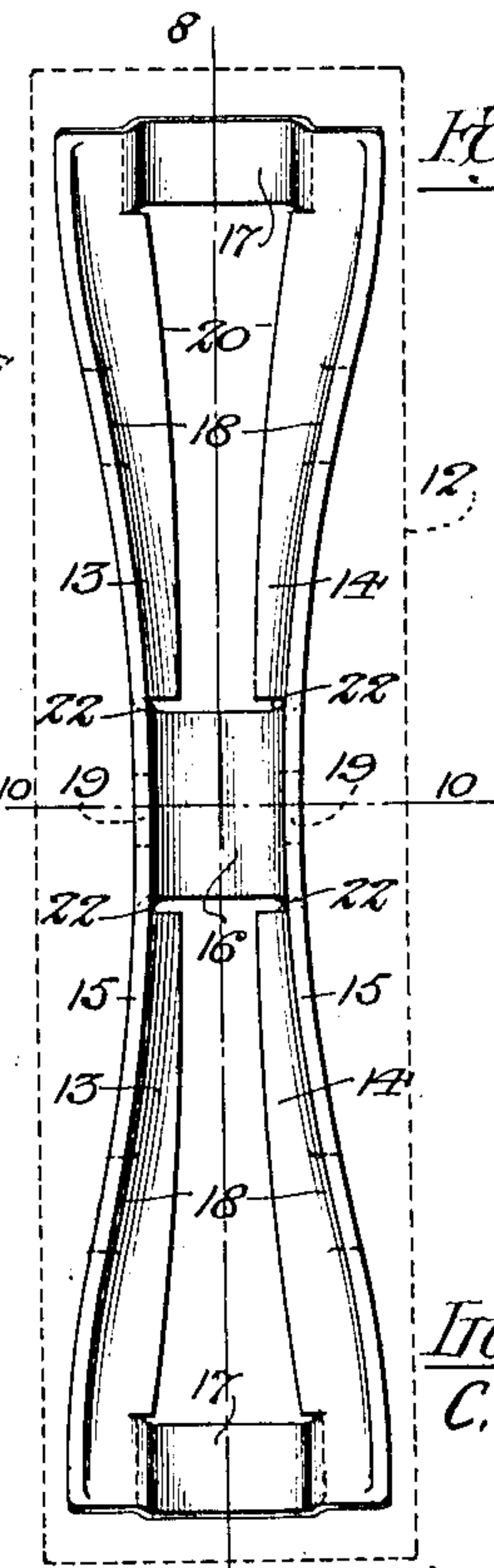


Fig. 9.



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No. 892,883.

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C. D. PETTIS.
BRAKE SHOE.

APPLICATION FILED MAR. 30, 1908.

3 SHEETS—SHEET 3.

Fig. 11.

