

No. 764,891.

PATENTED JULY 12, 1904.

C. E. HEQUEMBOURG.
WHEEL.

APPLICATION FILED DEC. 17, 1903.

NO MODEL.

4 SHEETS—SHEET 1.

Fig. 1.

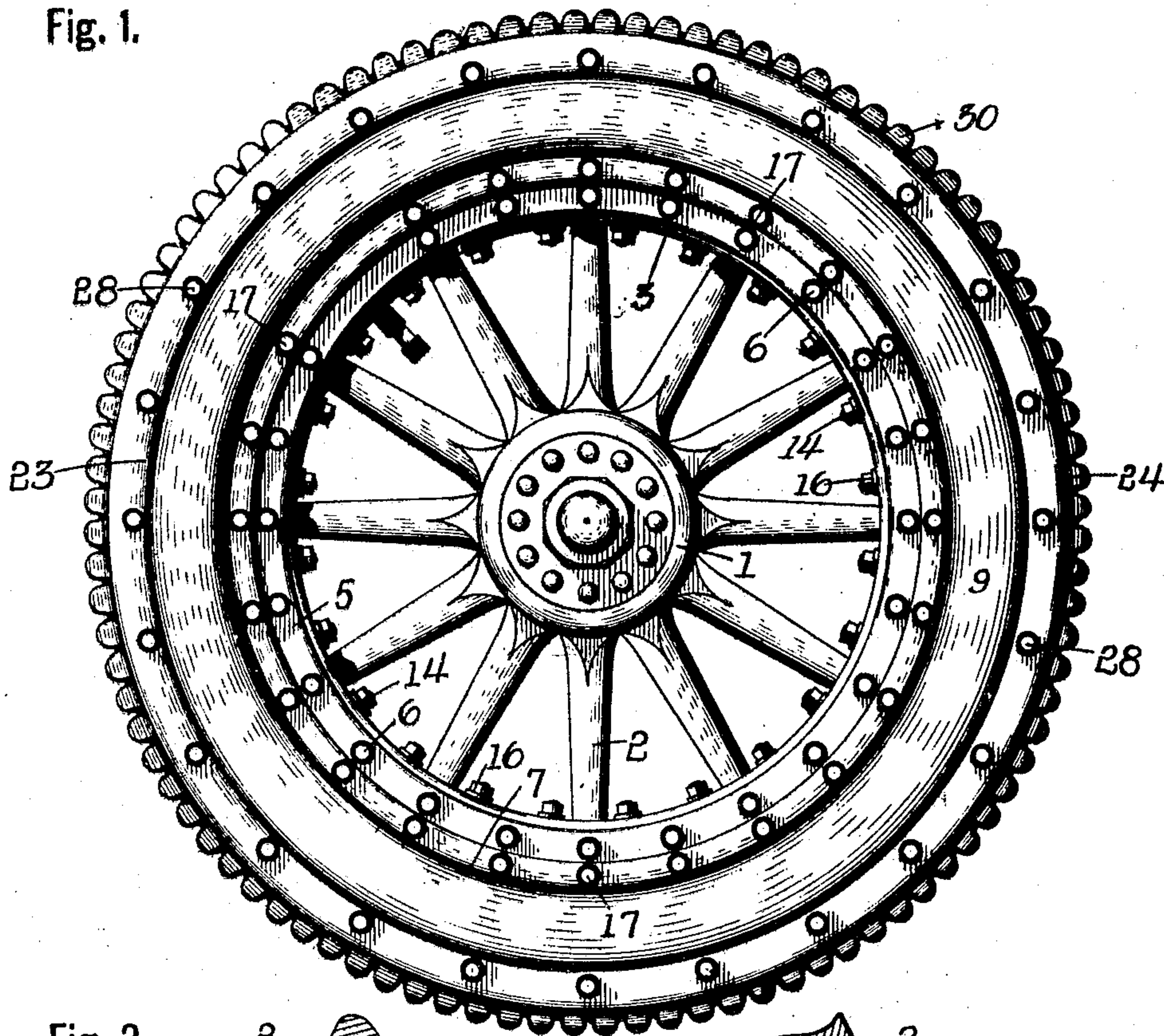
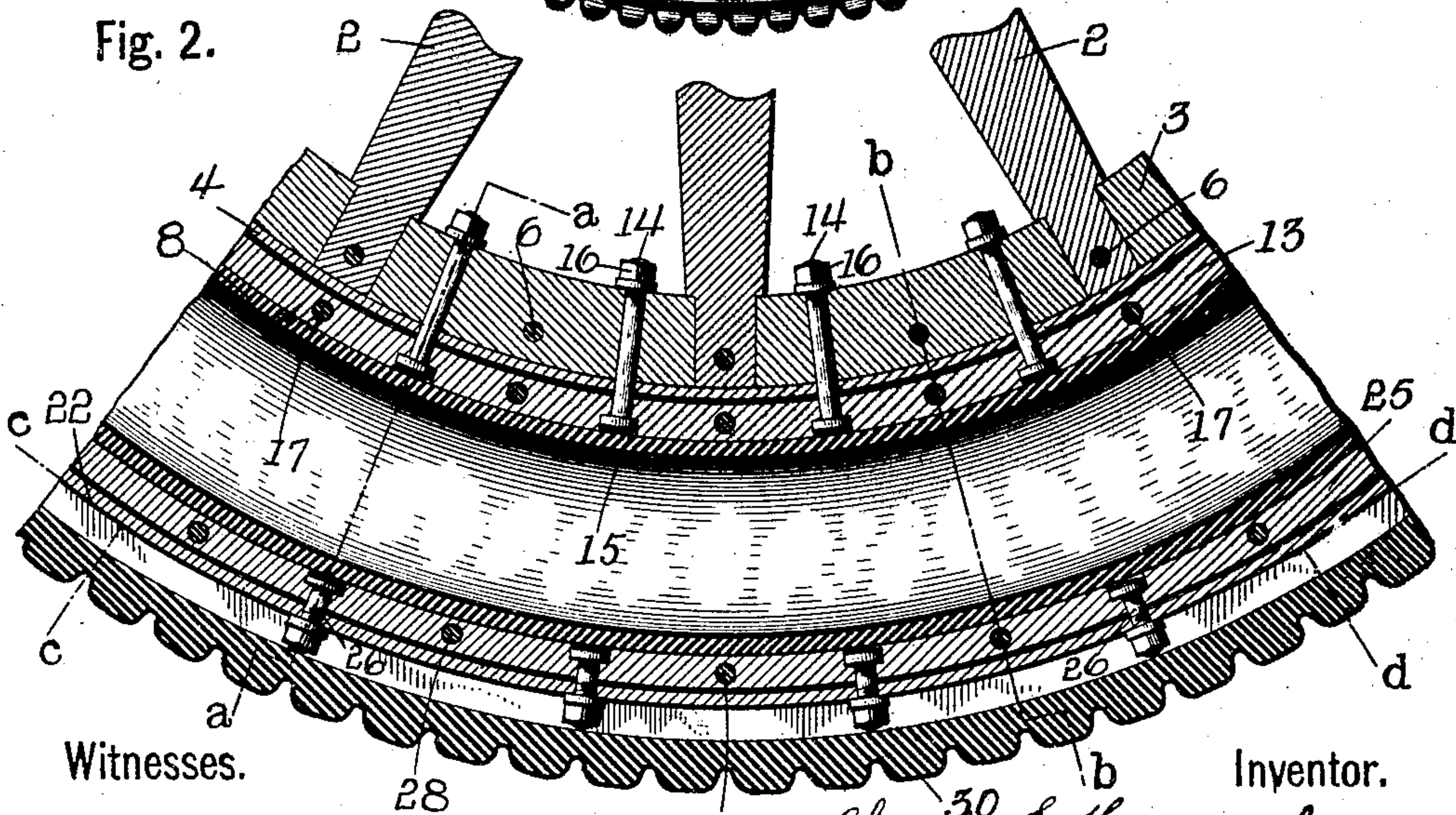


Fig. 2.



Witnesses.

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Geo. A. Neubauer.

Inventor.

By Charles E. Hequembourg.
A. J. Langster, Attorney.

