No. 726,790. PATENTED APR. 28, 1903.

S. R. WAGG.

REFINING ENGINE.

APPLICATION FILED NOV. 26, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

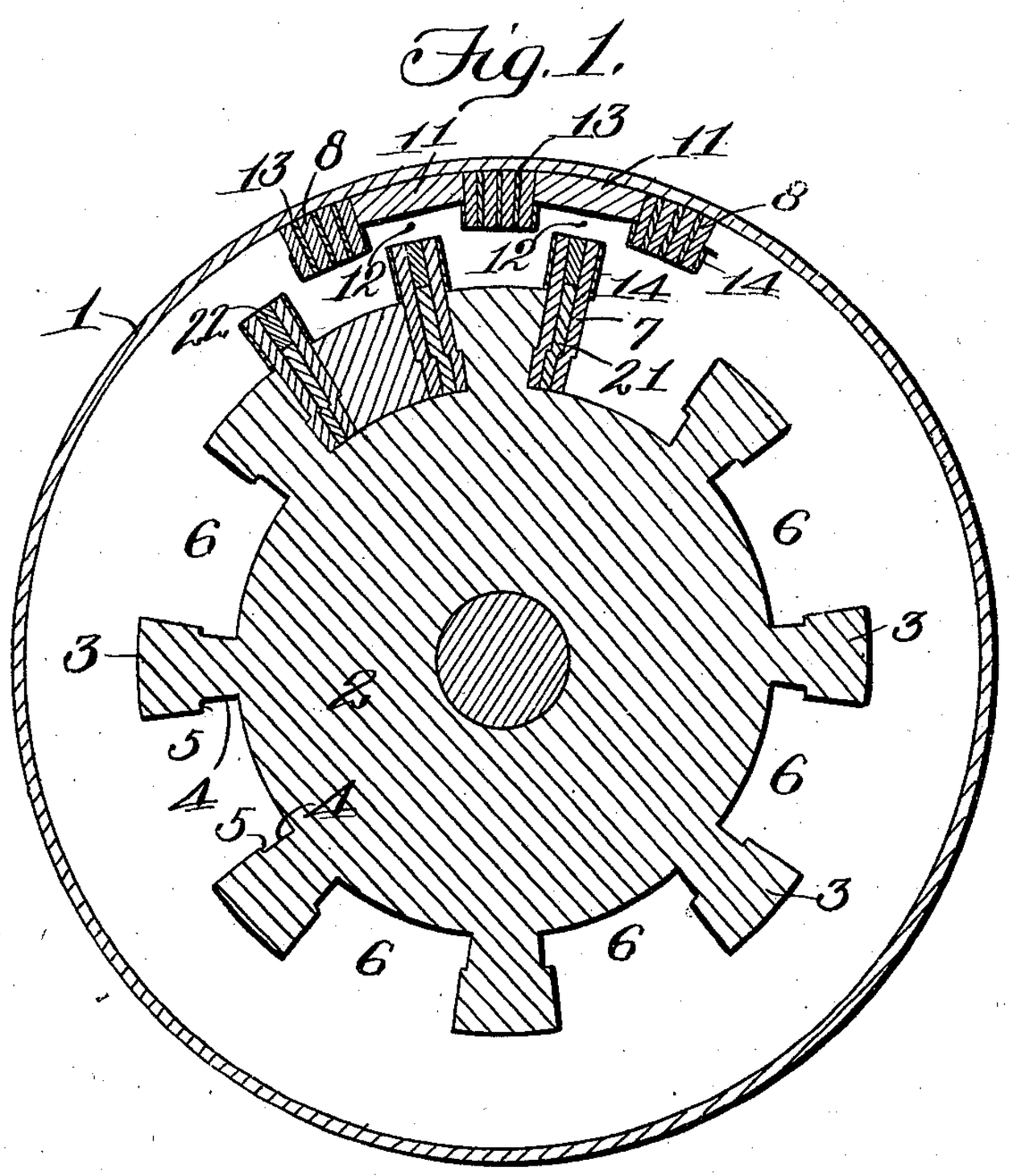


Fig. 2.