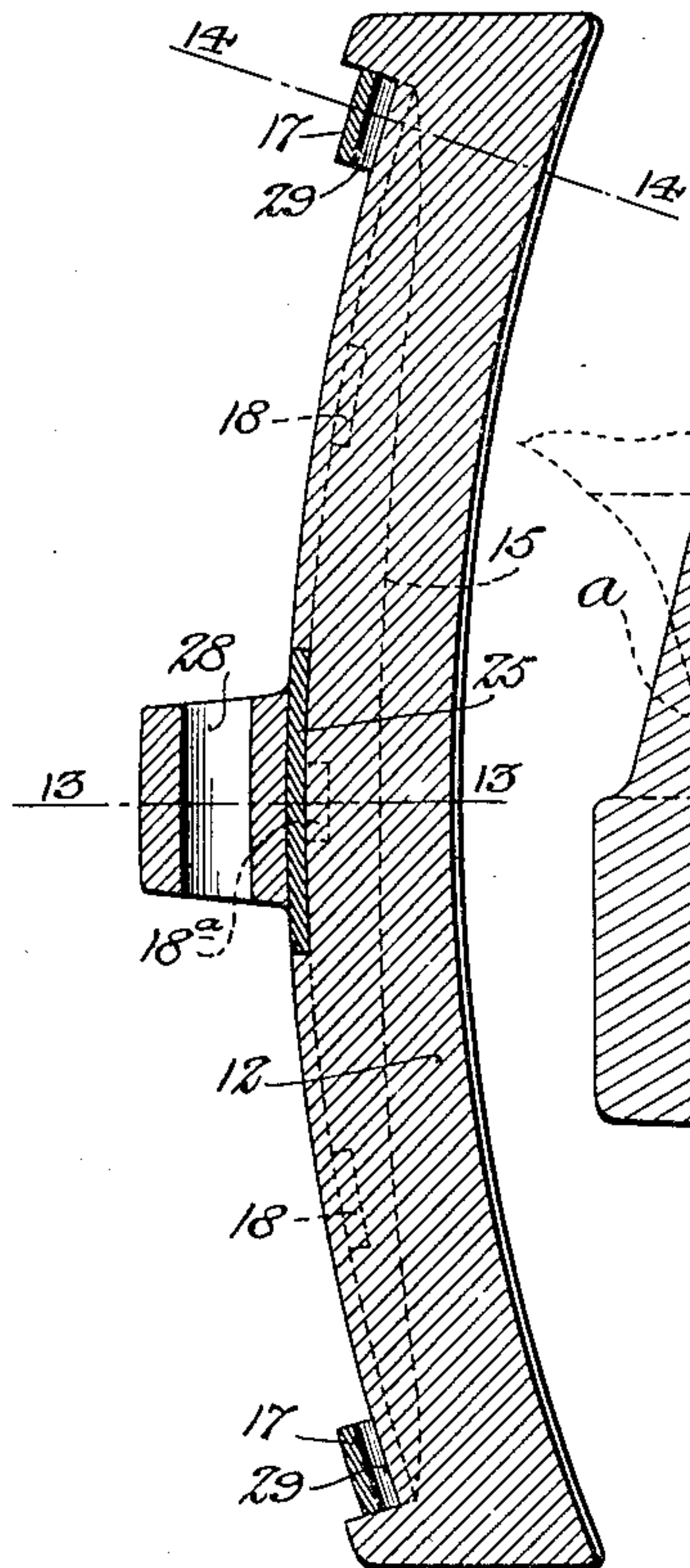


Fig. 13.