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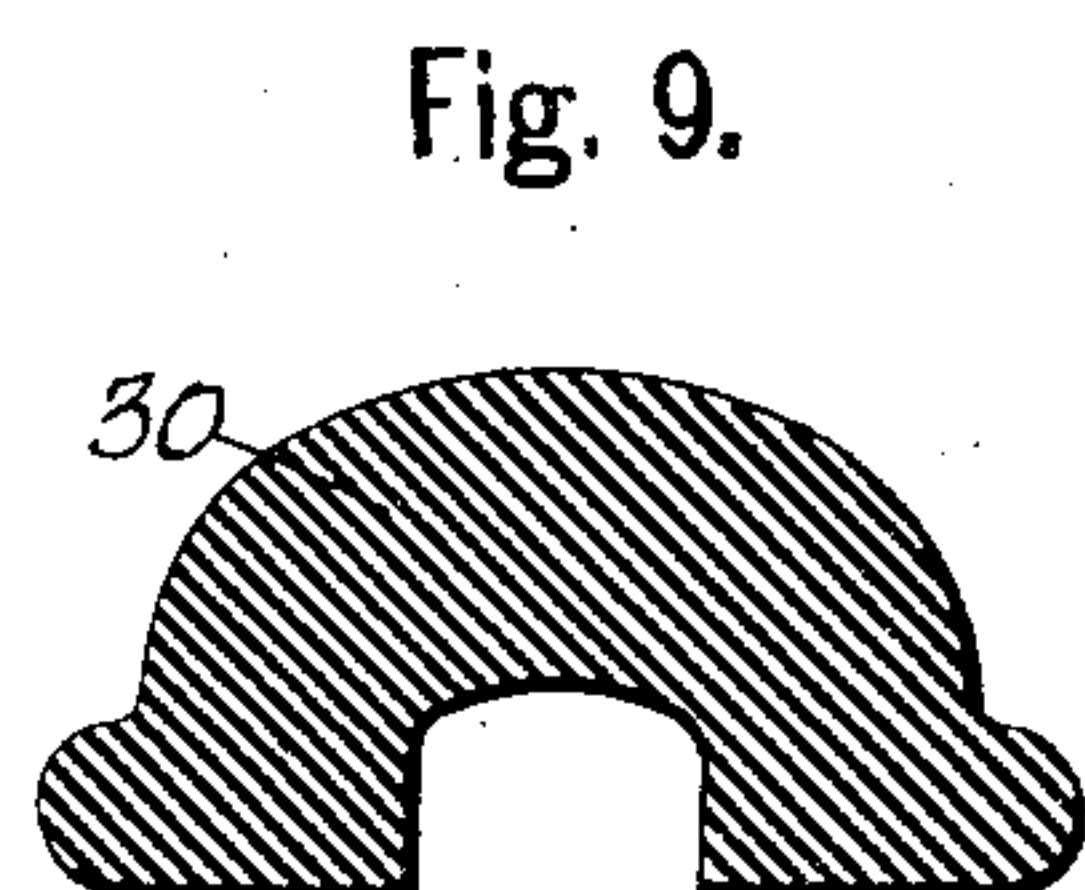
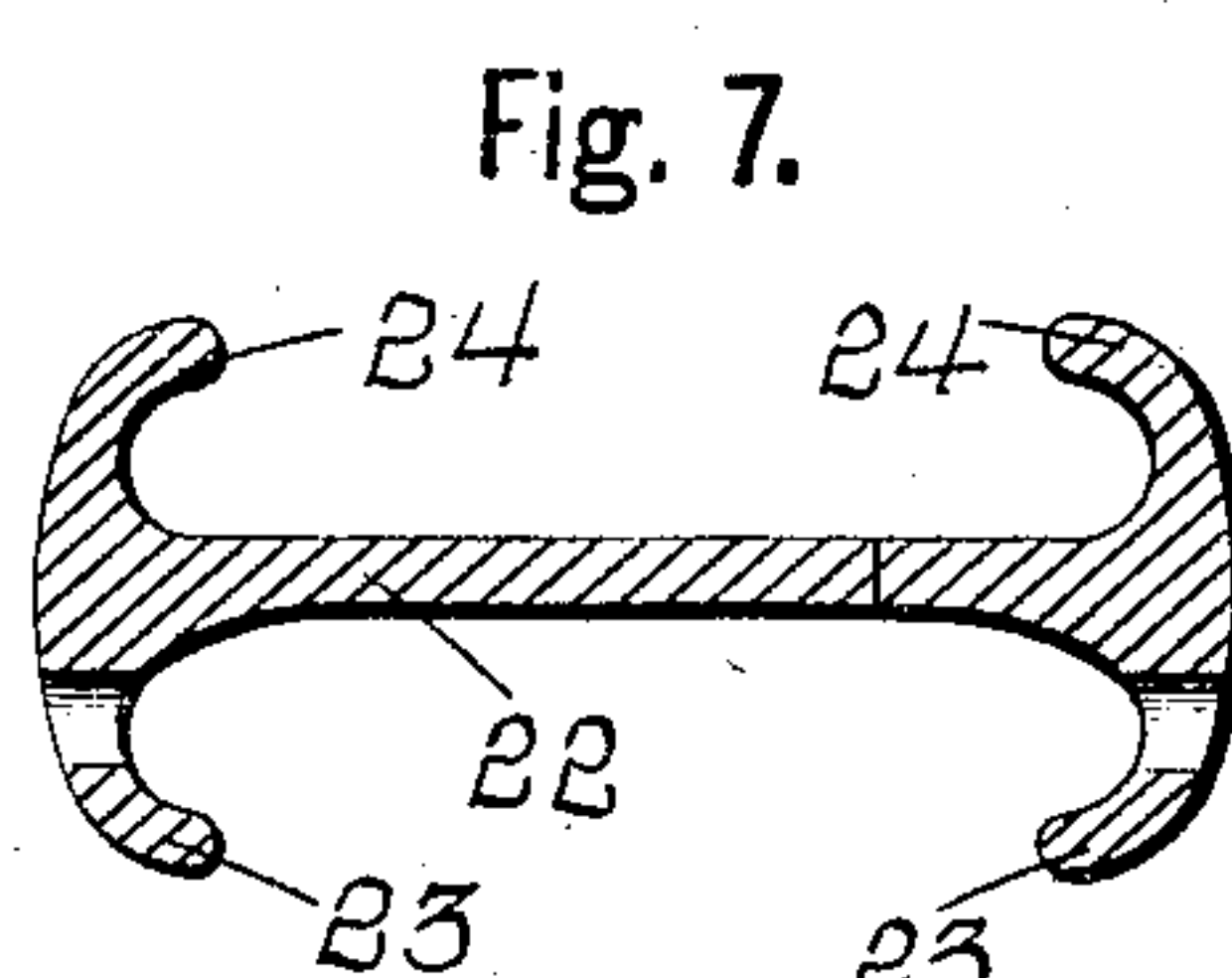
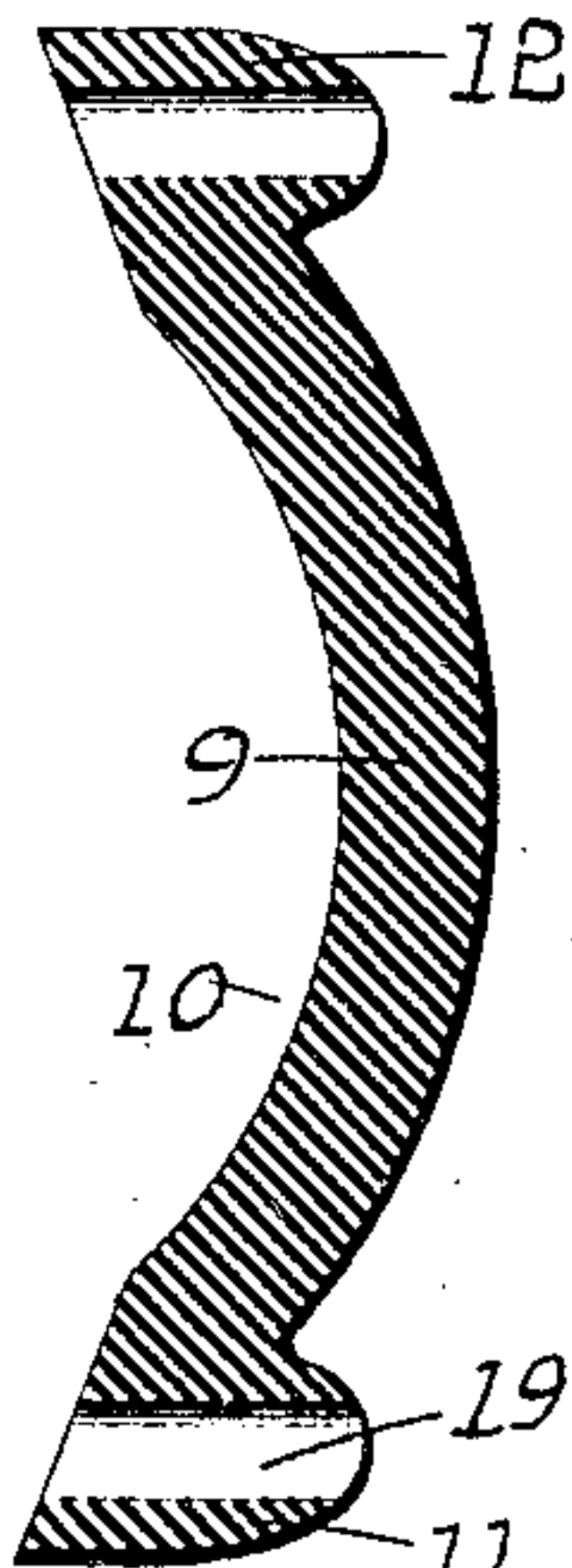
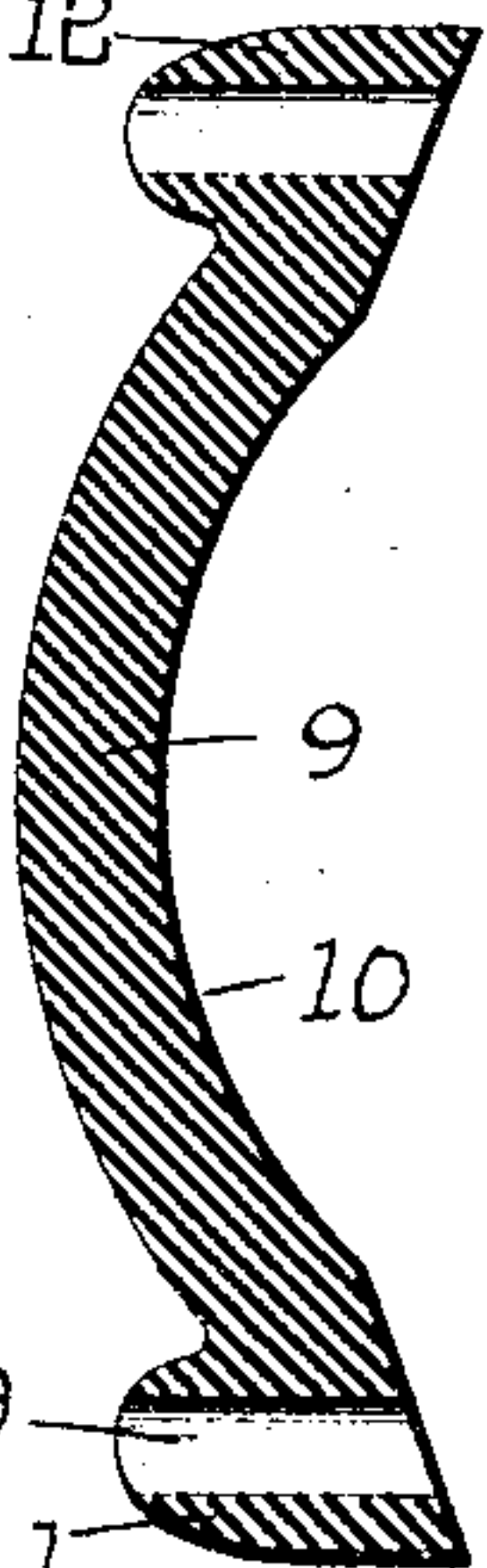
