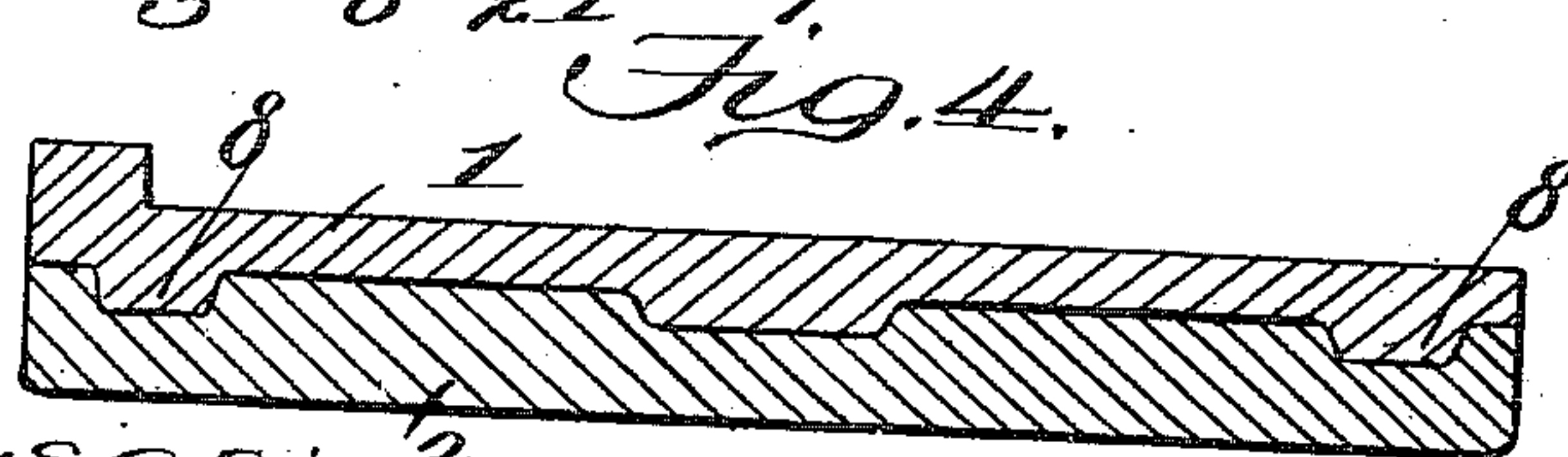
