No. 791,843. PATENTED JUNE 6, 1905.

S. R. WAGG.

REFINING ENGINE.

APPLICATION FILED MAR. 11, 1903.

Fig. 1.

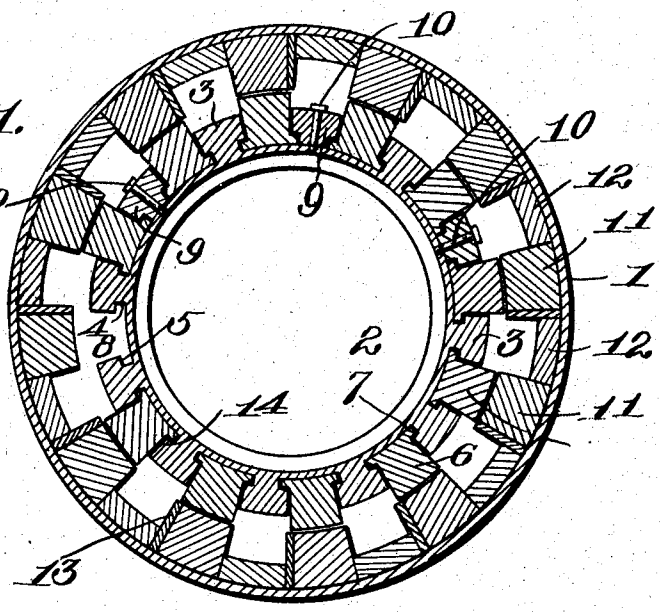


Fig. 2.

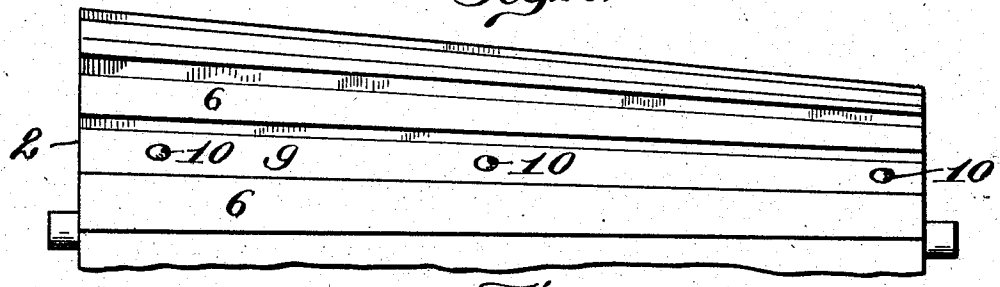


Fig. 3



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No. 791,843. Patented June 6, 1905.

UNITED STATES PATENT OFFICE.

SOLOMON R. WAGG, OF APPLETON, WISCONSIN.

REFINING-ENGINE.

SPECIFICATION forming part of Letters Patent No. 791,843, dated June 6, 1905.

Application filed March 11, 1903. Serial No. 147,321.

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.

This invention relates to a novel construction of refining-engine of the Jordan type, and has for its object to provide a novel arrangement of bars about the shell of the engine and to provide for reinforcing the stone bars to prevent them from crumbling.

As above briefly stated, refining-engines, whether of the Jordan or any other type, have, so far as I am aware, invariably had their plugs and shells provided with metal blades. It is found in practice that pulp submitted to the action of these metal blades is cut rather than drawn out, and the result is a paper-stock more or less brittle in character, and it has been recognized in the art as a great desideratum to provide a refining-engine which in operation would draw out the fiber of the stock rather than cut it, the former operation resulting in producing a stock with long fiber, and therefore possessing the maximum strength and pliability. It has been found that the action of stone upon stock, whether obtained from wood or rags or a combination of both, produces highly satisfactory results along the line indicated, and I have therefore conceived the idea of providing a refining-engine having bars of stone instead of metal.

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

Figure 1 represents a section through the shell and cone of an engine constructed according to my invention. Fig. 2 is a view in elevation of a portion of the plug, and Fig. 3 is a sectional plan view showing the interior of the shell to illustrate the novel manner of arranging the bars therein.

Referring now to the drawings, 1 indicates the shell, and 2 the plug, of an engine, the latter being provided with a series of longitudinal ribs 3, extending from end to end of the plug, and provided adjacent to the surface of the plug with undercut recesses 4, affording shoulders 5, said recesses and shoulders being provided on each side of each rib.

6 indicates the stone bars, which, as shown, are relatively very broad as compared with the ordinary metal bars now employed and are provided at their bottom sides and at each side with a lateral projection 7, which extends throughout the length of the bars. These projections 7 form shoulders which are designed to be received into the recesses 4 and engage the shoulders 5. I may adopt either one of two ways of securing the bars 6 about the plug—that is to say, I may insert the bars 6 endwise in the recess 8 between two ribs 3, or I may make each alternate rib 3 detachable, and having placed two bars 6 in position insert a removable rib 9 between them, so that its shoulders will bear upon the projections 7 of each bar, and then secure the removable rib 9 to the plug by means of suitable bolts 10. The ribs 3, which are not removable, will preferably be formed integral with the plug.