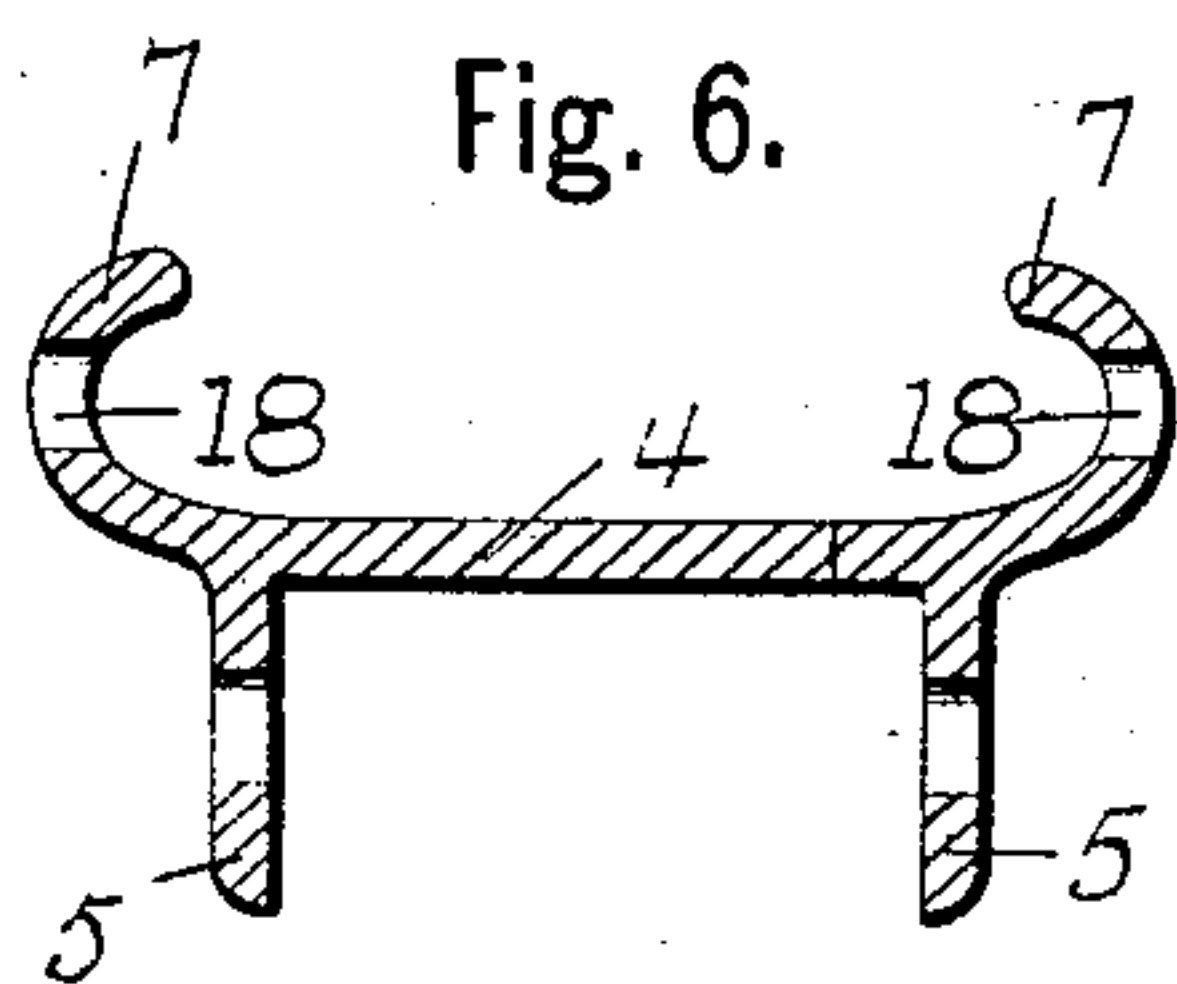
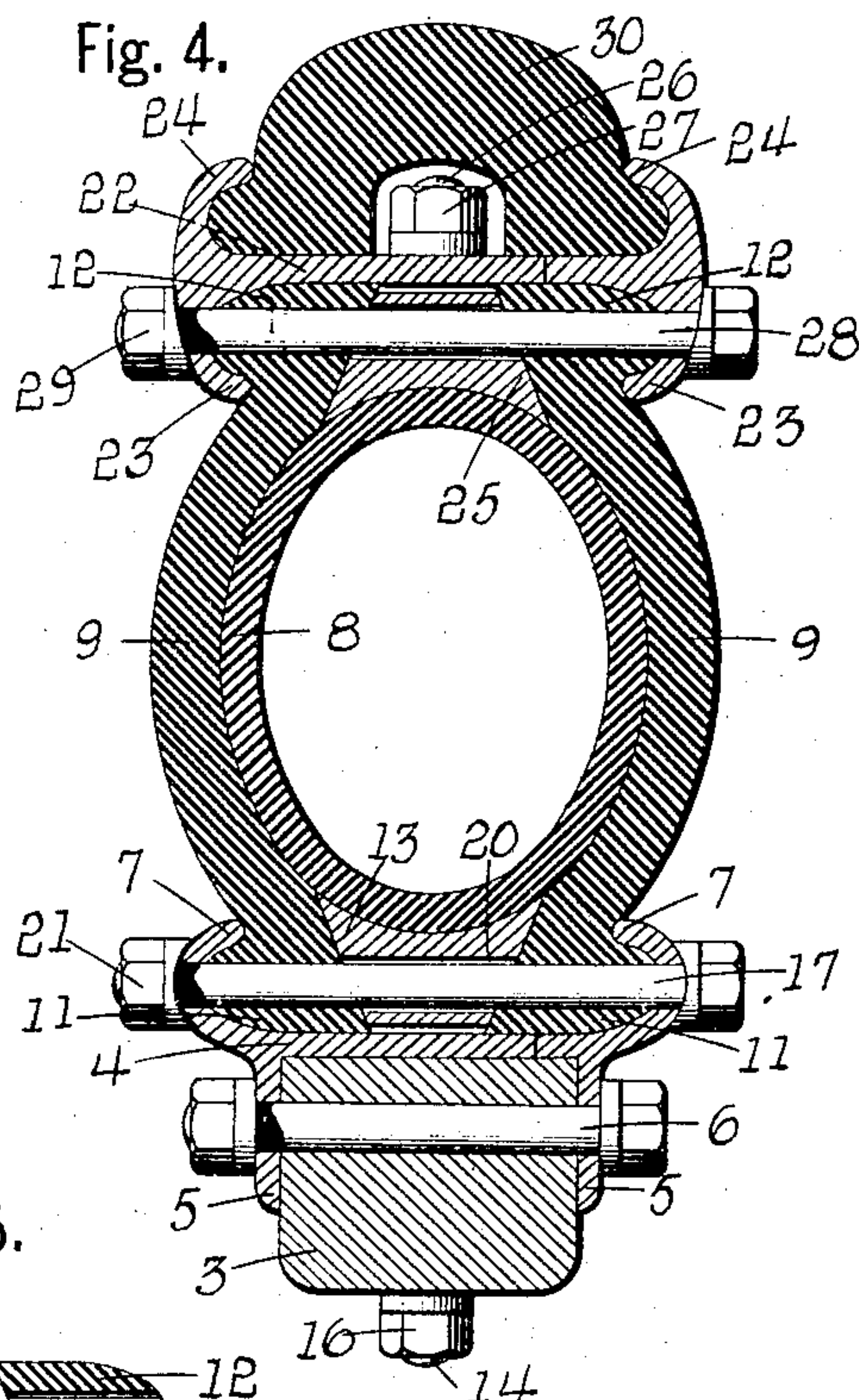
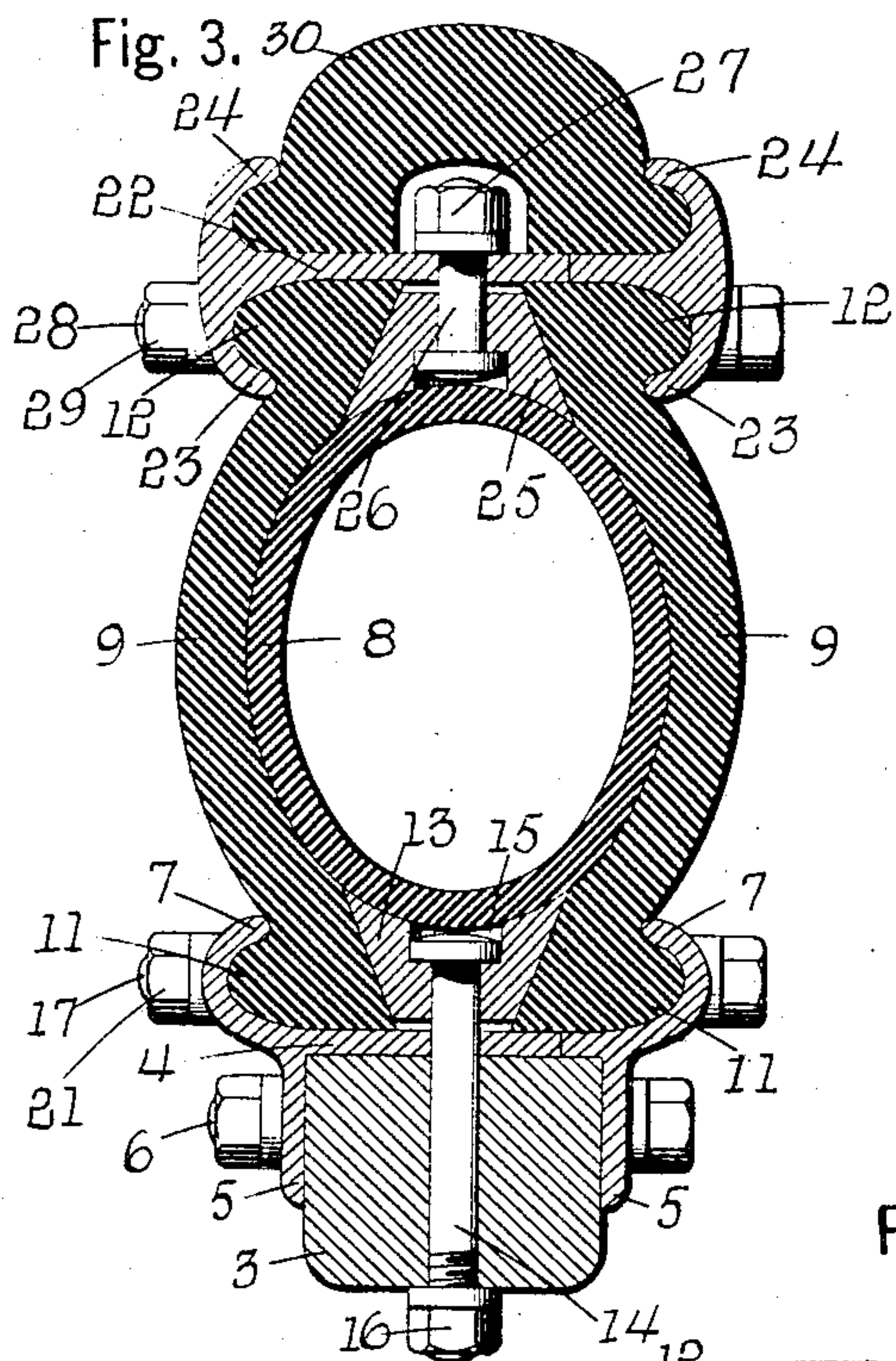
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NO MODEL.