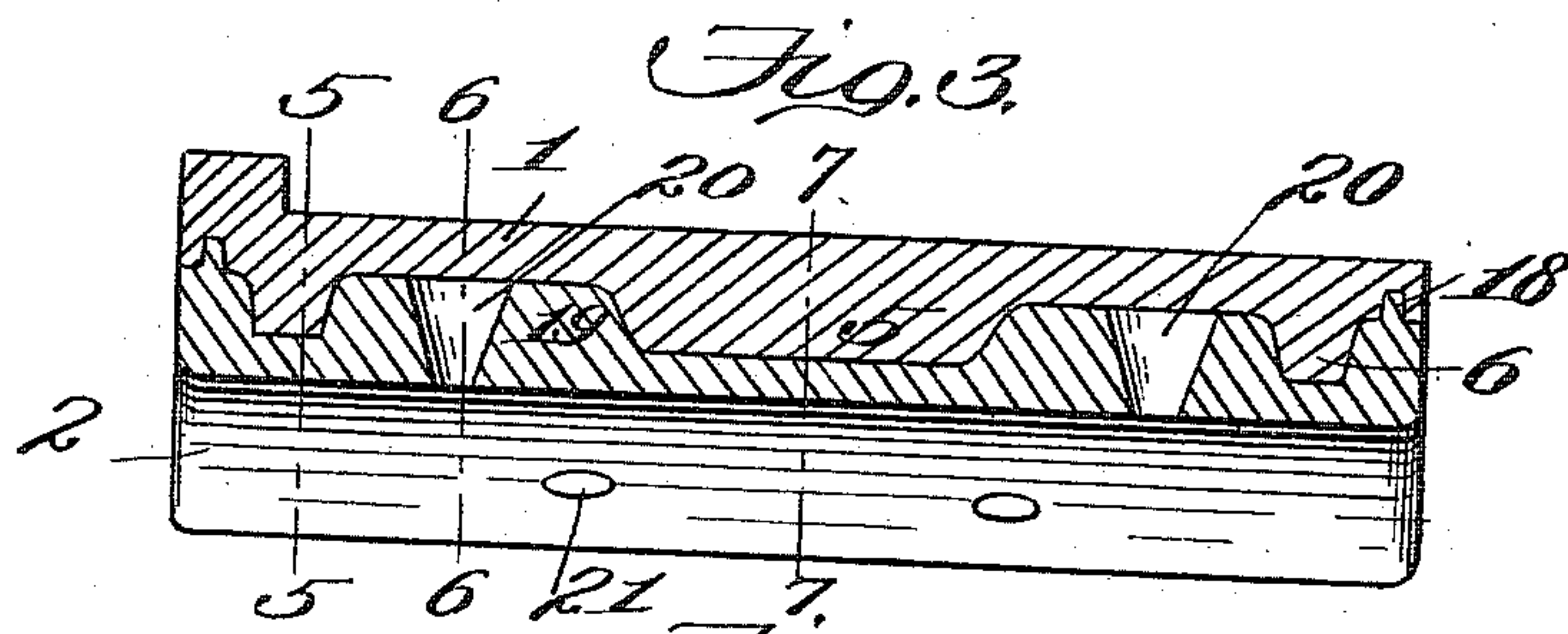
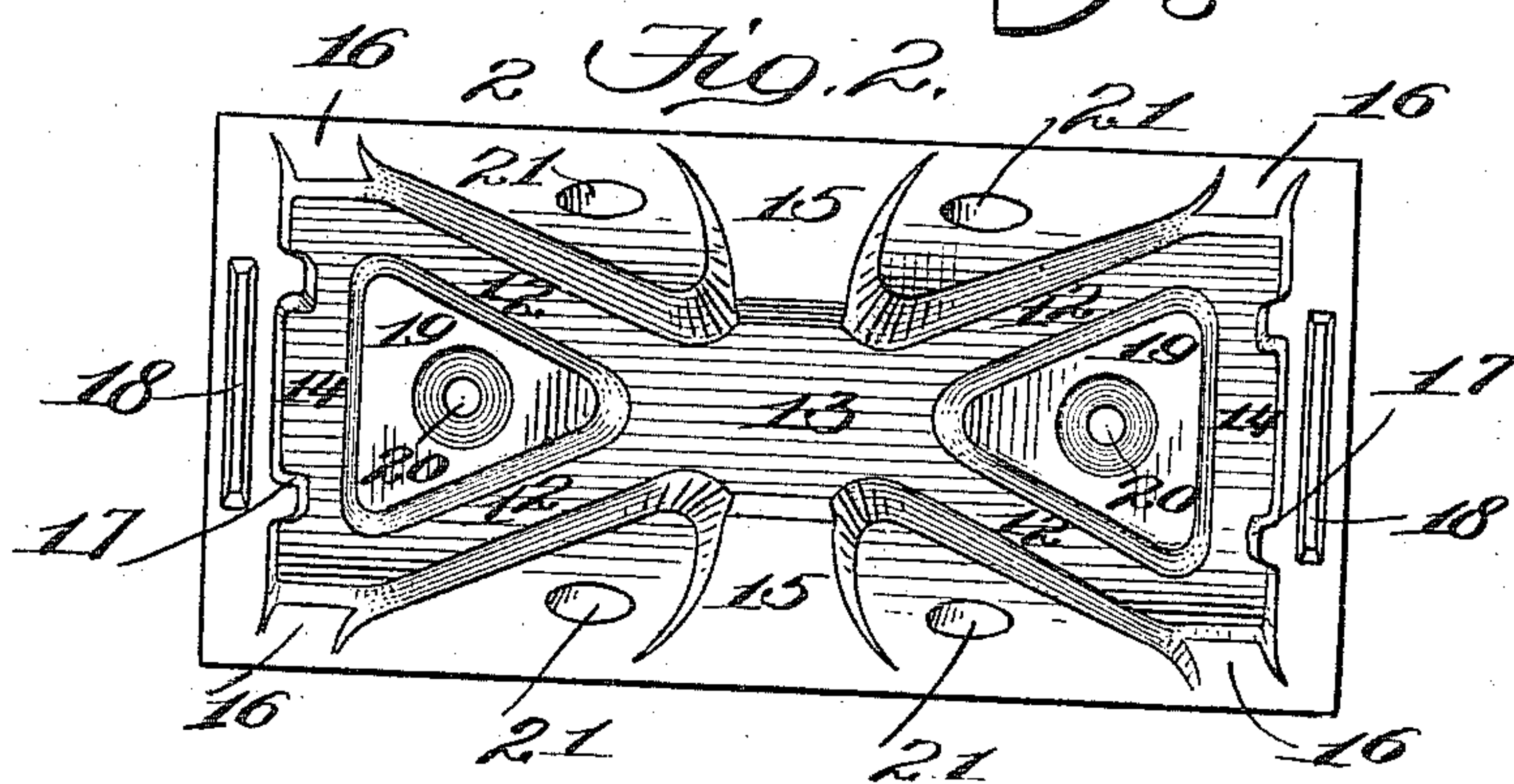