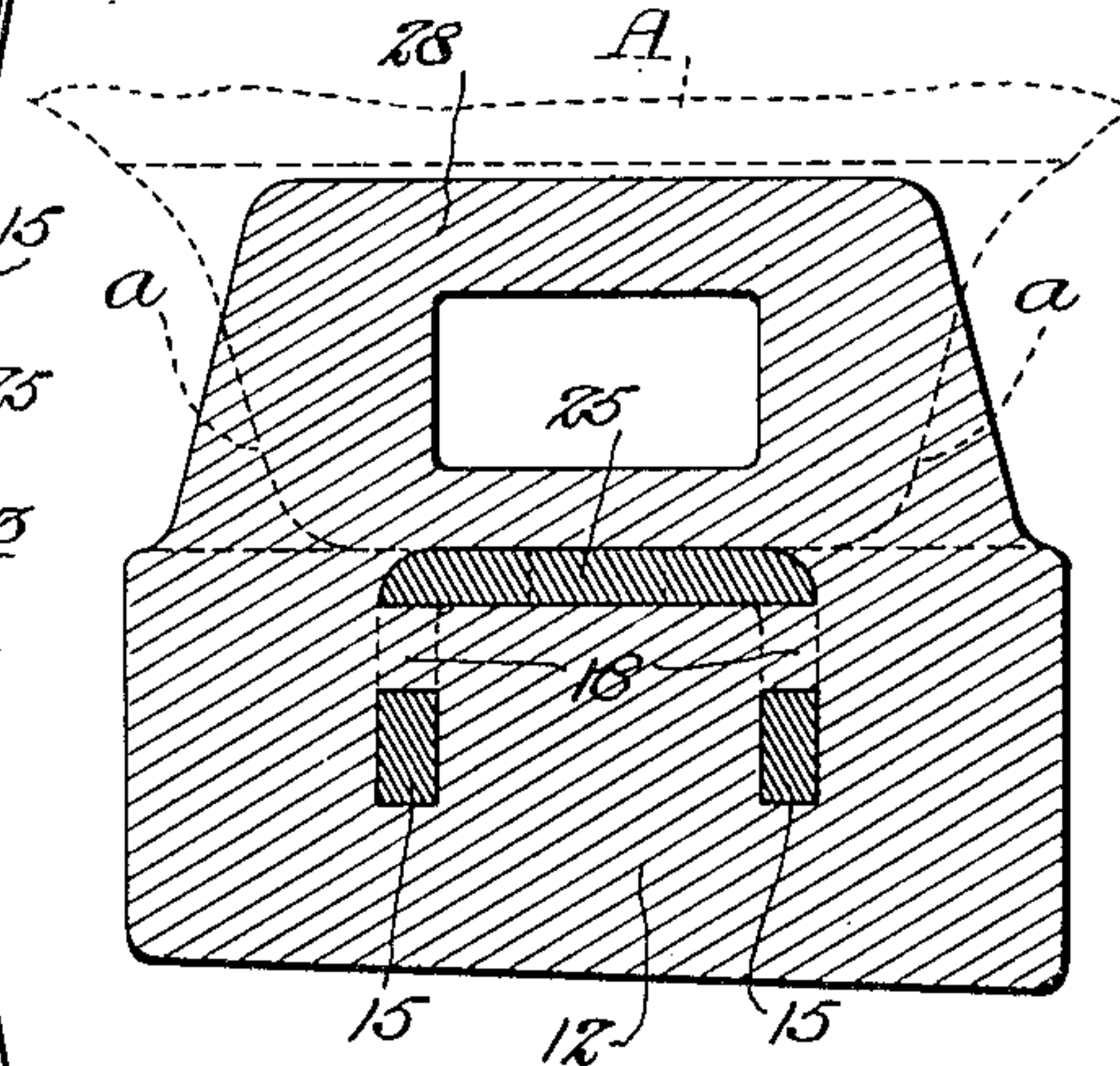


Fig. 12.