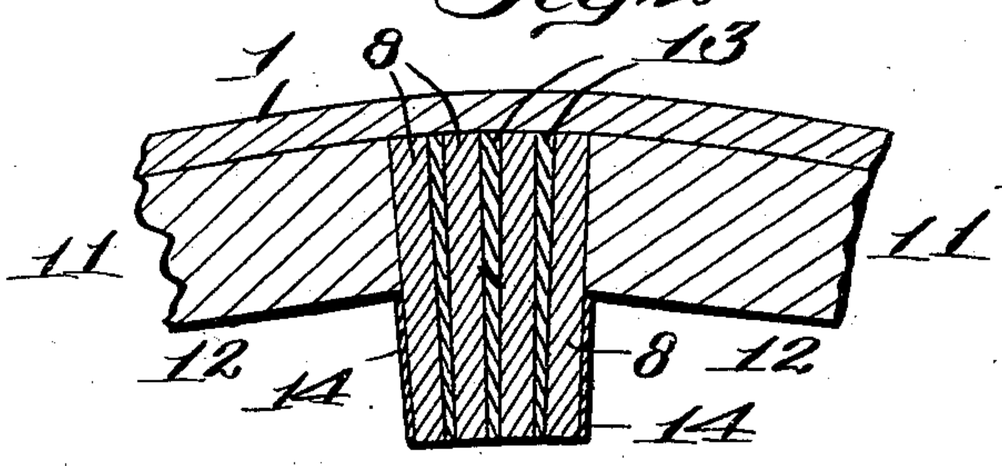
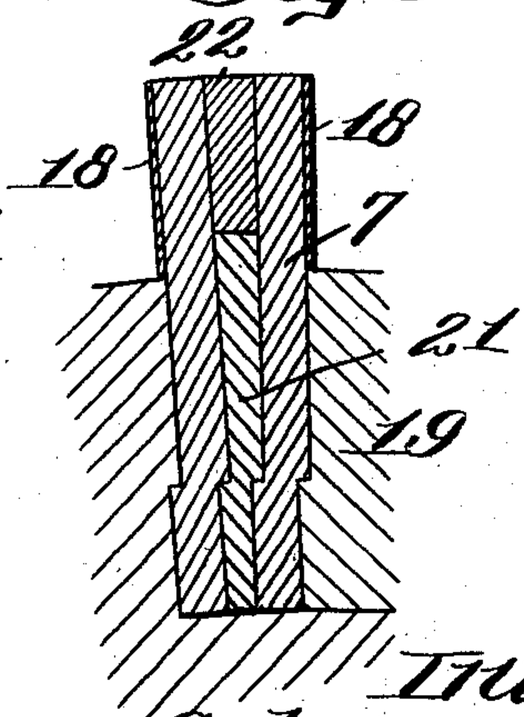


Fig. 3.



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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 4.

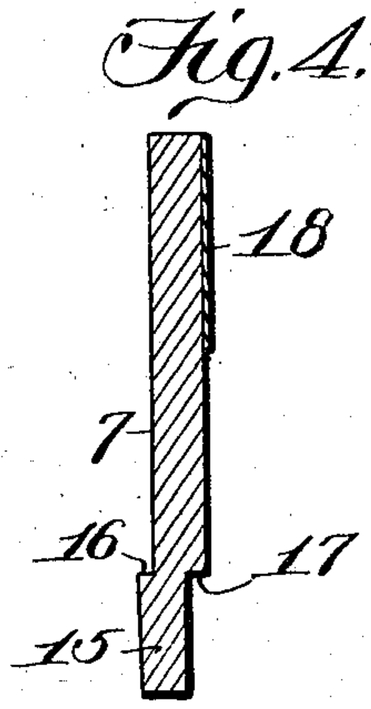


Fig. 5.

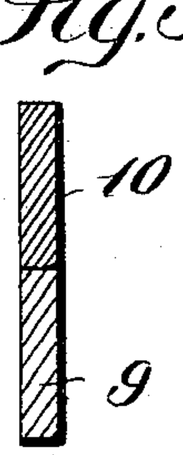


Fig. 6.

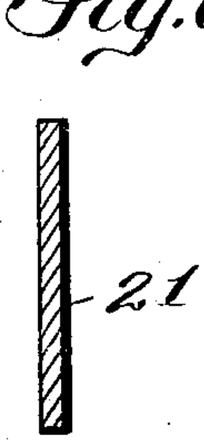


Fig. 7.