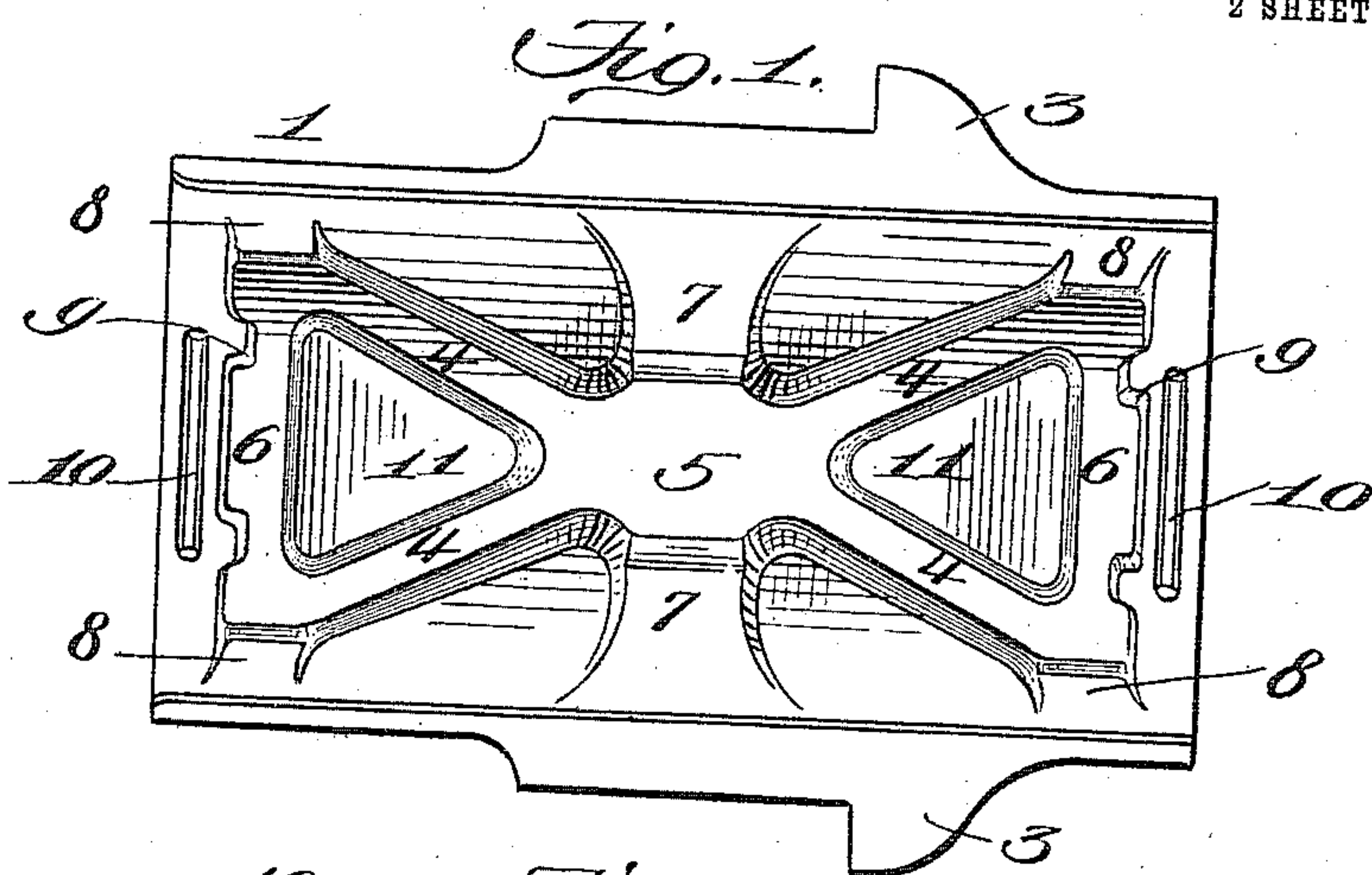