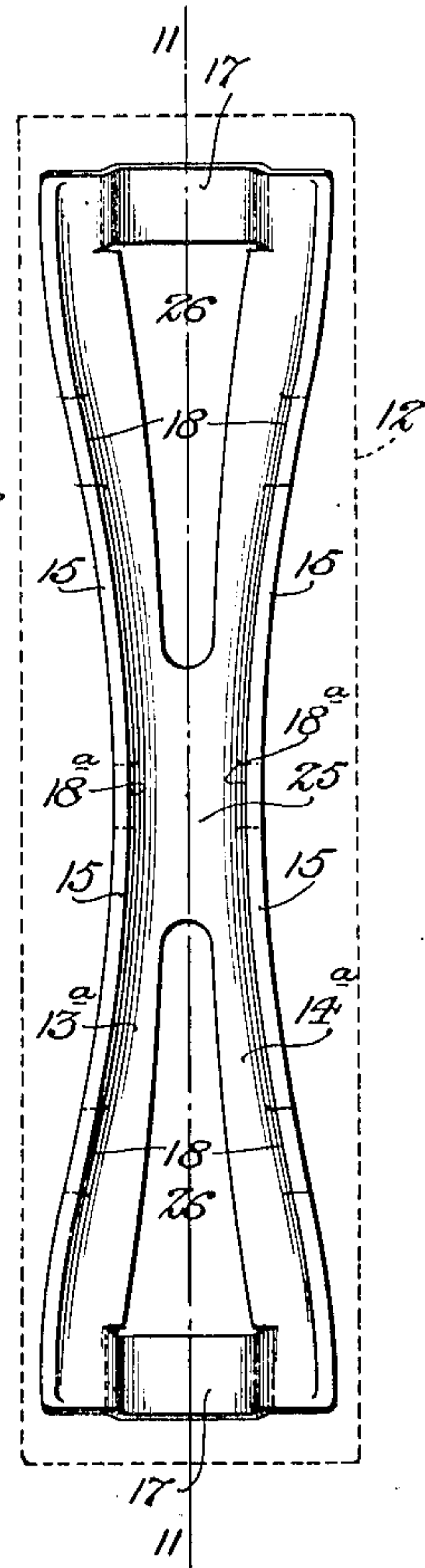
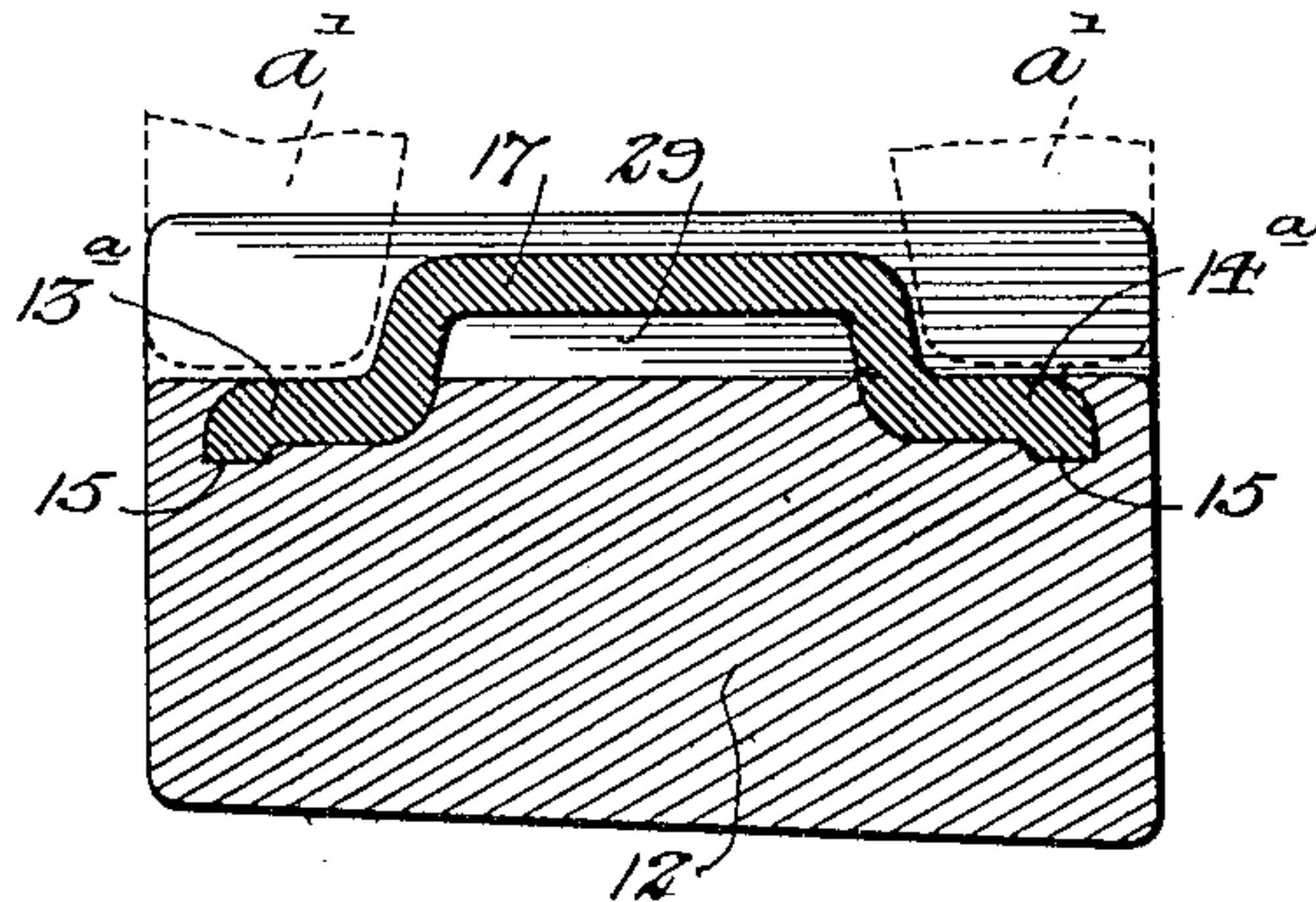


Fig. 14.



Witnesses:-

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Inventor:-

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UNITED STATES PATENT OFFICE.

CLIFTON D. PETTIS, OF CHICAGO, ILLINOIS.

BRAKE-SHOE.

No. 892,883.

Specification of Letters Patent.

Patented July 7, 1908.

Application filed March 30, 1908. Serial No. 424,122.

To all whom it may concern:

Be it known that I, CLIFTON D. PETTIS, a citizen of the United States, and a resident of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Brake-Shoes, of which I do declare the following to be a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

The invention has relation more particularly to that class of brake shoes in which a strip or plate of soft steel or like ductile metal is united to the cast iron body of the shoe in the casting operation; this type of shoe being commonly designated as "composite" or "steel back" shoes.

The object of this invention is to provide a brake shoe that shall have not only the advantages incident to the most favored types of composite shoes now upon the market, but shall also possess far greater strength and durability than any of such shoes with which I am familiar.