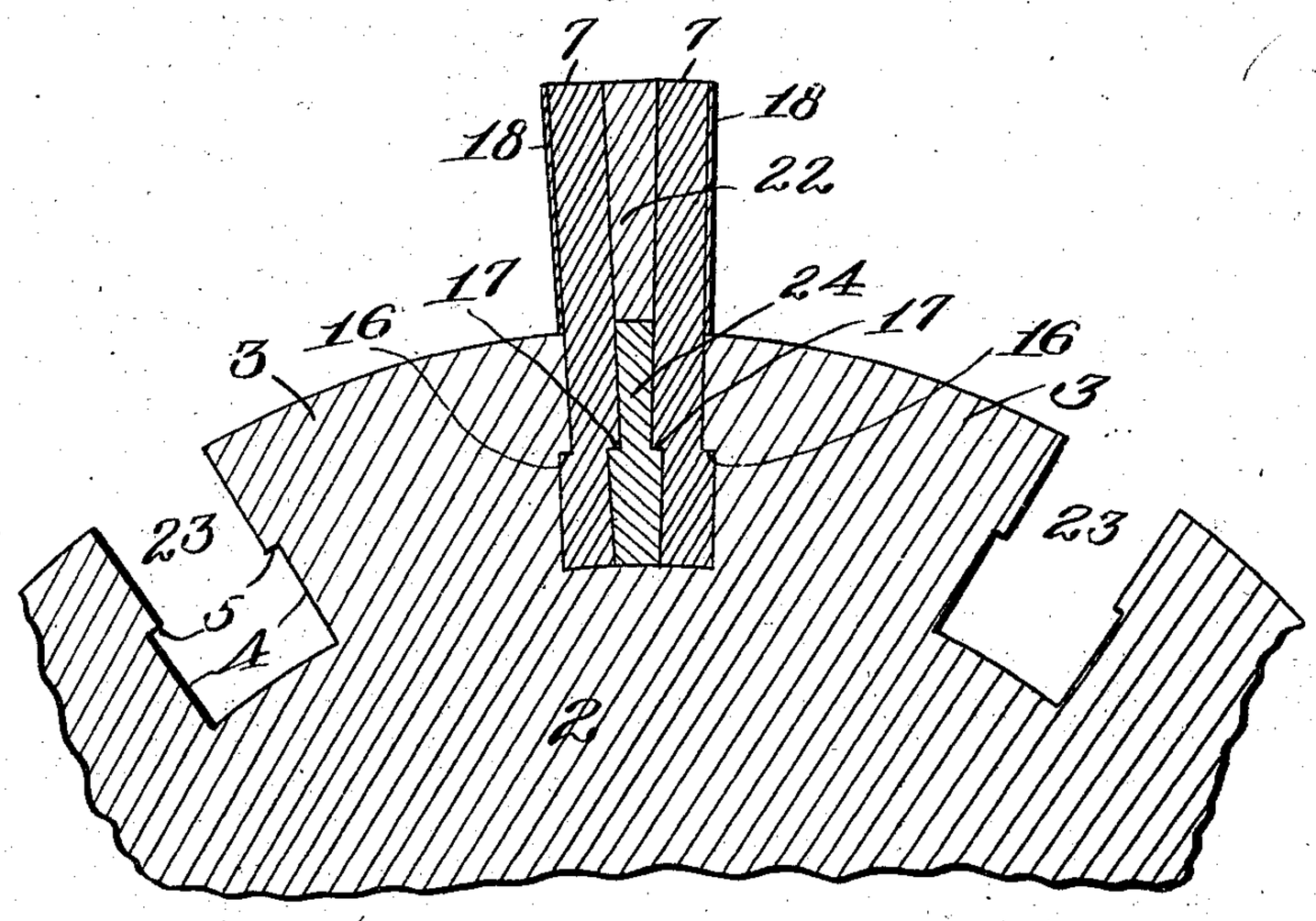
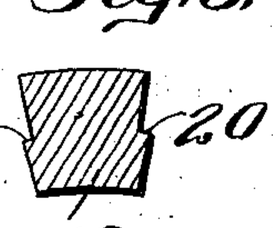


Fig. 8.



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UNITED STATES PATENT OFFICE.

SOLOMON R. WAGG, OF APPLETON, WISCONSIN.

REFINING-ENGINE.

SPECIFICATION forming part of Letters Patent No. 726,790, dated April 28, 1903.

Application filed November 26, 1902. Serial No. 132,947. (No model.)

To all whom it may concern:

Be it known that I, SOLOMON R. WAGG, a citizen of the United States, residing at Appleton, in the county of Outagamie and State of Wisconsin, have invented new and useful Improvements in Refining-Engines, of which the following is a specification.