11 indicates the stone bars of the shell, which are secured in position in the ordinary manner and spaced the requisite distance apart by means of wooden wedge-blocks 12. In order to provide against crumbling of these bars in operation, I locate adjacent to the striking side of each of the bars 11 a metal bar 13, which will protect the edge of the stone bars. This metal bar 13, however, may be omitted. The inlet of these engines is always at the smaller end, and it is therefore desirable to have the bars spaced well apart in order that the stock may enter freely and be readily distributed about the engine and quickly shortened. In the further progress of the stock through the engine, however, it is desirable to bring the bars about the shell gradually closer together to secure the maximum action of the bars upon the stock. Accordingly in Fig. 3 I have illustrated a novel manner of arranging the bars about the shell. As ordinarily constructed the shell of a Jordan engine five feet long will be provided with four sections of bars each fifteen inches long. According to my novel arrangement of the bars, beginning at the smaller end of the shell 1, I show the bars 11 of the first section spaced a considerable distance apart, the bars

of the second section a less distance apart, the bars of the third section a still less distance apart, and the bars of the fourth section at the larger end of the shell at a still less distance apart. By this arrangement I not only provide for the ready inlet of the stock to the engine and its easy distribution, but also provide for a progressive treatment to reduce the length of the fiber gradually to the desired extent. As the stock enters the engine it is longer and stronger than at any other point in its progress through the engine, and consequently the bars at the smaller end of the engine should be stronger to resist the greater pressure which they have to bear than the bars at other points in the engine. Proceeding, therefore, according to the theory that as the stock approaches the larger end of the engine the wear and pressure upon the blades is less, owing to the greater reduction of the stock, I provide bars at the smaller end of the cone in the first section of considerable thickness, while the bars in the second, third, and fourth sections are successively of less thickness, as is clearly shown by Fig. 3. A further reason for this arrangement is that thick bars produce the least desirable stock—that is to say, stock that has been reduced by thick bars forms poorly and works slowly on the wire into a sheet of paper, whereas a thin bar makes a fine clear sheet that forms rapidly on the paper-machine into a sheet of paper. It is therefore desirable, as will be apparent, that the stock should be submitted to the action of thin blades to reduce it to the proper condition before it leaves the engine. Hence by this progressive arrangement of bars from thick to thin I also provide for the gradual reduction of the stock, the bars being proportioned in strength to the pressure that they have to bear at any given point in the progress of the stock through the engine.

In order to secure the stone bars 6 firmly in position without danger of breaking the same, I interpose between the sides of the ribs 3 and the sides of said bars layers of softer material, such as lead or other soft metal, wood, or rubber 14.

The metal bars 13 may be placed on both sides of the stone bars 11, if desired.

While I have described my invention in connection with a refining-engine, it will be obvious that the same may be applied equally well to the ordinary Holland engine, and such application or use is intended to be covered by the claims appended hereto.

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

1. In a refining-engine, a shell provided around its interior with a number of stone bars, and a metal plate located at the side of each of said bars and extending to the outer edge thereof.

2. In a refining-engine, a shell provided around its interior with a number of bars arranged in sections extending from end to end of the shell, the bars of one of said sections being of greater thickness than the bars of any of the other sections.

3. In a refining-engine, a shell provided around its interior with a number of bars arranged in sections extending from end to end of the shell, the bars in one section being of greater thickness than the bars of the section adjacent thereto.

4. In a refining-engine, a shell provided around its interior with a number of bars arranged in sections extending from end to end of the shell, the bars of the section at the inlet end of the shell being of greater thickness than the bars of the section adjacent thereto.

5. In a refining-engine, a shell provided around its interior with a number of bars arranged in sections extending from end to end of the shell, the bars in the said sections being successively of less thickness beginning at the inlet end of the engine.

6. In a refining-engine, a shell provided around its interior from end to end with a number of bars, the bars at the inlet end of the shell being of greater thickness than the bars at the outlet end.

7. In a machine of the character described, in combination with a revolving body carrying bars, an opposing stationary body provided on its interior with a number of bars arranged in sections extending from end to end thereof, the bars of one of said sections being of greater thickness than the bars of any of the other sections.

8. In a machine of the character described, in combination with a revolving body carrying bars, an opposing stationary body provided on its interior with a number of bars arranged in sections extending from end to end thereof, the bars in the said sections being successively of less thickness beginning at the inlet end of the engine.

9. In a machine of the character described, in combination with a revolving body carrying bars, an opposing body provided on its interior with a number of stone bars and a metal plate located at the side of each of said bars and extending to the outer edge thereof.

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.