4 SHEETS—SHEET 2.



Witnesses.

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No. 764,891.

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APPLICATION FILED DEC. 17, 1903.

NO MODEL.

4 SHEETS—SHEET 3.

Fig. 12.

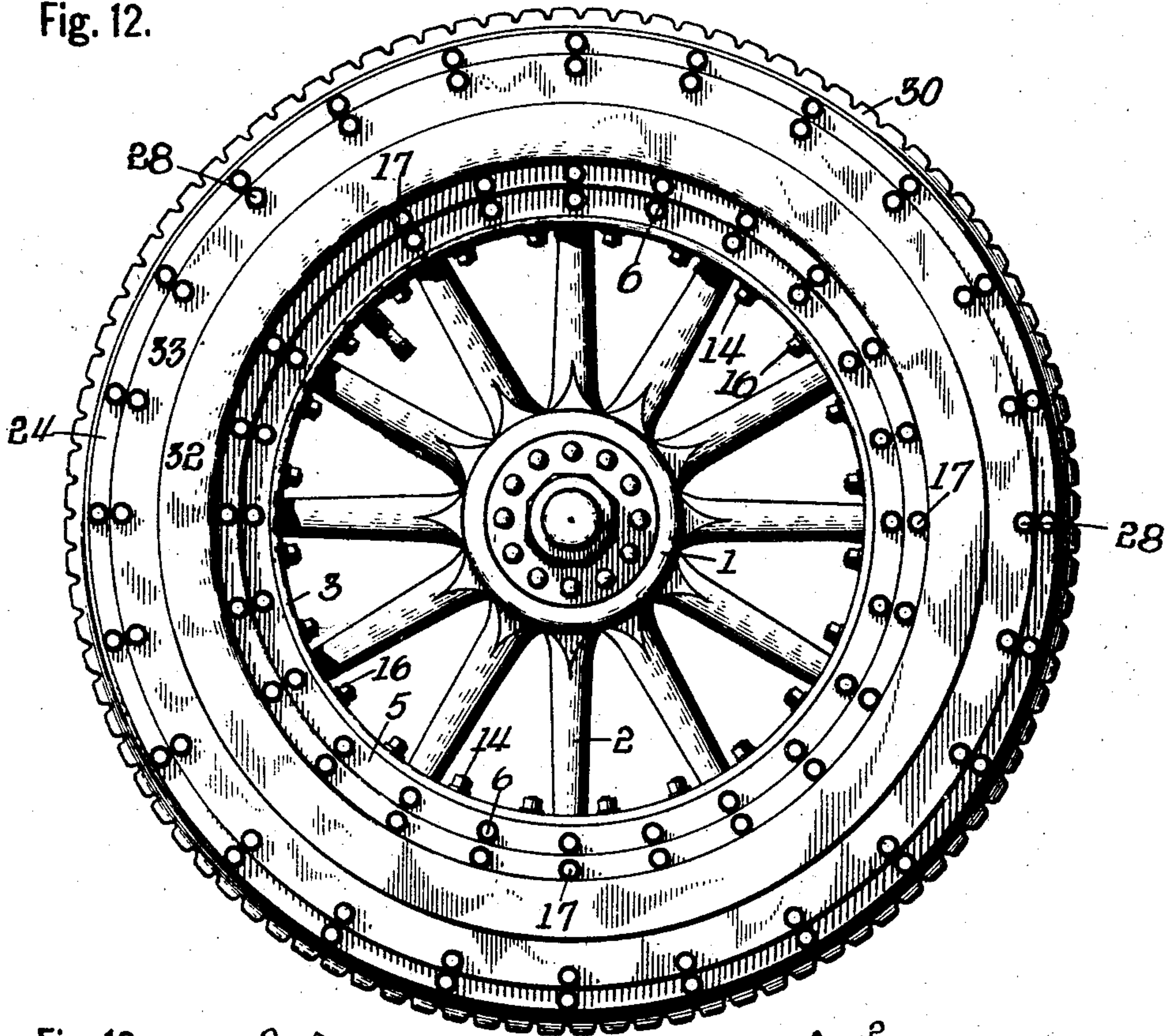
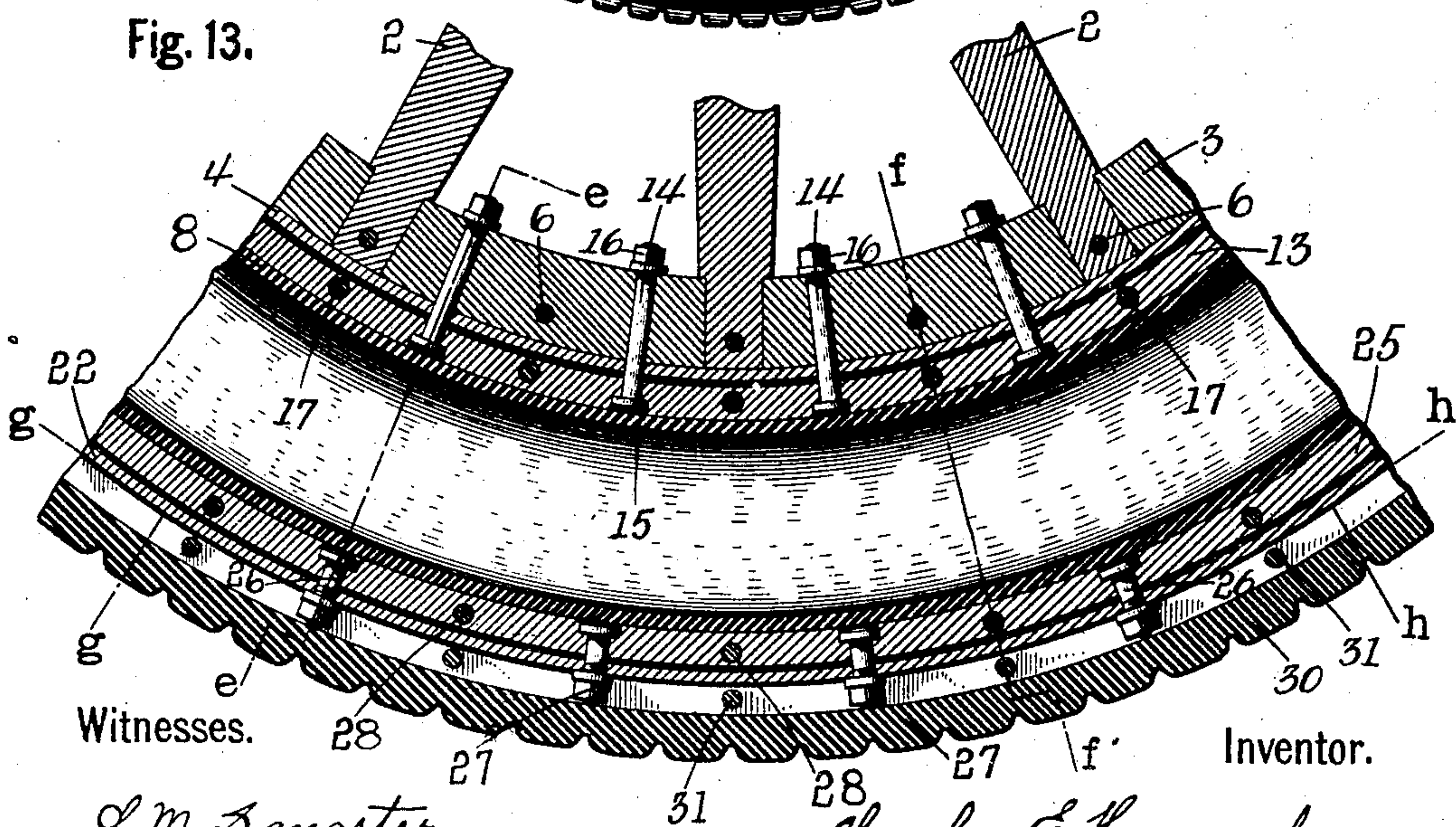


Fig. 13.