H. F. SCHRODER.
JOURNAL BEARING.
APPLICATION FILED JAN. 25, 1909.

985,460.

Patented Feb. 28, 1911.
2 SHEETS—SHEET 1.



Witnesses:
Claude H. Kester
J. B. Kester

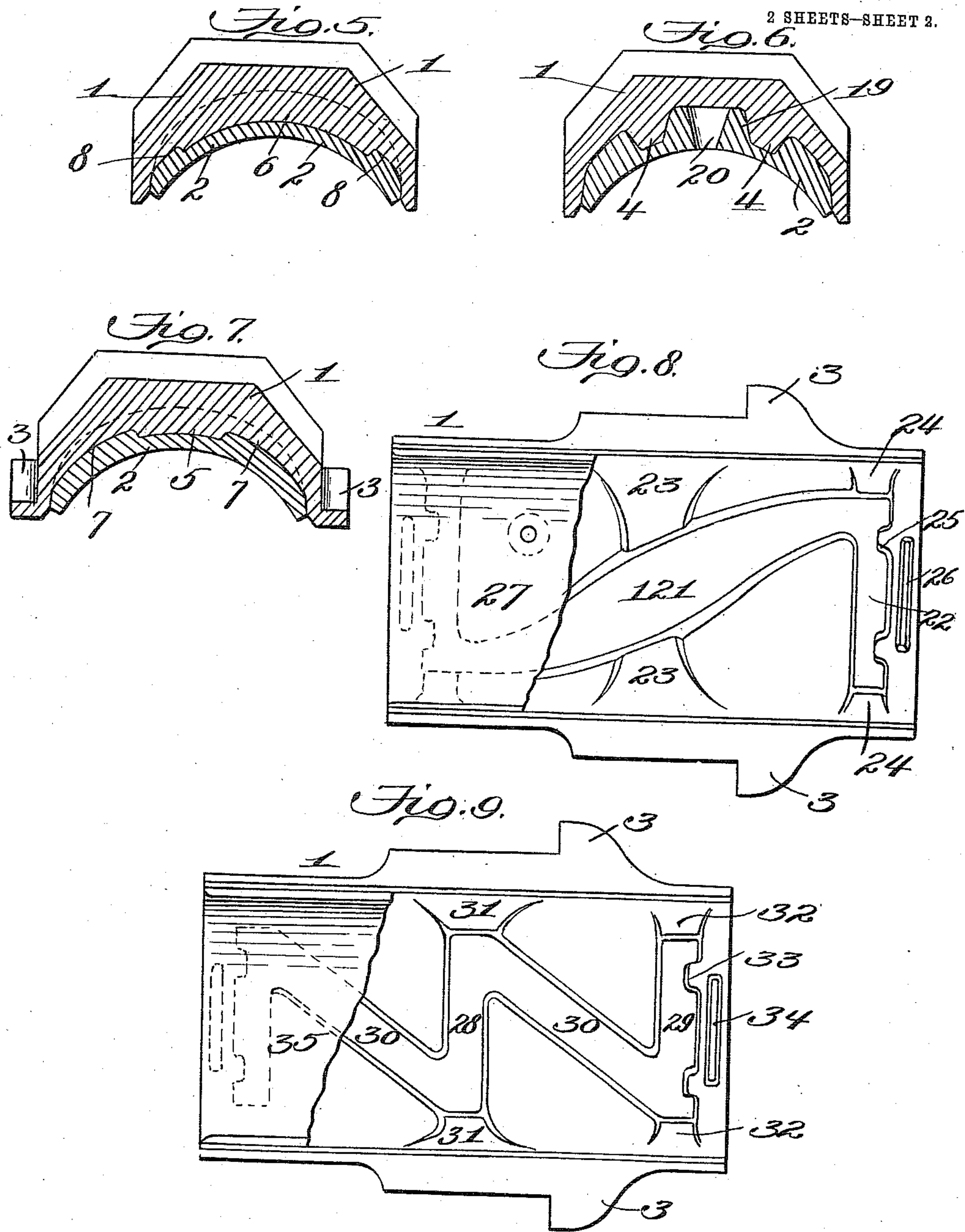
Inventor
Herman F. Schroder
By James L. Norris
Atty

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Witnesses:
Claude H. Kessler
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UNITED STATES PATENT OFFICE.

HERMAN F. SCHRODER, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS,
TO WILLIAM H. MINER, OF CHICAGO, ILLINOIS.

JOURNAL-BEARING.

985,460.

Specification of Letters Patent.

Patented Feb. 28, 1911.

Application filed January 25, 1909. Serial No. 474,070.

To all whom it may concern:

Be it known that I, HERMAN F. SCHRODER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Journal-Bearings, of which the following is a specification.

My present invention relates to improvements in journal bearings and more especially to the class adapted for use on railway cars, it being of the composite type embodying a hard metal shell and a relatively soft or bearing metal lining, and it has for its object to provide an improved bearing of this class wherein the hard metal shell and the soft metal lining are separably united by interengaging ribs and recesses whereby the lining may be renewed with facility, the formation of the ribs on the shell being such as will effectually reinforce the same whereby it may resist the pressures and strains imposed thereon and especially such torsional strains as are due to curves and other irregularities in the track.

Another object of the invention is to provide the bearing shell with ribs of an improved formation whereby a relatively large and properly distributed bearing area is provided, this bearing area formed by the ribs being continuous and is adapted to engage the journal should the soft metal lining wear or run out.

