D. J. HAYES.

RICE HULLER.

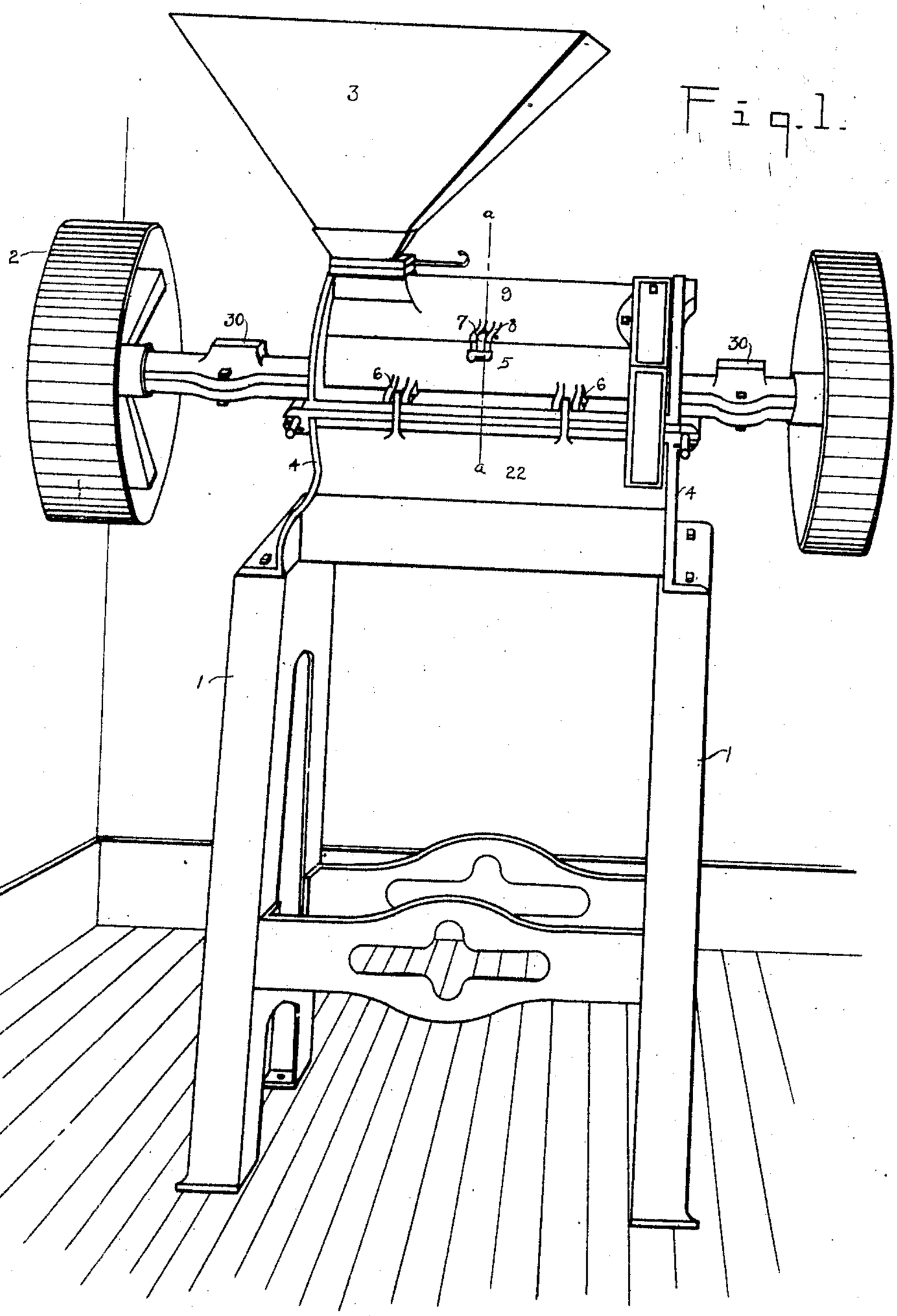
APPLICATION FILED NOV. 2, 1908.