My invention relates to certain new and useful improvements in refining-engines, and has for its objects to provide novel constructions of the bars which are adapted to be placed about the shell and plug of the engine and a novel manner of arranging and securing said bars in their respective positions.

In order that my invention may be clearly understood, I have illustrated the same in the accompanying drawings, in which—

Figure 1 is a cross-section through an engine of the Jordan type, a portion only of the shell and plug being supplied with bars. Fig. 2 is an enlarged sectional view of a portion of the shell, showing the outer bars of a group provided with a strip of acid-resistant metal forming a shoulder engaging the wedge-blocks and showing the wood filling between the blades. Fig. 3 is an enlarged sectional view of a portion of the plug, showing the manner of securing the blades therein. Fig. 4 is an enlarged view of a single blade for the plug. Fig. 5 is an enlarged view of a single blade for the shell, showing the two materials of which it is composed. Fig. 6 is an enlarged view of a strip or bar of lead used for insertion between two blades to lock them in place. Fig. 7 is an enlarged sectional view of a portion of the plug, showing a modified arrangement of the same blades; and Fig. 8 is a sectional view of a wedge-block for the plug.

Referring now to the drawings, 1 indicates the shell, and 2 the plug, of a Jordan refining-engine. The plug is provided about its periphery with a series of longitudinal ribs 3, extending, as will be understood, from end to end of the plug and undercut on each side to form recesses 4, having shoulders 5. Between adjacent ribs is afforded a longitudinal groove 6, in which the blades 7 are adapted to be secured in either one of the ways hereinafter described. The blades 8 of the shell may be formed from any preferred metal or combinations of metals, phosphor-bronze being preferably employed. This metal, however, as compared with steel, is very expensive. For purposes of economy, therefore, I have provided a construction of bar (shown in Fig. 5) in which the outer half or wearing part of the blade (indicated by 9) is of phosphor-bronze, while the other half, 10, is of steel. The two halves of the bar are welded together to form an integral structure or bar. The bars 8, formed of a single piece of metal or having the compound construction described, are assembled about the shell in groups of two, three, four, or more, the groups of bars being separated by the ordinary wedge-blocks 11, which are of less height than the bars, so as to provide a space 12 for the passage through the engine of the paper-stock. Between each pair of the blades 8 I place a wood pillar 13. Heretofore it has been common to partly fill the space between the blades with strips of wood glued together, the working edge of the blade projecting a considerable distance beyond this filling, and as the blades wore away a strip of wood would be pulled out from between the blades. As an example of this character of filling, reference may be made to my prior patent, No. 625,818, dated May 30, 1899. It is a fact well known to paper-manufacturers that single bars cut the fiber instead of drawing it out, and thereby weaken the paper, causing breakage on the paper-machine. The wear upon the blades due to impact with the stock and to the action of acid and alum used in sizing the stock is very great. I find that wood will protect the blades, being practically unaffected by the action of the acid, and I have therefore conceived the idea of filling the space between the blades in a group flush to the wearing edge of the blade. To do this, I take a single strip of wood, preferably soft pine, and place it between the blades, as more clearly shown in Fig. 2. These fillings not only protect all but the forward blade of the group, but being softer than the metal of the blades will in practice wear away in advance of the blades, but only to such an extent as to leave a scarcely-perceptible portion of the blades projecting beyond the wood. As a result the blades operate to rub the fiber, as it were, and draw it out, as distinguished from cutting it, and a superior product is produced