Another object of the invention is to provide the hard metal shell with fillets which connect the ribs at the four corners and at opposite sides of the center with the side walls of the shell, the construction and arrangement of these fillets being such as to provide an effectual reinforcement for the sides of the shell whereby they may sustain torsional strains, the central fillets also uniting the intermediate portions of the rib with the sides of the shell at points adjacent or opposite to the key-engaging ears whereby the pressures exerted on the latter may be effectually sustained, these fillets being of such dimensions as to perform the functions just stated without interrupting the continuity of the soft metal lining so that should the latter wear comparatively thin, its several sections will remain connected so that they cannot become displaced.

Further objects of the invention are to provide the shell with ribs which cross diagonally and are connected at their ends to form pockets whereby portions of the soft metal lining will be confined in such pockets should the marginal portions of the lining melt; to provide cavities in certain sections of the soft metal lining to contain and properly distribute a lubricant and, furthermore, to provide means for keying the end portions of the lining in place whereby they may resist the end thrust of the journal which would tend to displace them.

To these and other ends, the invention consists in certain improvements, and combinations and arrangements of parts, all as will be hereinafter more fully described, the novel features being pointed out particularly in the claims at the end of the specification.

In the accompanying drawing:—Figure 1 is a plan view of the under side of a bearing shell constructed in accordance with my present invention, this shell being of the Master Car Builders' type and is adapted for use upon railway cars; Fig. 2 represents a top plan view of the soft metal lining showing the recesses, pockets and grooves which inter-fit with the correspondingly formed ribs and projections within the shell, the shell and soft metal lining being thereby detachably united. Fig. 3 represents a central axial section taken through a bearing embodying the shell and soft metal lining as shown in the two preceding figures; Fig. 4 represents a longitudinal section through the bearing adjacent to one of its edges showing the fillets which unite the sides of the shell with the ribs; Figs. 5 and 6 represent transverse sections through the bearing taken on the lines 5—5 and 6—6, respectively, of Fig. 3; Fig. 7 represents a transverse section of the bearing on the line 7—7 of Fig. 3; and Figs. 8 and 9 illustrate two other forms of the invention, a portion of the soft metal lining being broken away in each instance to show the formation of the ribs and fillets in the shell.

Similar parts are designated by the same reference characters in the several views.

The present invention relates generally to bearings of the composite type and certain features thereof are of especial advantage in

connection with bearings of the type used upon railway cars.

In the accompanying drawing, I have shown certain forms of the invention, but it will be understood that these forms are shown merely as examples and, while they are well adapted to serve the purposes for which they are intended, certain modifications and changes may be made in the detail construction and arrangement of the parts whereby the invention may be applied to the best advantage in each particular case.

According to the present invention, the bearing comprises a shell 1 and a lining 2, the shell being composed preferably of brass or any other relatively hard metal or alloy which is able to withstand the pressures and strains to which such bearings are usually subjected, and the lining which is relatively softer may be composed of any suitable bearing metal or composition, such as Babbitt metal which is suitable as a bearing surface for the journal on the car axle. In this instance, the bearing is of the Master Car Builders' type and is provided, as usual, with the ears 3 at the opposite sides thereof to engage the keys or wedges in the journal box.

Practical experience has demonstrated that a journal bearing for railroad cars must resist pressures and strains, especially torsional strains which are due to curves and other track conditions at six different points on the bearing, that is to say, such strains must be resisted at the four corners and at each side of the center. Assuming that the bearing is pivoted at the center so as to provide for allowances in fitting the bearing to the key or wedge, sufficient strength must be provided to prevent spreading or crushing through the center, and at the same time the four corners of the bearing must be suitably connected to the body of the bearing so as to prevent distortion. The present invention provides a bearing which is capable of amply sustaining such strains by providing in the present instance diagonally arranged ribs which connect four corners of the bearing and cross at or in proximity to its center, torsional twisting of the bearing being thereby prevented and the pressure produced upon the center of the bearing is properly distributed throughout the extent thereof.

In that form of the invention shown in Figs. 1-7 inclusive, a rib is formed within the concavity of the shell which rib consists of four sections 4 which extend diagonally from the central or intermediate point of the shell and toward the four corners thereof. These sections of the rib cross at the center, or rather they merge into a central enlargement 5, while the ends of the diagonally extending rib sections extend to points in proximity to the opposite ends of