Witnesses.

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WHEEL.

APPLICATION FILED DEC. 17, 1903.

NO MODEL.

4 SHEETS—SHEET 4.

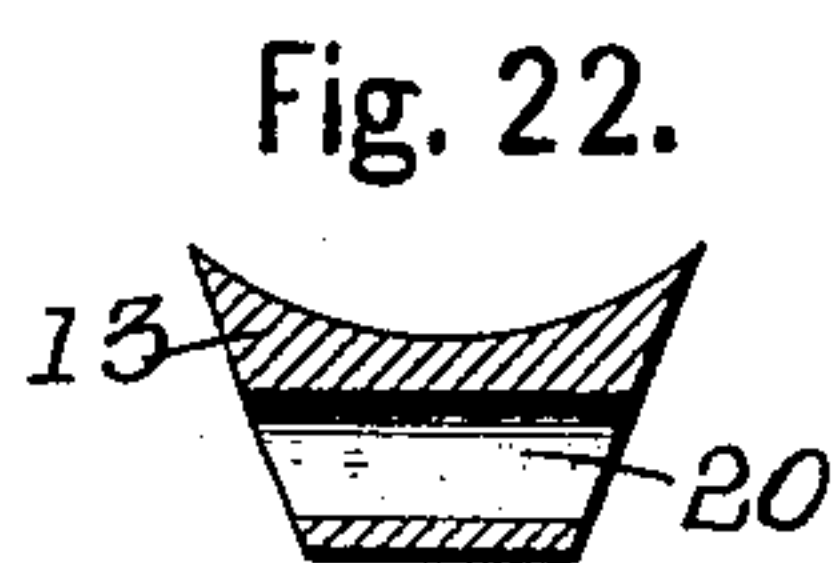