918,048.

Patented Apr. 13, 1909

3 SHEETS—SHEET 1

Fig. 1.



WITNESSES:

Ernest Helbig.

Barbara Miller.

INVENTOR

Daniel J. Hayes.

BY

Edward V. Hardway

ATTORNEY

D. J. HAYES.

RICE HULLER.

APPLICATION FILED NOV. 2, 1908.

918,048.

Patented Apr. 13, 1909.

3 SHEETS—SHEET 2.

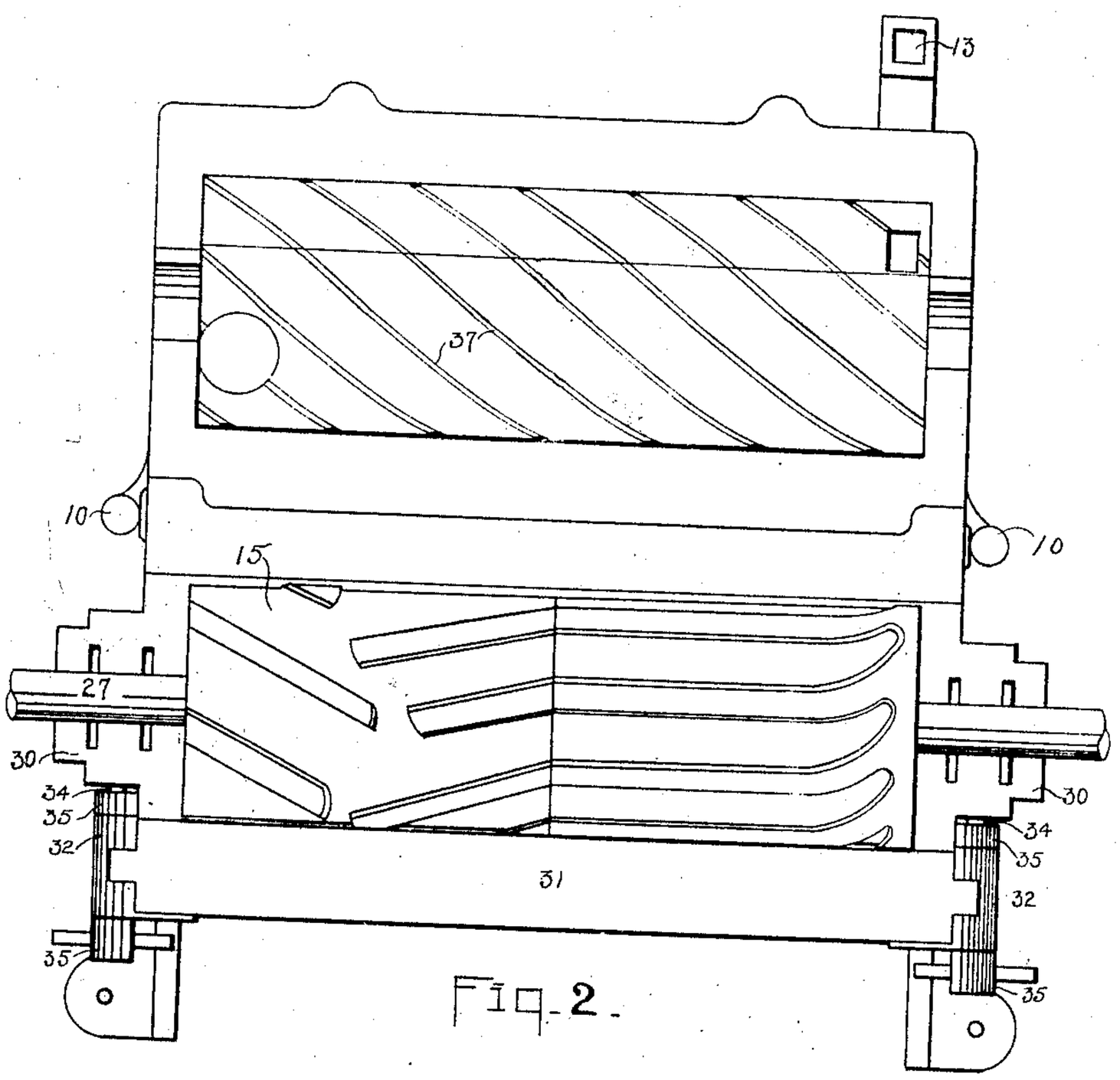


Fig. 2.