the shell and are connected by transverse rib sections 6, these transverse rib sections being located inwardly from the respective ends of the shell to provide spaces for the soft metal lining. The opposite sides of the central enlargement 5 are connected to the respective sides of the shell by fillets 7, these fillets being of a depth less than the depth of the said enlargement and as they approach the respective sides of the shell, they preferably decrease in depth and at the same time they flare or expand so that these fillets gradually merge into a relatively large area at each side of the shell. The opposite sides of each of these fillets are also preferably inclined so that these sides also gradually merge with the upper wall of the shell. The ribs are also connected to the four corners of the shell by similar fillets 8, these latter fillets being also of a depth less than that of the rib and they decrease in depth and expand in width as they merge with the respective side walls of the shell. In order to insure the maximum strength for the rib, the side walls thereof also taper or expand as they approach the upper wall of the shell. The outer sides of the transverse sections 6 of the rib are preferably provided with one or more keying recesses 9, and the upper wall of the shell is also preferably provided adjacent to each of its ends with a depression 10 which is preferably elongated, in a direction transversely of the bearing. In this form of the invention just described, the crossing of the rib and connecting of its ends forms a pair of triangular closed pockets 11, and the surface of the rib is continuous and circuitous throughout its extent and is preferably concentric with the edges formed at the opposite sides of the shell, the curvature of the bearing surface of the rib conforming closely to the curvature of the journal to which the bearing is to be applied.

The soft metal lining 2, according to the present invention, is separably united with the bearing shell by forming this lining with grooves or recesses which are exact counterparts of the rib, fillets and other projections which are formed in the shell so that the lining may be readily inserted into the shell and, when so inserted, will be accurately positioned and held therein and it shall receive uniformly the pressure which the shell sustains. This lining, therefore, is formed either by casting in a mold or otherwise with diagonally extending grooves 12 which match the diagonally extending rib sections 4, these grooves merging in a central enlargement 13 which matches the enlargement 5 of the shell. The diagonally extending grooves 12 are connected at their ends by the transverse grooves 14, shallow grooves 15 are formed at opposite sides of the central enlargement 13 and merge therewith so as to match the

central fillets 7 of the shell, the shallow grooves 16 are formed at the four corners of the lining so as to match the corresponding fillets 8 of the shell, the projections 17 are formed adjacent to the opposite ends of the lining and project into the connecting grooves 14 so as to cooperate with the keying recesses 9 of the shell, and a rib 18 is formed in immediate proximity to each end of the lining so as to enter the correspondingly shaped depressions 10 of the shell, an effectual interlock being thereby provided between the lining and shell which will prevent displacement of the latter, although the lining may be readily removed whenever it is necessary or desirable to renew it. The lining when so formed will also be provided with triangular sections 19 which are positioned and shaped to fit closely within the correspondingly shaped triangular pockets 11 in the shell.

In order to prevent heating of the bearing, suitable recesses or apertures may be formed therein to contain a lubricant. In Fig. 2 the lining is shown as provided with conical lubricant openings 20 which extend through the triangular sections 19, the upper and wider portions of these openings being closed by the top wall of the shell, while the smaller or contracted end of each opening is open at the bearing surface of the lining. If so desired, an additional set of lubricant openings 21 may be formed in the shell at opposite sides of the grooves 15 which receive the central fillets of the shell.

In this form of the invention, the triangular sections 19 of the soft metal lining are confined in corresponding pockets which are wholly surrounded by the rib on the shell and, as the bearing surface of this rib is continuous and is adapted to closely fit the journal, the metal in such pockets will be prevented from escaping should the bearing from any cause become sufficiently hot to melt the marginal portions of the lining so that damage or destruction of either the bearing shell or journal is avoided.

In composite bearings of this class, the end thrust of the collar on the journal tends to strip the ends of the lining from the shell. In the present construction, these end portions of the lining are effectually keyed in position so as to resist the torsion exerted thereon by the end thrust of the journal by the interengagement of the keys or projections 17 of the lining with the recesses 9 on the connecting sections for the ends of the rib, and also by the engagement of the transverse rib 18 of the lining with the corresponding depression 10 in the shell and, moreover, these end sections of the lining will remain connected with the central portions of the lining by that portion which extends across the shallow fillets 8, the latter being of a depth less than the depth of the rib so that

a portion of the soft metal lining will surround the rib, although the surface of the latter should bear directly on the journal after the soft metal is exhausted.

In that form of the invention shown in Fig. 8, the shell is provided with a rib which is formed somewhat differently from that shown in the preceding figures, the rib embodying a diagonally extending section 121 which extends from one corner of the shell diagonally to the opposite corner, and the ends of this diagonal section unite with a transversely extending rib section 22 which is arranged adjacent to each end of the shell, the central portion of the diagonal section 121 being preferably widened at its center and is connected at this point to the sides of the shell by the fillets 23 which are similar to the central fillets 7 in the preceding construction, and the opposite ends of the transverse rib sections 22 are united to the respective corners of the shell by the fillets 24 which are similar to the fillets 8 in the preceding construction. In this form of the invention, the outer sides of the transverse rib sections 22 are provided with keying recesses 25 and the transverse depressions 26 which interlock with corresponding projections and ribs which are formed on the lining, these keying recesses and depressions corresponding to the similar recesses and depressions which are formed in the preceding construction. The soft metal lining 27 separably fits the shell in this form as in the form first described.