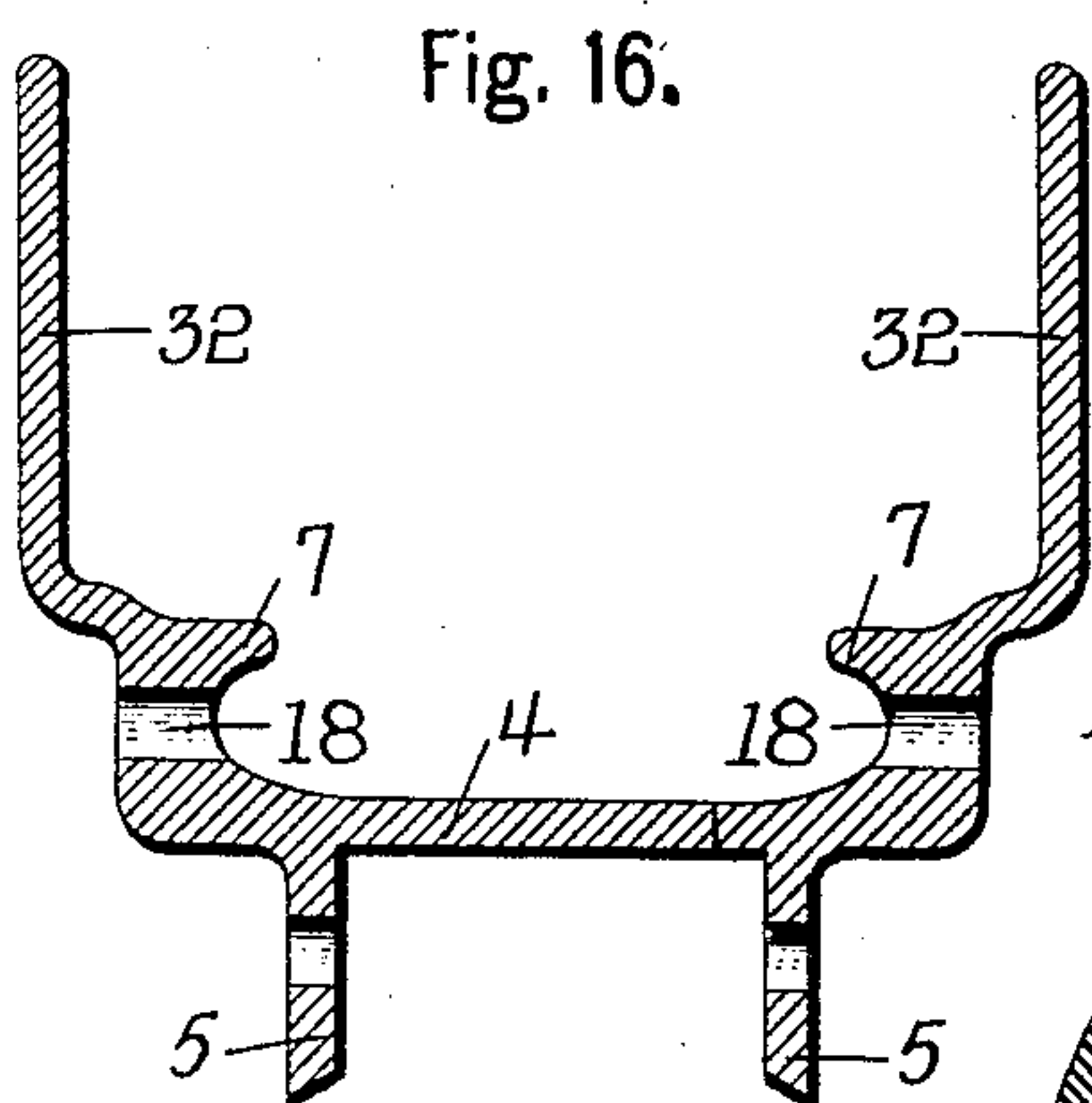
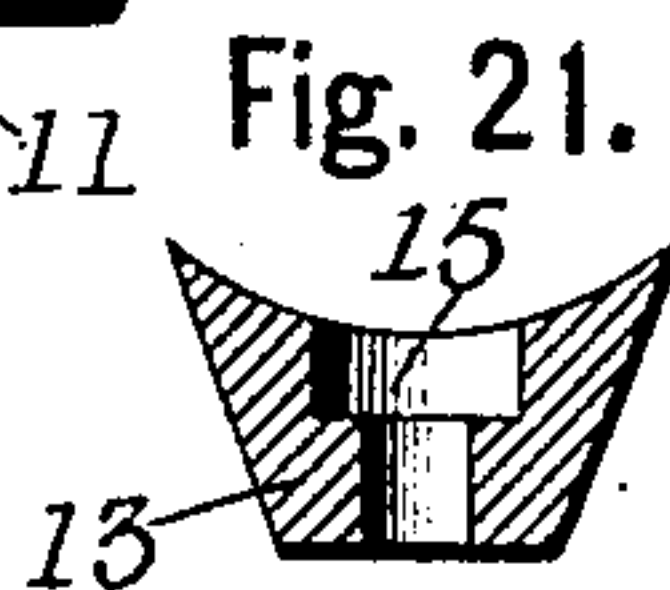
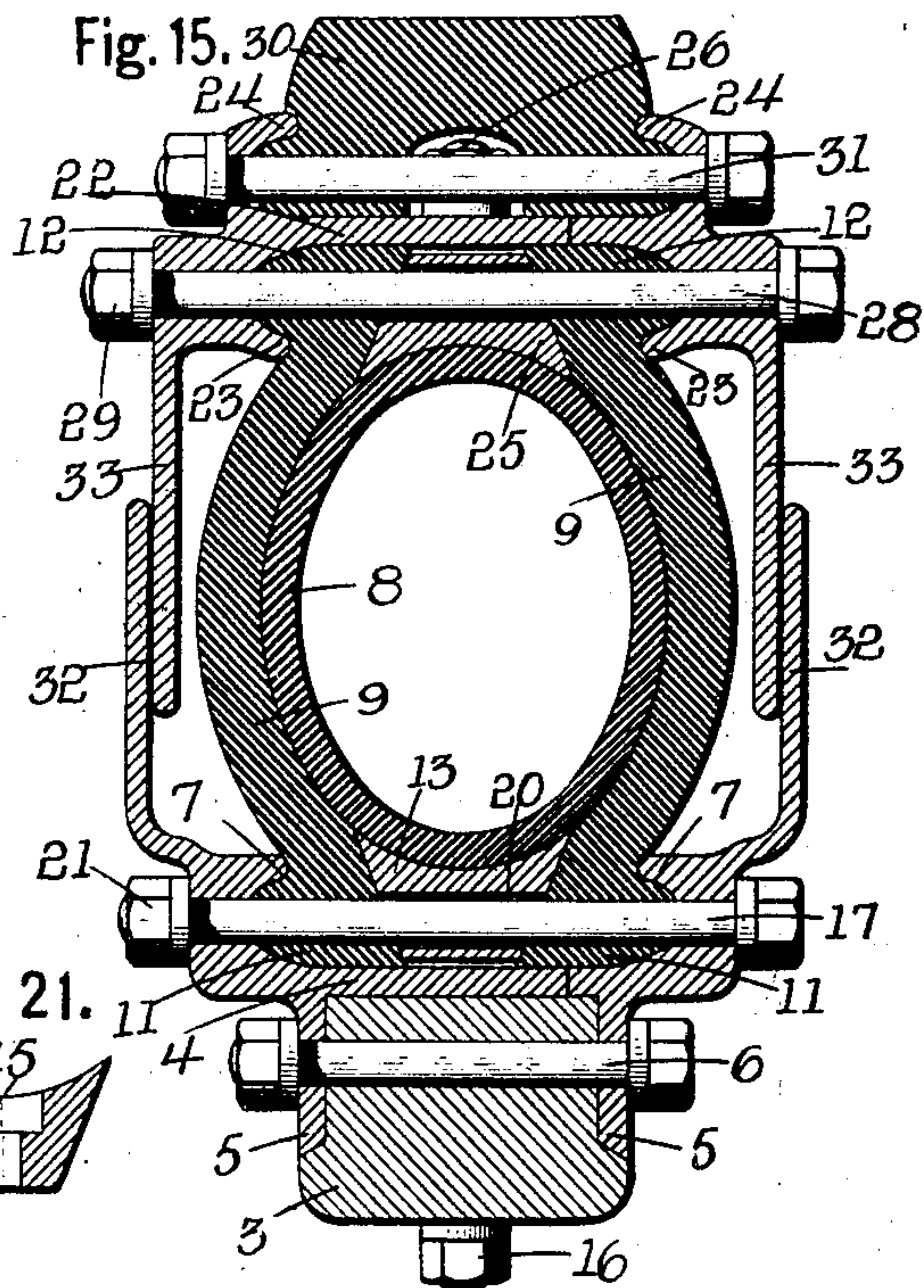
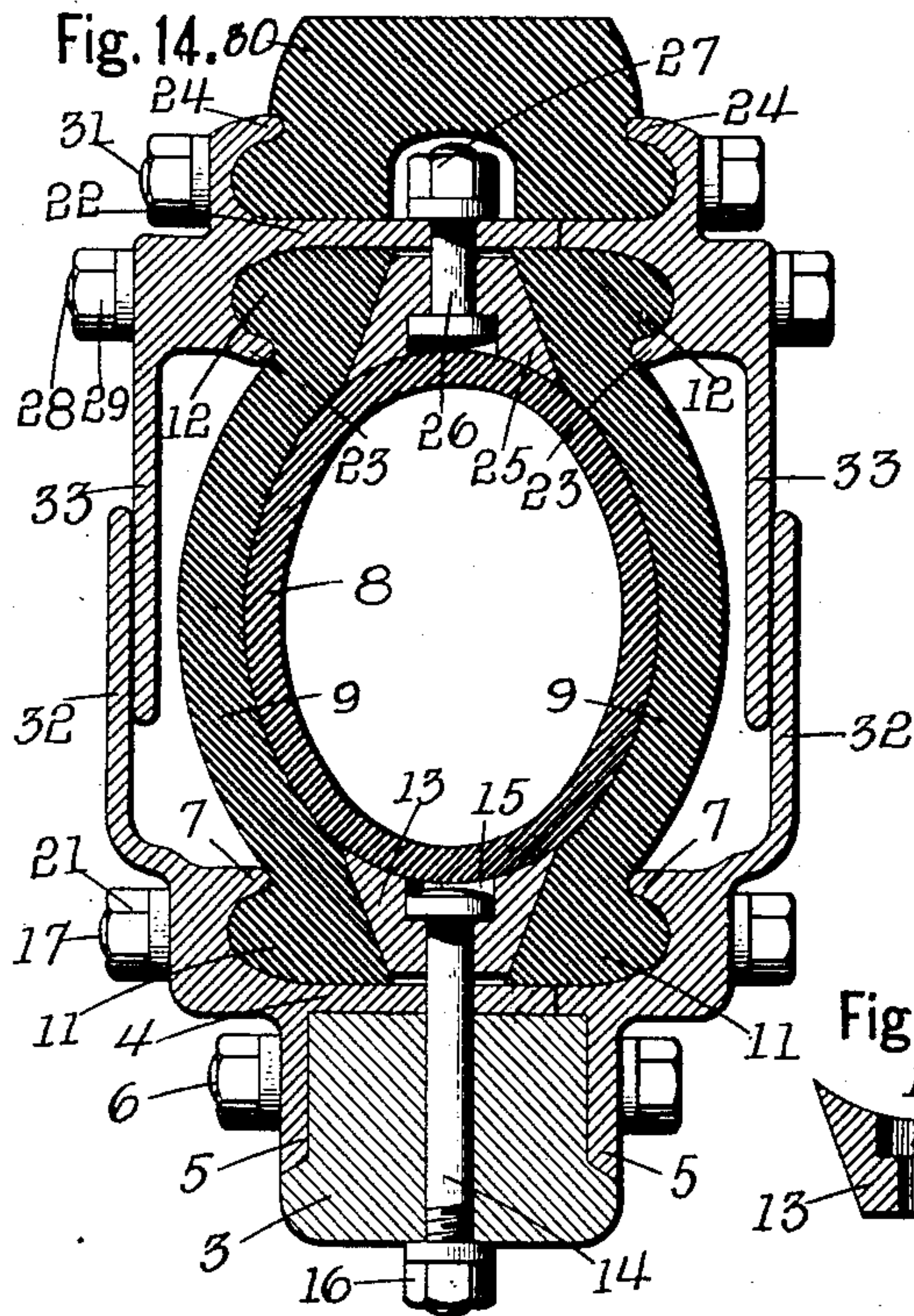