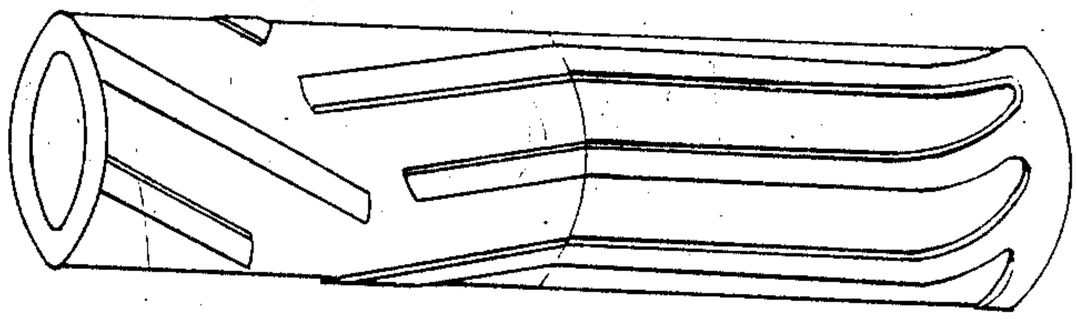


Fig. 3

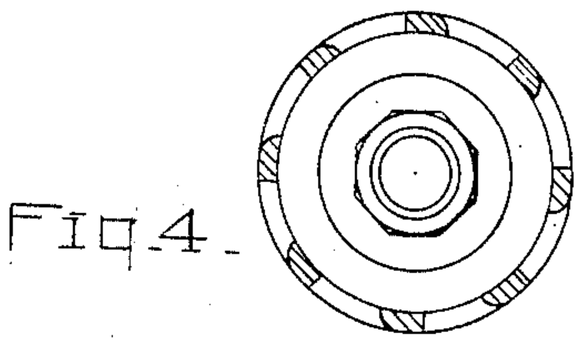


Fig. 4.

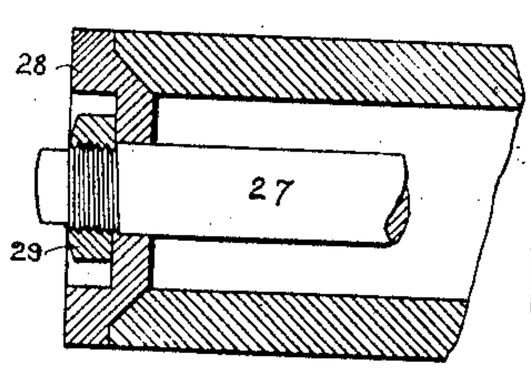


Fig. 5.

WITNESSES:

Ernest L. Ewing

La Vina Miller

INVENTOR

Daniel J. Hayes.

BY

Edward V. Hardway.

ATTORNEY

D. J. HAYES.

RICE HULLER.

APPLICATION FILED NOV. 2, 1908.

918,048.

Patented Apr. 13, 1909.