The invention consists in the features of improvement hereinafter described, illustrated in the accompanying drawings and particularly pointed out in the claims at the end of this specification.

The annexed drawings illustrate a brake shoe which I regard as the preferred embodiment of the invention. It will be readily understood, however, that individual features of the invention may be employed with marked advantage and without the adoption of the structure as an entirety, and that the details of structure may be varied without departure from the spirit of the invention. Therefore, I do not wish my invention to be understood as restricted to the precise structure shown, and I shall, therefore, in the claims at the end of this specification, point out the features which are regarded as characteristic of my invention.

Figure 1 is a view in side elevation of a brake shoe embodying my invention, this shoe being shown as mounted upon a brake-head of the Master Car Builders' type. Fig. 2 is a view in longitudinal section on line 2—2 of Fig. 3. Fig. 3 is a back view of the brake shoe. Fig. 4 is a detail face view of the back plate or skeleton of my improved shoe. Fig. 5 is an enlarged cross section on line 5—5 of Fig. 2. Fig. 6 is an enlarged cross section on line 6—6 of Fig. 2. Fig. 7 is an enlarged cross section on line 7—7 of Fig.

2. Fig. 8 is a view in longitudinal section on line 8—8 of Fig. 9. Fig. 9 is a face view showing one form of the back plate, the body of the shoe being indicated in outline. Fig. 10 is an enlarged view in cross section on line 10—10 of Fig. 8. Figs. 11, 12 and 13 are views similar to Figs. 8, 9 and 10, but showing a modified construction embracing features of the invention. Fig. 14 is an enlarged transverse section on line 14—14 of Fig. 11.

My improved brake shoe comprises a cast metal body 12 and a strengthening back which, preferably, is formed from a single plate of soft steel or like ductile metal that will be united with the cast metal body of the shoe in the casting operation.

In the preferred form of the invention illustrated in the drawings, the strengthening back consists of two side portions 13 and 14, each having an inwardly extending flange 15, these side portions 13 and 14 being united together centrally by the key lug or loop 16 and at their ends by the guide lugs 17, the several lugs being formed integral with the side portions 13 and 14 of the back plate. The side flanges 15 preferably extend from end to end of the back plate of the shoe, these flanges having their greatest depth at the center of the shoe and diminishing in depth therefrom towards their ends. By thus forming the side flanges 15, the greatest strength is given to the back of the shoe at the center, at which point the most severe strain is imparted to the shoe when the brakes are applied, the strain diminishing from the center towards the ends of the shoe. In other words, each of the side flanges 15 thus shaped forms a truss with its greatest strength at the point of greatest strain. The advantage of thus shaping the side flanges will be readily understood by reference to Fig. 1 of the drawings, where it will be seen that the brake-head A exerts its main pressure upon the shoe through its central lugs a that bear upon the back of the shoe at each side of the key lug 16. The flanges 15 of each of the side portions 13 and 14 are preferably formed with perforations 18 at two or more points throughout their length to permit the cast metal, of which the body of the shoe is formed, to flow freely through the perforations and interlock with the flanges at opposite sides thereof. Similarly, perforations 19 are formed at the base of the side walls of the lug 16, into which perfora-