Fig. 18.

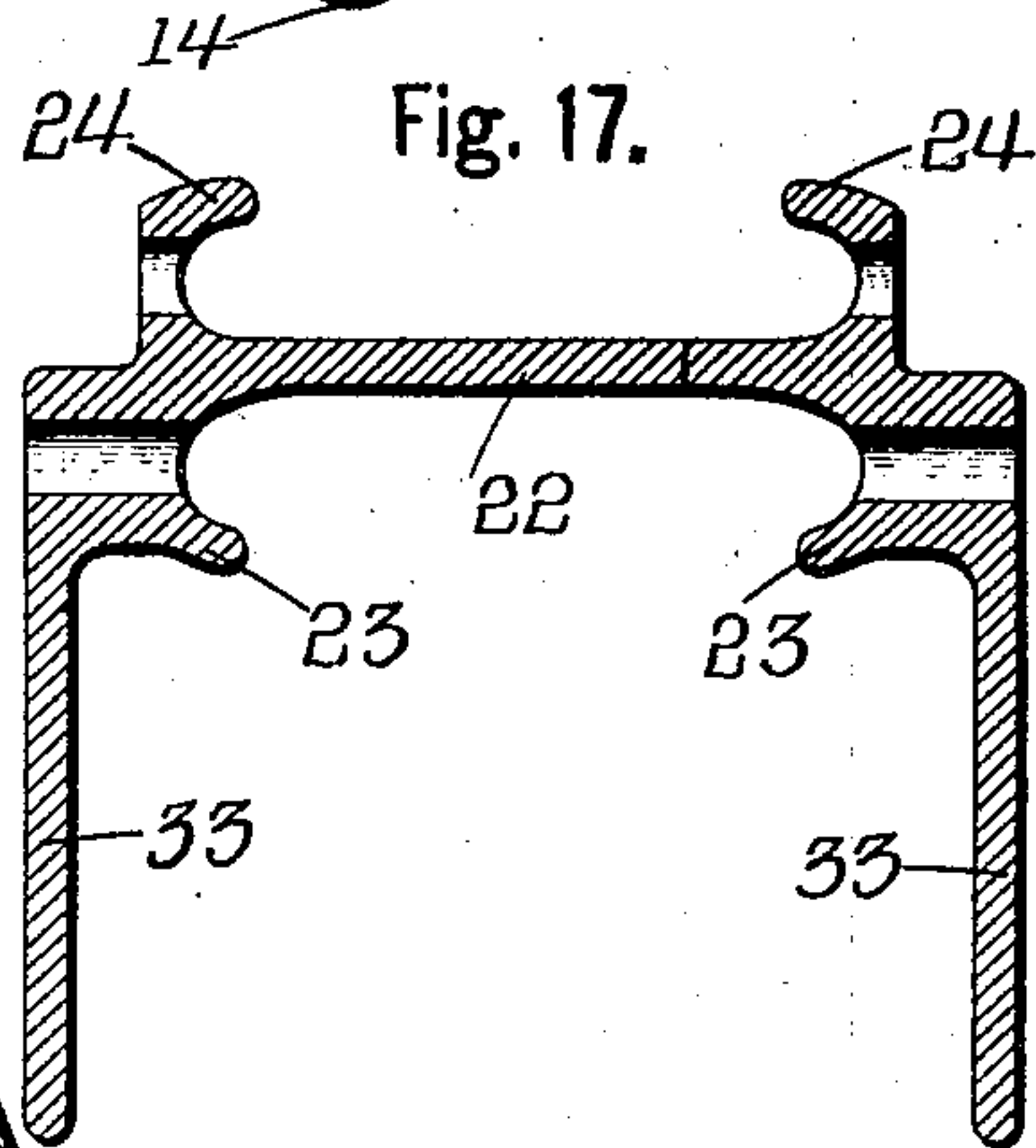
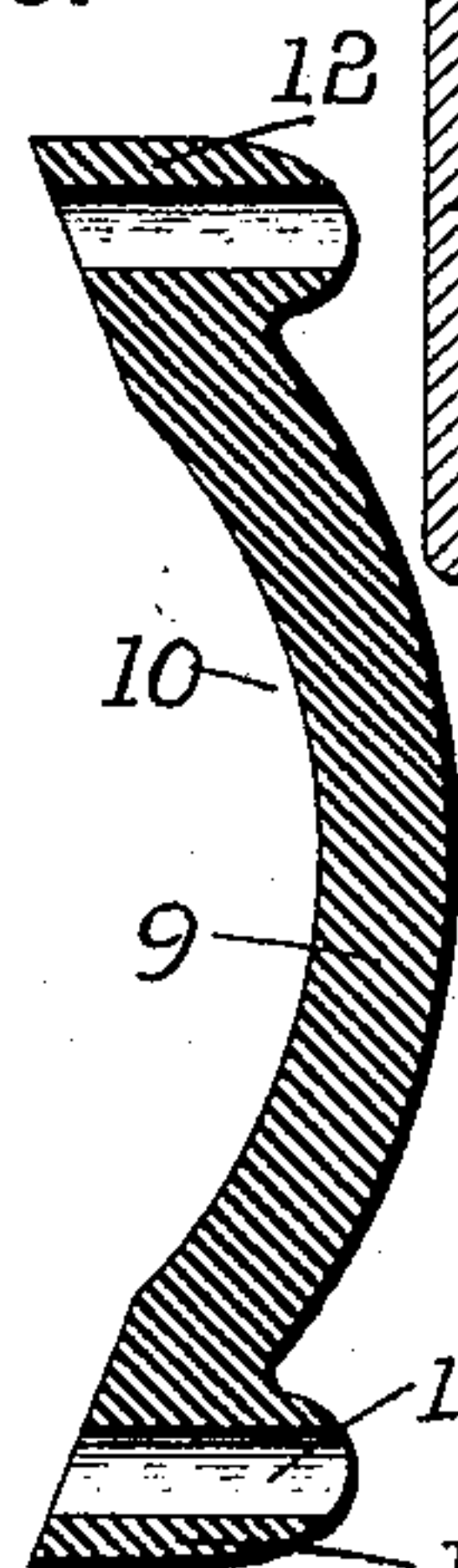
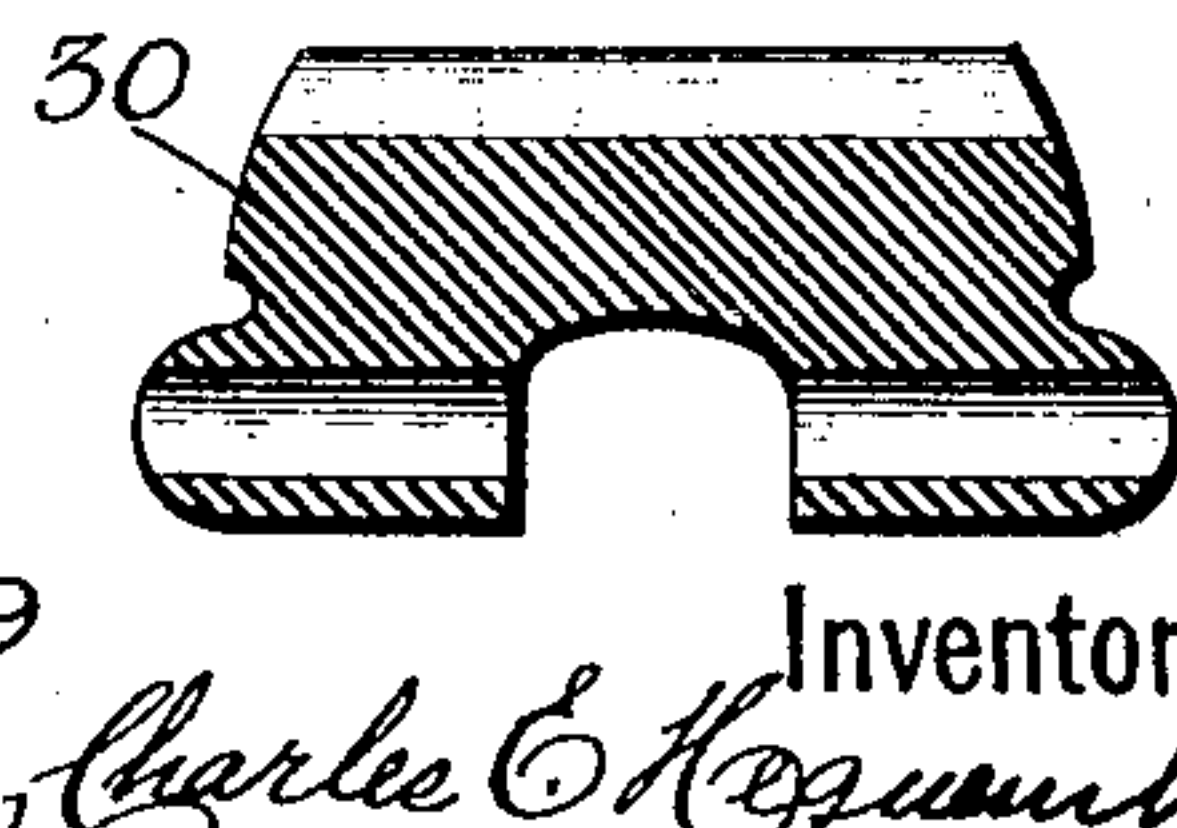


Fig. 19.



Fig. 20.



Witnesses.

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UNITED STATES PATENT OFFICE.

CHARLES E. HEQUEMBOURG, OF CHAUTAUQUA, NEW YORK.

WHEEL.

SPECIFICATION forming part of Letters Patent No. 764,891, dated July 12, 1904.

Application filed December 17, 1903. Serial No. 185,567. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. HEQUEMBOURG, a citizen of the United States, residing at Chautauqua, in the county of Chautauqua and State of New York, have invented certain new and useful Improvements in Wheels, of which the following is a specification.

This invention relates to an improved wheel for vehicular purposes, and it includes among its constituent elements or necessary parts an elastic tire which is supported and positively fastened between parts of the wheel.

The principal object of the invention is to positively and securely fasten the tire parts together, so that they cannot separate when the tire is undergoing severe transverse, longitudinal, or other strain in either an inflated or deflated condition.

This improvement is chiefly applicable to automobiles, in which the first consideration is safety for the occupants of the car. I secure safety in the highest possible degree by arranging a non-puncturable metal rim around the periphery of the tire, which is positively locked to a comparatively wide portion of said tire against involuntary separation therefrom under all conditions. With this improved rim the danger of the sudden dropping of one of the front or rear wheels and consequent loss of control of an automobile when in rapid motion is completely eliminated, for even though the air-pressure is reduced from any cause the outer metal rim is still supported and yieldingly held in position by the flexible side members, which form flexible side connections between the outer rim and the wheel at all points around its circumference and practically support the outer metal rim through their own elasticity. This prevents much deflation of the tire and consequent dropping of the wheel to which it is attached, and thus enables the operator to still retain control of the automobile even though one or more of the tires are injured or punctured.

Some of the objects of the invention are to render the wheel and its tire more durable, to eliminate the danger of a sudden flattening of the tire, which is inherent in the present large pneumatic tires, and to construct a firmer,

stronger, and more efficient wheel which shall possess sufficient elasticity for all practical purposes.

The invention also relates to a novel form of tire, an improved arrangement for securing the tire to the wheel, and other details of construction, all of which will be fully and clearly hereinafter described and claimed, reference being had to the accompanying drawings, in which two adaptations of my invention are shown.

Figure 1 is a side elevation of one adaptation of my improved wheel and tire. Fig. 2 is an enlarged central longitudinal section through a fragment of the adaptation of my improved wheel and tire shown in Fig. 1. Fig. 3 is an enlarged transverse section through the tire and wheel-rim on line *a a*, Fig. 2. Fig. 4 is an enlarged transverse section through the tire and wheel-rim on line *b b*, Fig. 2. Fig. 5 is a detached transverse section through the members of the rubber shoe or case. Fig. 6 is a detached transverse section through the inner clencher-rim. Fig. 7 is a detached transverse section through the outer clencher-rim. Fig. 8 is an enlarged transverse section through the outer or cushion tire on line *c c*, Fig. 2. Fig. 9 is an enlarged transverse section through the outer or cushion tire on line *d d*, Fig. 2. Fig. 10 is an enlarged transverse section through the tapering ring, cutting through one of the openings for the radial bolts. Fig. 11 is an enlarged transverse section through the tapering ring, cutting through one of the openings for the transverse bolts. Fig. 12 is a side elevation of another form of my improved wheel and tire having a protecting and inclosing case for the rubber portion of the tire. Fig. 13 is an enlarged central longitudinal section through a fragment of the form of wheel and tire shown in Fig. 12. Fig. 14 is an enlarged transverse section through the tire and wheel-rim on line *ee*, Fig. 13. Fig. 15 is an enlarged transverse section through the tire and wheel-rim on line *ff*, Fig. 13. Fig. 16 is a detached transverse section through the inner clencher-rim of the form shown in Fig. 12. Fig. 17 is a detached transverse section through the outer clencher-

rim of the form shown in Fig. 12. Fig. 18 is a detached transverse section through the rubber shoe or case. Fig. 19 is an enlarged transverse section through the outer or cushion tire on line *g g*, Fig. 13. Fig. 20 is an enlarged transverse section through the outer or cushion tire on line *h h*, Fig. 13. Fig. 21 is an enlarged transverse section through the tapering ring, cutting through one of the openings for the radial bolts. Fig. 22 is an enlarged transverse section through the tapering ring, cutting through one of the openings for the transverse bolts.