3 SHEETS—SHEET 3.

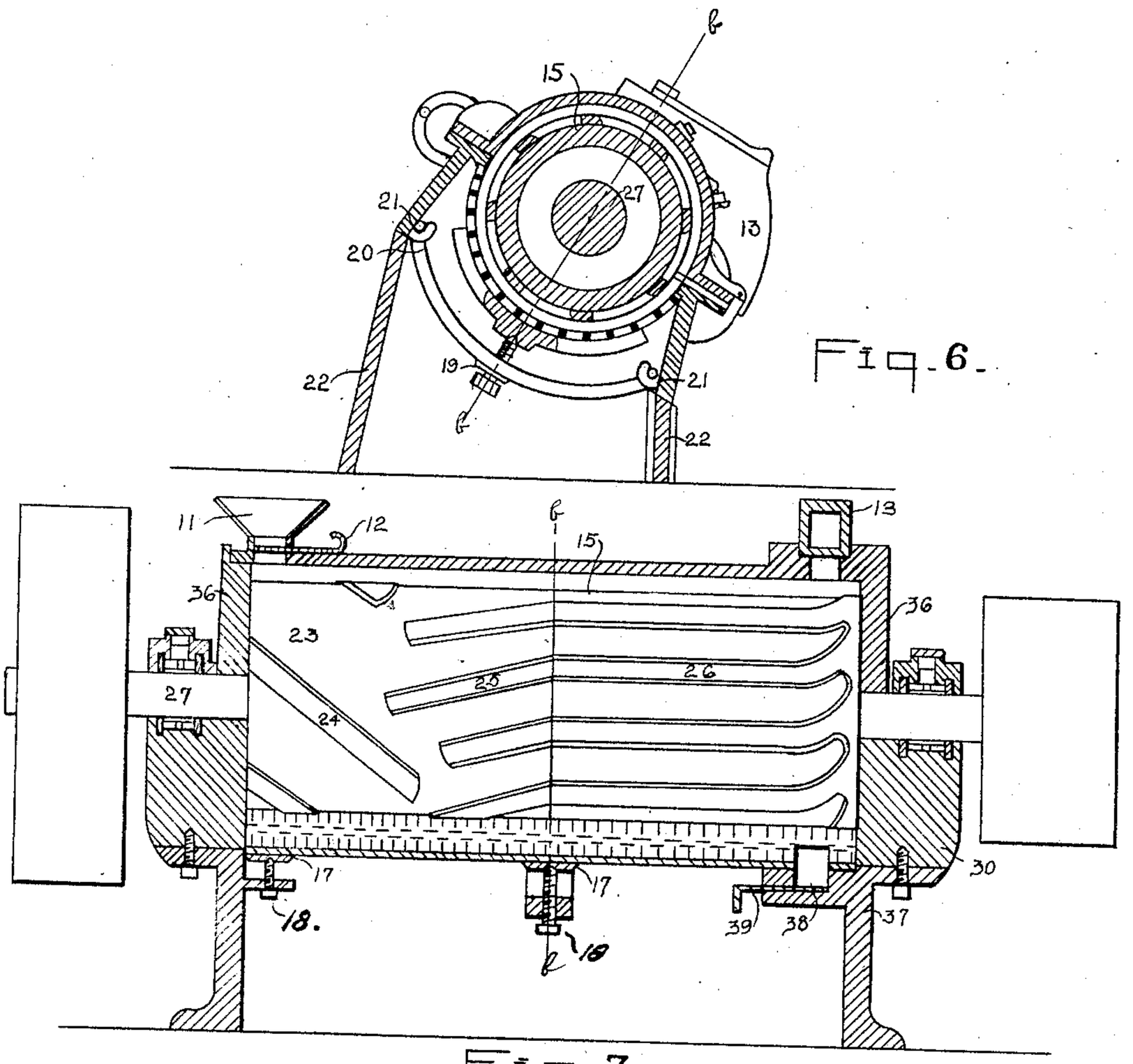


Fig. 6.

Fig. 7.