tions the cast metal of the body of the shoe will freely flow in the casting operation. The side portions 13 and 14 are separated by the opening or cut-away space 20 that extends
 5 between the end lugs 17 and this cut-away space 20 is of greatest width adjacent the end lugs and diminishes in width towards the center of the shoe. The center lug 16 and the end lugs 17 are stamped outwardly from
 10 the plate and, as shown, the top webs of the side portions 13 and 14 are slit as at 22 so as to permit the side walls of the central lug 16 to rise from points outside the inner edges of the side portions 13 and 14. This location
 15 of the central lug is advantageous in that it brings parts of the side portions 13 and 14 opposite the key B which unites the brake shoe to the brake-head A. The angular side portions 13 and 14 are reversely bent or
 20 curved, being brought nearest together at the center of the shoe and flaring outwardly therefrom towards its ends. This reverse bending of the side portions 13 and 14 is attended with the following, among other ad-
 25 vantages: First, the reverse bending of the side portions 13 and 14 brings the outer walls of these side portions sufficiently near together at the center of the shoe to permit an ample quantity of the cast metal, comprising
 30 the body of the shoe, to flow on the outside of these side portions; and, as this metal sets and shrinks after the casting operation, it insures a firmer bond or union between the cast metal and the back plate of the shoe;
 35 second, the reverse bending of the side portions produces a considerable divergence of the flanges 15 from their centers towards their ends, and, when the shoe is worn, this gives a width of contact surface between the
 40 edges of these flanges and the car wheel equal to the altitude of the angle of such divergence measured at the center line of the flanges, thereby avoiding any danger of cutting or grooving a wheel, incident to the
 45 contact therewith of a narrow metal plate; third, the reverse bending or divergence of the strips or flanges 15 causes the central portions of these strips to be brought to points opposite the central lugs *a* of the
 50 brake-head and causes the end portions of the strips to be brought opposite the end lugs *a'* of the brake-head, giving the greatest strength to those portions of the shoe to which the severest and most direct strain is
 55 applied. And it is obvious that this reverse bending or divergence of the strips or flanges 15 would be advantageous even if the upper parts or side portions 13 and 14 were not employed; in other words, a material advantage would result from the employment of
 60 reversely bent or diverging plain or flat strips set on edge and so arranged as to extend beneath or at points opposite the end and central lugs of a brake-head.

65 In a subsequent part of this specification I

have described and illustrated how certain features of the invention may be employed without its adoption as an entirety, although it will be obvious that other modifications may be made by the skilled mechanic which
 70 will embody to a greater or less extent material features of the invention. The brake shoe above described serves to illustrate, however, what I regard as the preferred form of the invention in its entirety. 75

In the preferred manner of forming the back of my improved shoe, a plate of metal is first cut to form the open space 20 of materially greater width than the distance be-
 80 tween the side portions in the finished shoe; and, by means of suitable dies, the central lug 16 and end lugs 17 are stamped or struck outward, thereby drawing together more closely the side portions 13 and 14, and, as the central lug is formed of greater height
 85 than the end lugs, the side portions 13 and 14 are drawn more closely together at their centers. By the action of the dies, the side flanges 15 are also formed and a longitudinal curvature is given to the back corresponding
 90 in general outline to that desired in the finished shoe. When the back plate has been thus shaped, it will be set within the mold and the cast metal that is to comprise the
 95 body of the shoe will be poured upon it, this metal flowing between and outside of the side flanges 15 of the back into the open space 20 of the back and through the perforations 18 and 19 formed respectively in the
 100 side flanges 15 and in the walls of the central lug 16. If desired, the cast metal may be allowed to flow into the crown of the end lugs 17, as shown at 24 in Fig. 2 of the drawings, although this is not necessary, as the end
 105 lugs 17 will have ample strength without such reinforcement of cast metal. If it is not desired to permit the metal to flow into the crowns of the end lugs 17, cores or sand may be placed in such spaces prior to the
 110 casting operation in the same manner as a core or sand would be filled into the crown of the central lug 16 as far as the perforations 19. These details of the casting operation will be readily understood by those familiar
 115 with the manufacture of composite brake shoes of the type to which my invention relates.

When the casting operation has been completed, the finished structure will be as shown in Figs. 1, 2, 3, 5, 6, and 7 of the drawings; that is to say, the cast metal comprising the
 120 body of the shoe, will have embedded therein the flanges 15 and top plates of the side portions 13 and 14 and will extend a slight distance about the side walls of the central
 125 lug 16 and, if desired, will extend, as at 24, into the crowns of the end lugs 17 and across the other ends of these lugs, as shown. The increased strength of the shoe, incident to the features of my invention, will be found 130

to endure throughout the entire life of the shoe, since the inwardly projecting flanges 15 will last and will be firmly interlocked with the cast metal body until the shoe is entirely worn down to the thickness of the body portion of the back. In my improved brake shoe, the back thus not only serves as a most effective means of holding together the cast metal body of the shoe in case of fracture, but, because of the peculiar construction of the back, it imparts a far greater degree of rigidity to the shoe, thus enabling it to resist severe strains, even after a large part of the cast metal body has been worn away.