In that form of the invention shown in Fig. 9, the concave inner wall of the shell is provided with a rib which consists of a central transverse rib section 28, a pair of transverse rib sections 29 which are arranged toward the opposite ends of the shell, and these transverse rib sections are connected by a pair of diagonal rib sections 30. In this form of the invention, the central rib section 28 is united with the opposite sides of the shell by means of the fillets 31, and the opposite ends of each rib section 29 are united with the corners of the shell by the fillets 32, the fillets 31 corresponding to the central fillet 7 of the construction shown in Figs. 1-7 inclusive, while the fillets 32 correspond to those lettered 8 in the construction first described. The outer sides of the transverse rib sections 29 are also formed with keying recesses 33 and the shell is also provided at points adjacent to each end with the transversely extending depressions 34 which are adapted to receive corresponding projections or ribs which are formed on the soft metal lining 35, the lining in this form of the invention also being separably united with the shell.

In each form of the bearing, it will be observed that the bearing shell is so reinforced by the rib as to effectually sustain such pres-

5 sures and strains as are imposed on the four corners and at each side of the center thereof, the shallow fillets also uniting the rib with the side walls of the shell whereby the latter is capable of sustaining crushing strains imposed on the supporting ears as well as torsional strains tending to twist the shell. The rib on the shell in each instance is also formed with a continuous face which is curved concentrically with the journal and is adapted to have a bearing thereon should the anti-friction lining wear or run out.

10 By uniting the rib to the shell by shallow fillets, the end portions of the soft metal lining remain united or connected with the middle portions thereof, and in order to further secure the end portions of the lining from displacement owing to abnormal end thrust of the collars of the journal, the outer sides of the transverse connecting sections of the ribs in each case are provided with keying recesses which receive corresponding projections on the lining and, furthermore, the shell has adjacent to each end, a depression which coöperates with a corresponding boss or rib on the lining.

Any desired number of the lubricating openings may also be used to prevent heating of the bearing, and in that form of the invention shown in Figs. 1-7 inclusive, two pockets are formed within the rib wherein sections of the anti-friction metal shall be confined should the remainder of the lining melt and run out, the rib in such a contingency serving as a primary bearing surface while the anti-friction metal thus confined together with its lubricant saves the bearing shell and journal from damage. In each instance, the lining is a counterpart of the shell so that it is properly positioned relatively to the journal and shell, and the lining is separable from the shell so that the lining may be readily renewed.

45 I claim as my invention:

1. A journal bearing comprising in combination, a main shell of hard, strong bearing metal and a removable liner shell of soft bearing metal, said shells having on their meeting faces interengaging longitudinally extending ribs and transversely extending end ribs, said longitudinally extending ribs of the main shell being bent or inclined inwardly or toward each other from both ends toward the middle, and the inner faces of the longitudinally extending ribs of the liner shell being inclined toward each other from both ends toward the middle, said longitudinally and transversely extending ribs of the main shell being continuously connected and said longitudinally and transversely extending ribs of the liner shell being continuously connected and surrounding at sides and ends said ribs of the main shell.

65 2. A journal bearing comprising in combination,

a main shell of hard, strong bearing metal and a removable liner shell of soft bearing metal, said shells having on their meeting faces interengaging, longitudinally extending ribs and transversely extending end ribs, said longitudinally extending ribs of the main shell being bent or inclined inwardly or toward each other from both ends toward the middle, said main shell having a broad intermediate bearing rib intersecting with said longitudinally extending ribs, and provided with extensions projecting beyond the outer edges of said longitudinally extending ribs, said longitudinally and transversely extending ribs of the main shell being continuously connected and said longitudinally and transversely extending ribs of the liner shell being continuously connected and surrounding and embracing the ribs of the main shell at the sides and ends.

3. A journal bearing comprising in combination, a main shell of hard, strong bearing metal and a removable liner shell of soft bearing metal, said shells having on their meeting faces interengaging, longitudinally extending ribs and transversely extending end ribs, said longitudinally extending ribs of the main shell being bent or inclined inwardly or toward each other from both ends toward the middle, said main shell having a broad intermediate bearing rib intersecting with said longitudinally extending ribs, and provided with extensions projecting beyond the outer edges of said longitudinally extending bearing ribs, and transversely extending shallow ribs extending beyond the end extensions of said broad intermediate rib, said longitudinally and transversely extending ribs of the main shell being continuously connected and said longitudinally and transversely extending ribs of the liner shell being continuously connected and surrounding and embracing the ribs of the main shell at the sides and ends.