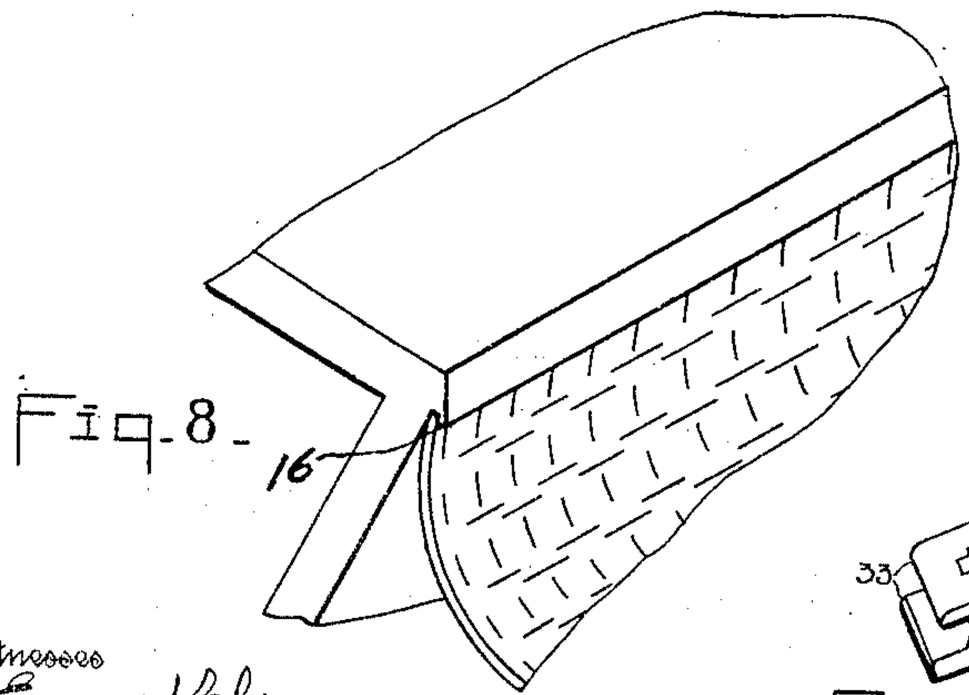


Fig. 8.

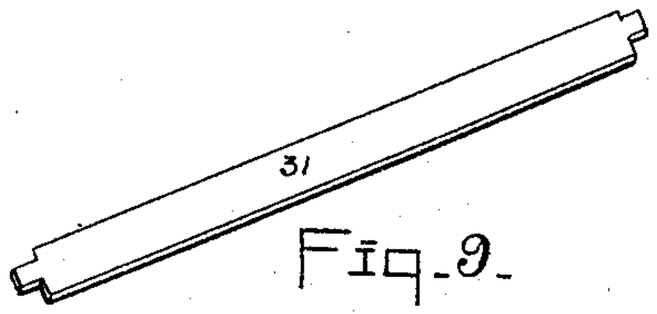


Fig. 9.

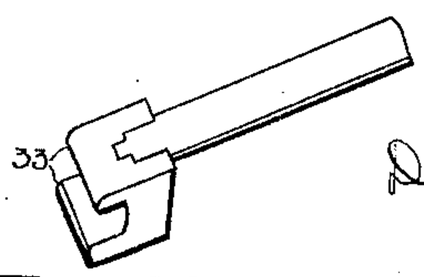


Fig. 10.

Witnesses
Ernest H. Gay.
La Vera Miller.

Inventor
Daniel J. Hayes.
By
Edward V. Hardway,
Attorney

UNITED STATES PATENT OFFICE.

DANIEL J. HAYES, OF HOUSTON, TEXAS.

RICE-HULLER.

No. 918,048. Specification of Letters Patent. Patented April 13, 1909.

Application filed November 2, 1908. Serial No. 460,640.

To all whom it may concern:

Be it known that I, DANIEL J. HAYES, a citizen of the United States, residing at Houston, in the county of Harris and State of Texas, have invented certain new and useful Improvements in Rice-Hullers, of which the following is a specification.

My invention relates to new and useful improvements in rice hulling machines.