While I have shown two adaptations of my invention in the accompanying drawings, one in which a tire is held in suspension between two rims, the sides only of the tire being exposed, and the other in which flanges extend from the rims and lap each other and form a box-like annular case on the periphery of the wheel, within which the tire is completely inclosed, I realize that there are many other methods of constructing a wheel on my principle of suspending and protecting the tire, and therefore reserve the rights to any and all forms that fairly come within the scope of the following claims.

The adaptation of my invention shown in Figs. 1 to 11, inclusive, while it is more especially adapted to light-running or fairly light-running vehicles, such as carriages or automobiles, may perhaps be built especially light for bicycles or heavier—for instance, for heavy draft-wagons, drays, or trucks. The wheel in this adaptation is of the artillery type and has the usual hub 1, spokes 2, and felly 3. An inner rim 4, which is formed in two separate sections, has upwardly-extending flanges 5, which fit on each side of and partially embrace the felly 3, being firmly secured thereto by screw-bolts 6, which pass transversely through the flanges 5 and the felly. (See Figs. 3 and 4.) A series of the screw-bolts 6 are employed, being arranged at intervals around the circumference of the wheel. The inner rim 4 also has outwardly-extending flanges 7, which are of a curved shape in cross-section to constitute clencher-tire-locking portions. The pneumatic tire shown consists of an inner tube 8, of elastic material, such as rubber, and an outer case, which is formed of two separate and independent members or halves 9, each of which is of an annular ring-like formation and is disked in cross-section, as shown at 10 in Fig. 5. The members 9 are duplicates of each other, and each practically constitutes one side of the case and is provided with clencher portions at its margins or edges. These marginal portions I have respectively designated by the numerals 11 and 12 in the accompanying drawings for the purpose of distinguishing the outer marginal portions from the inner marginal parts. The inner marginal clencher portions 11 are locked in the annular clencher-flanges 7 of the inner rim 4 by an annular ring

or band 13, of wood or like material, which is capable of being slightly compressed to contract the ring. This ring 13 has sides which taper toward each other inwardly from its periphery and by pressing against the inner surface of the clencher marginal portions 11 as it is contracted upon the inner rim serves to force the inner clencher marginal portions 11 into the clencher-flanges 7, as shown in Figs. 3 and 4. The peripheral wall or surface of the ring 13 is curved in cross-section to conform to the circular form of the inner tube 8. The ring 13 is drawn or contracted upon the inner rim 4 by a series of screw-bolts 14, which are arranged circumferentially around the felly and extend radially through the felly, inner rim, and the ring 13, the heads of the bolts being seated in countersunk openings 15 in the ring 13 (see Fig. 10) and screw-nuts 16 placed upon the inner projecting screw-threaded ends of the bolts. The clencher portions 7 of the inner rim are firmly drawn to each other and locked to the inner marginal clencher portions 11 by a series of transversely-extending screw-bolts 17, which are arranged at intervals around the wheel and pass through horizontal openings 18 in the clencher portions 7, (see Fig. 6,) horizontal openings 19 in the marginal portions 11, (see Fig. 5,) and horizontal openings 20 in the ring 13. The openings 20 in the ring 13 are slightly larger in size than the bolt-shanks to permit the slight contraction of the ring necessary to draw it closely to the inner rim. (See Fig. 4.) Screw-nuts 21 are placed upon the screw-threaded ends of the bolts 17. The outer marginal clencher portions 12 are tied or clamped together by an outer rim 22, which is formed in two sections. This rim is provided with two oppositely-extending sets of clencher portions 23 and 24, each of which consists of two opposed curved flanges or members. The inner set of clencher portions 23 is arranged to fit upon and partially embrace the outer clencher portions 12 of the tire sides which are forced therein by a ring 25, substantially similar to the ring 13, with the exception that the sides thereof taper outwardly from the inner surface toward the periphery instead of in the opposite direction, as with the ring 13, and the inner surface is curved to conform to the inner tube of the tire instead of the outer surface, as in the ring 13. The ring 25 is expanded (instead of being contracted like the ring 13) by a series of screw-bolts 26, which are arranged at intervals around the wheel and extend through the outer rim and the ring, having their heads fitted in countersunk openings in the ring 25 and being provided with screw-nuts 27 on their projecting screw-threaded ends. The sections or parts of the outer rim are drawn together to firmly clench the outer marginal portions 12 by a series of transverse screw-bolts 28, which are arranged at intervals around the wheel

and extend through the inner clencher portions 23, the outer marginal clencher portions 12 of the tire sides, and the ring 25, the openings through the ring being slightly larger than the shank of the bolts to permit the ring 25 to be expanded against the inner surface of the outer rim. A nut 29 is placed upon the screw-threaded end of the bolts 28. An outer cushion-tire 30 is arranged around the outer rim, being firmly tied to the wheel by the outer set of clencher portions 24.

In the adaptation of the invention shown in Figs. 12 to 22 an additional series of transverse bolts 31 are employed, which pass through the outer set of clencher portions 24 and the cushion-tire 30 and serve to more firmly lock and secure the wheel parts together.

The sides of the tire are also protected and completely inclosed by straight flanges 32 and 33, which radiate from the inner and outer rims and lap each other, as shown in Figs. 14 and 15. These flanges 32 and 33 project by each other and in connection with the two rims form a complete inclosing box-like structure on the periphery of the wheel of annular form, so that the tire is entirely inclosed within a hollow ring, of which the outer part can move radially with reference to the remainder against the tension of the tire.

In this improved wheel a tire is practically suspended between rims, to which it is tied or clamped, so that the elastic action of the entire annular surface is brought into play when the wheel is in operation.

The great aim of this invention is to increase the factor of safety to the highest possible efficiency by positively locking the tire parts to the wheel against involuntary separation under any and all circumstances, so that an automobile equipped with the improved tire will be under complete control when running at high speed, even though the pressure of air in the tire on one of the wheels has through some cause become suddenly reduced, producing what is technically termed "deflation" of the tire. However, with this improved tire such deflation or deflation to the limit of the cross-sectional area is impossible, owing to the yielding supporting of the outer surrounding rim from the felly or rim proper of the wheel by flexible side members.

It will be noted that the peripheral surface of the tire to which the outer rim is positively locked is equal in width, or nearly so, to the tire itself and that the rim is positively fastened to this portion of the tire at all points around its circumference. The great advantage of this is that the rim is so strongly fastened to the tire that it becomes practically a part of the tire itself, so that all transverse strain is transmitted to and acts against the flexible side members of the tire.

I claim as my invention—

1. In a wheel, a clencher-tire, a clencher-

rim in a plurality of sections surrounding said tire, and bolts for tightening the sections of the rim upon the tire.

2. In a wheel, a clencher-tire, a clencher-rim in a plurality of sections surrounding said tire and transversely - arranged bolts for tightening the sections of the rim upon the tire.

3. A wheel having a tire and a metallic rim or band surrounding said tire and positively locked continuously throughout to a portion of said tire equal or nearly equal in width to the tire itself against involuntary separation therefrom when either in an inflated or deflated condition.

4. A wheel having a tire provided with peripheral enlargements or clenching portions and a clencher rim or band surrounding said tire and positively fastened to said clenching portions when in either an inflated or deflation condition.

5. In a wheel, an inner rim, a tire on said inner rim having peripheral clencher portions and an outer clencher-rim around said tire and positively locked to said clencher portions.

6. In a wheel, an inner rim, a tire on said inner rim having peripheral clencher portions, an outer clencher-rim around and positively locked to said tire under all conditions of inflation and deflation and a cushion-tire around said outer rim.

7. In a wheel, an inner clencher-rim, a pneumatic tire around said rim and an outer clencher-rim around said pneumatic tire and positively locked to said pneumatic tire under all conditions of inflation and deflation.

8. In a wheel, an inner rim, a pneumatic tire around said rim and an outer double sectional clencher-rim around and positively locked to said pneumatic tire.

9. A pneumatic tire including an inner tube and an outer case of two separate annular side members and clencher means for positively clamping and locking the outer margins of said members against involuntary separation when either inflated or deflated.

10. A pneumatic tire including an inner tube and an outer case of two separate annular side members having marginal clencher portions and inner and outer rims engaging and positively locking to said marginal clencher portions.

11. A safety-tire having a peripheral line of longitudinal separation and a clencher-rim having means for positively tying the peripheral margins of said tire against involuntary separation when either inflated or deflated.

12. In a wheel, an outer clencher-rim, an inner clencher-rim and a tire having a case in two sections or parts provided with marginal clencher portions positively locking in the outer and inner clencher-rims against involuntary separation when the tire is deflated.

13. A wheel having at least two rims, one

within the other, and provided with oppositely-extending flanges which together with the rims form a hollow annular peripheral case and at least one of said rims having
5 clencher portions and a tire completely inclosed within said case and having clencher portions positively locked to the clencher portions of said rim or rims.

14. A wheel having at least two rims, one
10 within the other, and provided with clencher portions and oppositely - extending lapping flanges which together with the rims form a hollow annular case and a tire completely inclosed within said case and having inner and
15 outer clencher portions positively locking in the clencher portions of the rims.

15. In a wheel, a plurality of rims, a tire between said rims and locked positively in either an inflated or deflated condition
20 throughout its circumference to said rims and a flange or flanges extending from a rim or rims and inclosing the sides of the tire.

16. In a wheel, a sectional rim having exterior and interior clencher parts and a plurality of tires, one surrounding the rim and
25 having clencher parts positively locking with the exterior clencher portions of the rim and another surrounded by said rim and having clencher parts positively locking with the interior clencher portions of the rims. 30

17. In a wheel, a sectional rim having a double set of clencher portions and two tires between which said rim is interposed, both of which have clencher parts positively locking
35 with the clencher portions of said rims.

18. In a wheel, an inner rim, a tire on said inner rim having peripheral clencher portions, and a sectional outer clencher-rim around said tire.

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Witnesses:

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