as a result. In order to protect the two outer blades of a group from the action of the acid, I secure to the outer sides of said blades a strip of an acid-resistant metal, such as brass or copper 14, which, as clearly shown in Fig. 2, form at their inner ends a shoulder to engage the wedge-blocks 11, and thus assist in holding them in position. The blades 7 of the plug in the process of rolling are provided at their inner ends with an offset portion 15, affording shoulders 16 and 17, oppositely disposed, as shown. Each of the blades 7 is also provided on its outer side with a strip of acid-resistant metal 18. The offset 15 is of a length to fit snugly within a recess 4 of a groove 6, its shoulder 16 being adapted to engage under the shoulder 5 of said recess. In assembling the blades about the plug two blades, with their offsets 15 similarly disposed, are placed in a groove 6 at each side thereof, as shown in Fig. 1, the shoulder 16 on each outermost blade of a pair engaging beneath the shoulder 5 in each rib 3. A wedge-block 19, which, as clearly shown, is provided with shoulders 20 for engaging beneath the shoulders 17 on the two innermost blades of each pair, is then inserted edgewise between the two pairs of blades, said wedge-blocks extending from end to end of the plug, as will be understood. A strip 21 of metal, preferably lead, (shown in detail in Fig 6,) is now inserted between each pair of blades and hammered or swaged until it has been forced to spread out and fill the space between the blades. By this means shoulders are formed on the metal strip 21, one of which engages under the shoulder 17 of one blade, while the other engages over the shoulder 16 of the other blade. Thus it will be seen that the four blades 7, the metal strips 21, and the wedge-block 19 are successively locked to each other and to the ribs 3 by the various shoulders described, and it will be impossible for any of these parts to fly out during the rapid revolution of the plug. It will be clear that as the strips 21 spread out while being swaged between the blades all of the parts named located within a groove 6 will be forced into firm contact with each other and with the ribs 3, and thus all looseness of the blades will be prevented. The lead strips 21 do not extend to the outer edges of the blades, as shown, and in the channel or groove thus provided between each pair of blades I wedge firmly a strip of wood 22, which extends flush to the outer edges of the blades and answers the same purpose as the filling-strips 13.

I wish it understood that if the blades 7 were arranged singly about the plug, as is the common practice, they would be provided on both sides with a strip of acid-resistant metal 18.

In Fig. 7 I have shown a modification in the arrangement of the blades about the plug. According to this plan the groove 23 afforded between two ribs 3 is made narrower than the groove 6, and the wedge-block 19 is dispensed with. Two bars only are inserted in the groove 23, and they are locked in place by means of a lead strip 24 swaged between them, forcing their shoulders 16 firmly under the shoulders 5 on the ribs 3 and itself being spread out to engage under the shoulder 17 of each bar. The wooden strip 22 is inserted between the bars to extend flush to the outer edge thereof as before.

Having thus fully described my invention, what I claim as new is—

1. In a refining-engine, a series of blades arranged therein in groups of two or more blades, and an acid-resistant plate secured to the outer side of the outside bar of each group in a manner to form a shoulder at the inner edge of said plate.

2. In a refining-engine, a series of blades arranged therein in groups of two or more blades, wedge-blocks separating the groups of blades, and an acid-resistant plate secured to the outer side of the outside bar of each group and forming shoulders engaging said wedge-blocks.

3. In a refining-engine, a series of blades arranged therein in groups of two or more blades, said blades having shoulders, and a soft-metal strip swaged between adjacent blades to engage the shoulders thereof.

4. In a refining-engine, a plug having a series of longitudinal ribs provided on opposite sides with shoulders, a series of blades inserted between adjacent ribs and having shoulders engaging those of the ribs, and a soft-metal strip swaged between adjacent blades to press the same firmly into engagement with said ribs.

5. In a refining-engine, a plug having a series of longitudinal ribs provided on opposite sides with shoulders, a series of blades inserted between adjacent ribs and provided on opposite sides with shoulders, the shoulders on the outermost blades of each series engaging the shoulders on the adjacent rib, and a soft-metal strip swaged between adjacent blades to engage the shoulders thereof and to press the blades firmly into contact with said ribs.

6. In a refining-engine, a plug having a series of longitudinal ribs provided on opposite sides with shoulders, a series of blades inserted between adjacent ribs and provided on opposite sides with shoulders, the shoulders on the outermost blades of each series engaging the shoulders on the adjacent rib, a wedge-block inserted between the blades in each series to separate the blades into groups of two or more blades, said wedge-block having shoulders engaging those of the adjacent blades, and a soft-metal strip swaged between adjacent blades to engage the shoulders thereof and to press the blades firmly into contact with said ribs and said wedge-block.

7. In a refining-engine, a series of blades arranged therein in groups of two or more blades, said blades having shoulders, a soft-metal strip swaged between adjacent blades to engage the shoulders thereof, and a filling

of a material softer than said blades inserted between the same and extending flush to the outer edge thereof.

8. A blade for refining-engines having its inner edge portion offset to afford shoulders on opposite sides of the blade.

9. A blade for refining-engines having its inner edge portion offset to afford oppositely-directed shoulders on the respective sides of the blade.

10. A bar for refining-engines having a plate of acid-resistant metal secured thereto and providing a shoulder at the inner edge of said plate.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

SOLOMON R. WAGG.

Witnesses:
GEO. H. PEERENBOOM,
P. L. SCHUELLER.