The object of the invention is to provide a device of the character described which will remove all bran, cuticle and gummy coatings from the rice grain and also all of the hulls which may not have been removed by the sheller.

Another object resides in the provision of means whereby the above object may be attained without breaking or grinding the rice grain, or by reducing the number of grains which are necessarily broken to a minimum.

None of the hullers now in practical use will remove all this bran and hulls because all of them are so constructed that the rice cannot be retained in the huller and properly distributed along the cylinder shell for sufficient length of time but is crowded too rapidly toward the outlet end of the cylinder shell and thence to the outlet spout.

The chief object of my invention is to overcome this precipitate movement of the rice toward the outlet and to hold it more evenly distributed along the cylinder shell until all of the hulls and bran have been removed.

A still further object comprehends an improved casing whose internal surface is provided with spiraled corrugations and an improved type of hulling cylinders, adapted to coöperate with said casing and with an additional opposing abrading surface in the nature of a hulling blade, adjustably held in the casing to coöperate with the cylinder.

Finally the object of my invention is to provide a device whereby the above objects may be attained, and which will be simple, durable, and easily constructed and one in which the several parts will not be likely to get out of working order.

With the above and other objects in view my invention has particular relation to certain novel features of construction and operation, an example of which is given in this specification and illustrated in the accompanying drawings, wherein:

Figure 1 is a perspective view of the complete machine. Fig. 2 is a top plan view with the cover turned back. Fig. 3 is a perspective view of the hulling cylinder. Fig. 4 is an end view thereof. Fig. 5 is a longitudinal sectional view of one end of the same. Fig. 6 is a transverse sectional view of my complete machine taken on the line *a—a* of Fig. 1. Fig. 7 is a vertical longitudinal section of the same taken on the line *b—b* of Fig. 6. Fig. 8 is a perspective view of the screen. Fig. 9 is the blade. Fig. 10 is a perspective view of one form of means for fastening the blade.

Referring now more particularly to the drawings wherein like numerals of reference refer to similar parts in all the figures, the numeral 1 refers to the legs upon which is mounted the supporting frame of my machine which may be of any approved form to support the casing in either a horizontal or an inclined position. The latter position is preferred as it admits of a more convenient access to the cylinder casing and a lift of the grain toward the hulling plate.

The numeral 2 refers to the drive wheel and the numeral 3 to the hopper.

My machine proper rests upon the legs by means of the supporting frame which comprises the ends 4, 4, and front and back member 22, 22.

5 is a lower section of the casing which operates on hinges 6 and is held in a closed position by means of a latch 7 which engages with catch 8 upon the upper section 9 of the casing. The section 5 of the casing is designed to open downwardly and toward the front while the section 9 of the casing which carries the hopper 3 is designed to operate on a rear hinge 10 and open upwardly and rearwardly thus exposing the interior of the casing and the machine. These two sections are divided in the horizontal axial line of the huller cylinder and the front or meeting edges are arranged to fit closely against each other. The lower section of the casing includes the usual screen bottom and the screen 14 in my construction is detachably held in place in the manner best shown in Fig. 6 and described hereafter.

In Fig. 7 the numeral 11 is the hopper seat from which an opening leads to the interior of the casing. This opening is regulated in size by means of a slide gate 12 which controls the flow of the rice into the

huller. 13 is the outlet spout from the huller and is also shown in Fig. 1, Fig. 6 and Fig. 7.