4. A journal bearing comprising in combination a main shell of hard, strong bearing metal, and a separate piece removable liner shell of soft bearing metal, said main shell having narrow longitudinally extending bearing ribs and transversely extending end bearing ribs on its under face at its crown portion and transversely extending channels at its extreme ends, and said main shell having side walls embracing and confining the liner shell at its outer edges, the longitudinally extending bearing ribs of said main shell being inclined toward each other from each end toward the middle, said liner shell having transversely extending marginal end ribs embracing the outer recessed ends of the main shell, marginal side ribs and central lugs fitting between said bearing ribs of the main shell, said longitudinally and transversely extending ribs of the main shell being continuously connected and said lon-

gitudinally and transversely extending ribs of the liner shell being continuously connected and surrounding and embracing the ribs of the main shell at the sides and ends.

5 5. A journal bearing comprising in combination a main shell of hard, strong, bearing metal, and a separate piece removable liner shell of soft bearing metal, said main shell having narrow longitudinally extending bearing ribs and transversely extending end bearing ribs on its under face at its crown portion, and transversely extending channels at its extreme ends, and said main shell having side walls embracing and confining the liner shell at its outer edges, the longitudinally extending bearing ribs of said main shell being inclined toward each other from each end toward the middle, said liner shell having transversely extending marginal end ribs embracing the outer recessed ends of the main shell and marginal side ribs and central lugs fitting between said bearing ribs of the main shell, said central lugs of the liner shell having lubricant cavities, said longitudinally and transversely extending ribs of the main shell being continuously connected and said longitudinally and transversely extending ribs of the liner shell being continuously connected and surrounding and embracing the ribs of the main shell at the sides and ends.

6. A journal bearing comprising in combination a main shell of hard, strong bearing metal, and a separate piece removable liner shell of soft bearing metal, said main shell having narrow longitudinally extending bearing ribs and transversely extending end bearing ribs on its under face at its crown portion, and transversely extending channels at its extreme ends, and said main shell having side walls embracing and confining the liner shell at its outer edges, the longitudinally extending bearing ribs of said main shell being inclined toward each other from each end toward the middle, said liner shell having transversely extending marginal end ribs embracing the outer recessed ends of the main shell and marginal side ribs and central lugs fitting between said bearing ribs of the main shell, said main shell having a transversely extending middle bearing rib intersecting with said longitudinally extending bearing ribs, said longitudinally and transversely extending ribs of the main shell being continuously connected and said longitudinally and transversely extending ribs of the liner shell being continuously connected and surrounding and embracing the ribs of the main shell at the sides and ends.

7. A journal bearing comprising in combination, a main shell of hard, strong bearing metal, and a separate piece removable liner shell of soft bearing metal, said main

shell having narrow longitudinally extending bearing ribs and transversely extending end bearing ribs on its under face at its crown portion, and transversely extending channels at its extreme ends, and said main shell having side walls embracing and confining the liner shell at its outer edges, the longitudinally extending bearing ribs of said main shell being inclined toward each other from each end toward the middle, said liner shell having transversely extending marginal end ribs embracing the outer recessed ends of the main shell, and marginal side ribs and central lugs fitting between said bearing ribs of the main shell, said main shell having a transversely extending middle bearing rib intersecting with said longitudinally extending bearing ribs, and projecting at its ends beyond the outer edges of said longitudinally extending bearing ribs, said longitudinally and transversely extending ribs of the main shell being continuously connected and said longitudinally and transversely extending ribs of the liner shell being continuously connected and surrounding and embracing the ribs of the main shell at the sides and ends.

8. A journal bearing comprising in combination a main shell of hard, strong bearing metal, and a separate piece removable liner shell of soft bearing metal, said main shell having narrow longitudinally extending bearing ribs and transversely extending end bearing ribs on its under face at its crown portion and transversely extending channels at its extreme ends, and said main shell having side walls embracing and confining the liner shell at its outer edges, the longitudinally extending bearing ribs of said main shell being inclined toward each other from each end toward the middle, said liner shell having transversely extending marginal end ribs embracing the outer recessed ends of the main shell, marginal side ribs and central lugs fitting between said bearing ribs of the main shell, said marginal end ribs of the liner shell having upwardly projecting keying lugs, and the main shell having corresponding recesses to receive said keying lugs.

9. A journal bearing comprising a hard metal shell and a soft metal lining united therewith, the shell being provided with an interior rib adapted to be covered by the lining and having a continuous face adapted to bear upon the journal when such lining is exhausted, said rib having transverse sections arranged in proximity to the respective ends of the shell but offset inwardly therefrom, the outer sides of said transverse rib sections being provided with keying recesses, the shell being provided at points between the recessed portions of the rib and the respective ends thereof with depressions,

and the lining having projections to co-
operate with the keying recesses on said rib
sections and also having ribs or bosses to
engage in the depressions in the shell where-
5 by torsional strains upon the end sections of
the lining will be sustained.

In testimony whereof I have hereunto set

my hand in presence of two subscribing wit-
nesses.

HERMAN F. SCHRODER.

Witnesses:

O. M. STIMSON,
C. S. WOODRUFF.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."