In the modified form of the invention illustrated in Figs. 8, 9 and 10 of the drawings, the structure of the back plate is in the main the same as that hereinbefore described, but in this form of the invention the side portions of the back of the shoe are drawn more nearly together and the walls of the central lug 16 extend in line with the side flanges 15 instead of being inset therefrom, as in the form of the invention illustrated in the preceding figures of the drawings. Other modifications of the invention will readily suggest themselves to those familiar with this type of brake shoe. Thus, in Figs. 11-14 is illustrated a brake shoe in which a strengthening back is formed with inwardly projecting strips or flanges 15, similar to those hereinbefore described, and in which the side portions 13^a and 14^a are connected together centrally as at 25, leaving cut-away spaces 26 extending from the central portion 25 to the raised end lugs 17 of the back plate. In this embodiment of the invention, the strips or flanges 15 are provided with perforations 18 and also with perforations 18^a at their centers. The central lug 28 in this last described shoe, is formed of the cast metal whereof the body of the shoe is composed. And, in forming this shoe, the cast metal is not allowed to run into the end lugs, but open spaces 29 are left beneath the crowns of such lugs, as shown in Fig. 14 of the drawings.

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

1. A brake shoe of the character described, comprising a cast metal body having embedded therein inwardly projecting, longitudinal strips, said strips being nearest each other at the central portion of the shoe and diverging thence towards the ends of the shoe.

2. A brake shoe of the character described, comprising a cast metal body having embedded therein reversely bent or diverging strips, said strips being drawn centrally toward each other to points opposite the central lugs of the brake-head, and diverging thence to points opposite the end lugs of the brake-head.

3. A brake shoe of the character de-

scribed, comprising a cast metal body having embedded therein longitudinal strips, said strips being nearest each other at the central portion of the shoe and diverging towards the ends of the shoe, said strips being united by an integral connection.

4. A brake shoe of the character described, comprising a cast metal body having embedded therein longitudinal strips, said strips being nearest each other at the central portion of the shoe and diverging towards the ends of the shoe, said strips being united together by integral connections at their ends and center.

5. A brake shoe of the character described, comprising a cast metal body having embedded therein longitudinal strips, said strips being nearest each other at the central portion of the shoe and diverging towards the ends of the shoe, said strips being united together by one or more raised lugs integral with said strips.

6. A brake shoe of the character described, comprising a cast metal body having embedded therein inwardly projecting, longitudinal strips, said strips being nearest each other at the central portion of the shoe and diverging thence towards the end of the shoe and being widest at the center and diminishing towards the end of the shoe.

7. A brake shoe of the character described, comprising a cast metal body and a back of ductile metal having side portions provided with one or more inwardly projecting flanges widest at the center and diminishing towards the end of the shoe.

8. A brake shoe of the character described, comprising a cast metal body and a back of ductile metal having side portions provided with inwardly projecting flanges extending substantially from end to end of the back, said flanges being nearer each other at the center than at the ends.

9. A brake shoe of the character described, comprising a cast metal body having embedded therein a back of ductile metal having angular side portions, the inwardly projecting parts of said side portions diverging from the central part of the shoe towards the ends thereof.

10. A brake shoe of the character described, comprising a cast metal body and a back of ductile metal comprising two longitudinally extending side portions having inwardly extending flanges and a raised central lug formed integral with said side portions.

11. A brake shoe of the character described, comprising a cast metal body and a back of ductile metal comprising two longitudinally extending side portions of angular outline connected by an offset central lug, said side portions being separated and forming a space that is filled by the body metal, said side portions being drawn in about the

center and flaring towards the ends of the shoe.

12. A brake shoe of the character described, comprising a cast metal body, longitudinally extending side portions or strips embedded in said cast metal body, and a lug formed integral with said side portions or strips, said lug being formed with openings in its walls to receive the cast metal of the body.

13. A brake shoe of the character described, comprising a body of cast metal having embedded therein a back formed of a single piece of ductile metal, cut-away longitudinally and centrally to form separate side portions and having integral therewith a raised central lug and raised end lugs.

14. A brake shoe of the character described, comprising a cast metal body having

embedded therein a strengthening back comprising two longitudinal bars connected at their centers by an integral lug, said lug rising from said bars at points nearer the outer sides of the back than are the opposing edges of said side bars.

15. A brake shoe of the character described, comprising a cast metal body and a strengthening back of ductile metal, said back being provided with an inwardly projecting strip extending longitudinally of the shoe, the central portion of said strip being nearest the longitudinal center of the shoe and the end portions of the strip diverging thence towards the ends of the shoe.

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Witnesses:

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