In Figs. 6, 7, and 8 the huller screen 14 is shown in perspective and also in its proper position in relation to the hulling cylinder 15. This screen is made of sheet metal and is semicircular so as to partially encircle the cylinder. It is provided with a number of oblong annular perforations arranged in longitudinal rows, said rows alternating with rows of oblong longitudinal perforations all of which are designed to permit the passage of bran and hulls therethrough. The edges of this screen are held in position by means of inwardly projecting under cut flanges 16 upon the inner edges of the upper ends of the front and rear sides of casing section 22 which form seats for the edges of the screen and the screen's distance from the hulling cylinder is regulated by means of yokes 17 at the center and feed end which are supported upon bridges 20 and which may be raised and lowered by the set screws 18. These screws operate through threaded bosses 19 carried by bridges 20 which in turn have secure engagement at either end with hooks 21, extending from the inner walls of the lower member 22 of the frame. The screws may thus be raised and lowered in these bosses and as they press against the screen holders will thus control its movements. The discharge end of this screen is supported upon a solid bearing flange 37 integral with the end member 4 and has a discharge opening 38 which is provided with a cut off slide 39.

The hulling cylinder is a unit but may be cast into substantially, equal sections and the sections be secured together in any desirable manner. As there is great wear on this cylinder it must be chilled and is cast hollow and is merely a cylinder shell. The feed end 23 of this shell is provided with ribs 24 which extend from the end thereof in a spiraled manner, at any desirable angle, preferably about forty-five degrees from one-fourth to one half of the length of the entire cylinder shell. Alternating with these ribs another set of ribs 25 begin at about that section of the feed end of the shell where the ribs 24 end. The alternate ribs of this second set each extend back between the ribs of the first set in such a manner as to catch the grain that may drop off of the inner ends of the ribs 24. There is left sufficient transverse and annular space between these sets of ribs for the passage of the rice. This second set of ribs spiral at an angle preferably, twelve or fifteen degrees in a reverse direction from that of the first set of ribs, so as to give a reverse or retarding motion to the rice from that given by said ribs 24. These ribs 25 extend to the center, or beyond if desirable, of the cylinder shell at this angle and connect with ribs 26 which are practically a continuation of ribs 25 and which extend in an exact longitudinal direction with said shell, or with a very slight rearward spiral, as shown in Fig. 3, to the outlet end thereof. Near the outlet end of the cylinder shell the ribs 26 are given a gradual but decided upward curve which again retards the motion of the rice and at the same time insures a more efficient discharge of the grain from the outlet pipe 13. These ribs 24, 25 and 26 are integral with the cylinder shell and the sectional end view of either of them is substantially triangular in shape with the larger side of the triangle having a decided outward curve shown in Fig. 7. This arrangement of the ribs equally distributes the wear and friction of the cylinder shell and prevents the feed end from wearing out before the discharge end as is usually the case in rice hullers.

The cylinder shell revolves on a shaft 27 as shown in Figs. 4, 5, 6, and 7. This shaft is secured to said shell by means of conical shaped clamps 28 which fit in conical bearing surfaces in either end thereof, through which clamps said shaft passes and to which it is secured by means of nuts 29. This shaft operates in bearings 30 and carries the drive wheel 12.

The numeral 31 designates the blade which is a flat rectangular hard metal member whose opposite edges may be rounded, convexed or straight as desired and is singly or doubly shouldered at each end and is secured at either end thereof to blocks 32 which are slidably held in between the opposing flanges of the casing 5 and of the frame 22. These blocks have bifurcated extensions 33 to receive the adjusting screws 34 provided with collars 35 to hold them from longitudinal play on blocks 32 and the said screws 34 engage threaded sockets in the lower bearing portion 30 of the cylinder shaft bearing. These blocks are provided with shouldered seats for receiving the shouldered ends of the blade as shown in Fig. 10 and as the arms formed by the shoulders are centrally located at the ends of the blade the blade may be readily reversed, end for end or edge for edge.

The blade is located in front of and near the bottom of the cylinder shell, so as to cooperate with said shell is parallel therewith and is so positioned that the edge thereof comes into close proximity with the ribs of the cylinder shell; the distance being regulated by the set screws 33. The grain is thrown against this blade by the rotary motion of the cylinder shell and the desired friction is thus produced The upper or top sections 5 and 9 of the casing are provided with a plurality of rows 37 of corrugations, which rows are parallel with each other and spiraled around the inner surface of the cas-

ing as shown. Instead of corrugations, ribs may be used if desired.

The operation of my device is as follows: When the rice comes from the sheller, practically all of the bran and a portion of the hull is still on the grain. It is then poured in the hopper and passes gate 12 into the feed end of the cylinder shell. This shell revolves from the front of the machine and the ribs 24 being rearwardly spiraled forces the grain toward the outlet end. The grain then comes in contact with ribs 25, which being forwardly spiraled impart to it a retard motion and throw it back toward the feed end. This retard motion is overcome by the grain thrown from ribs 24, as these ribs are spiraled at a much greater angle than the ribs 25 and is gradually forced toward the discharged end of the cylinder. The upward curve of ribs 26 near the outlet end of the cylinder shell again gives a retarding motion to the grain and forces it into the outlet spout 13 which discharges it from the machine. The ribs 24, 25, and 26 are so shaped as to carry the grain around with the cylinder shell and the friction caused by the rice being brought into contact with the blade by reason of the rotating motion thus given to it together with the friction caused by the corrugations or ribs on the inner surface of the upper sections of the casing in connection with the two retard motions above described removes all of the bran and hulls from the grain. The bran and hulls pass through the screen 14 and are removed from the machine by any suitable means. End casings 36 fit closely against the ends of the cylinder shell and prevent the escape of the grain except through outlet 13. The grain is discharged through this outlet spout 13 from the huller.

While I have described this form of my device I do not desire to limit myself to the specified construction described herein but desire to vary the construction so long as the spirit of the invention is not departed from.

What I claim is:—

1. In a rice huller, a cylinder shell, having a feed end and an outlet end, said feed end being provided with a set of ribs extending from the outer end thereof in a spiraled manner about one-fourth of the longitudinal distance between the ends thereof, another set of ribs extending in a reverse spiraled manner from the first set and extending to about the longitudinal center of the cylinder shell and a third set of ribs uniting with the second set and extending in an exact longitudinal direction with said cylinder shell to the outlet end thereof, each of said third set of ribs being provided with an upward curve near the outlet end thereof, the ribs of each set being substantially parallel with each other and being a uniform distance apart, and longitudinal spaces being left between the ribs of the first and second sets.

2. In a machine of the character described the combination with a huller blade and a casing, the latter having an inlet at one end and a discharge outlet at the other end: of a hulling cylinder provided with three sets of ribs, the first of which extend spirally from the feed end of said cylinder to a point intermediate the ends thereof, the second of which begin near where the first set terminate and extend in a spiraled direction the reverse of that of the first set to a point near the center of the cylinder and the third of which sets connects with the second and practically continue the same in a longitudinal direction with said cylinder to a point near the discharge end of the same and end in a gradual upward curve, the aggregate length of the three sets of ribs being equal to the length of the cylinder.

3. A hulling cylinder comprising a hollow shell whose body portion is of a uniform diameter, said body portion carrying ribs integral therewith, said ribs being divided into three sets, those of the first set curving spirally rearwardly from the feed end of said shell, those of the second set curving spirally forwardly from a point near the termination of the first set to a point near the longitudinal center of the shell and those of the third set being a practical continuation of those of the second set, each to each, extending in a substantially longitudinal direction to the outlet end of the shell.

4. In a machine as described, a casing, a hulling cylinder having ribs that extend lengthwise of the cylinder but not continuously, the entrant ends of the same curving rearwardly and spirally to a point intermediate the feed end of said cylinder and the longitudinal center thereof, and after suffering a break in their continuity extending forwardly in a curved and spiraled direction to a point intermediate the said break and the outlet end thereof and then to the outlet end of the shell and terminating with an upward and forward curve.

In testimony whereof I have signed my name to this specification in the presence of the two subscribing witnesses.

DANIEL J. HAYES.

Witnesses:
ED. E. ROGERS,
HARRY A. SHAFFER.