

Oct. 23, 1934.

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1,977,653

REPULPER DRIVEHEAD

Filed July 25, 1931

4 Sheets-Sheet 1

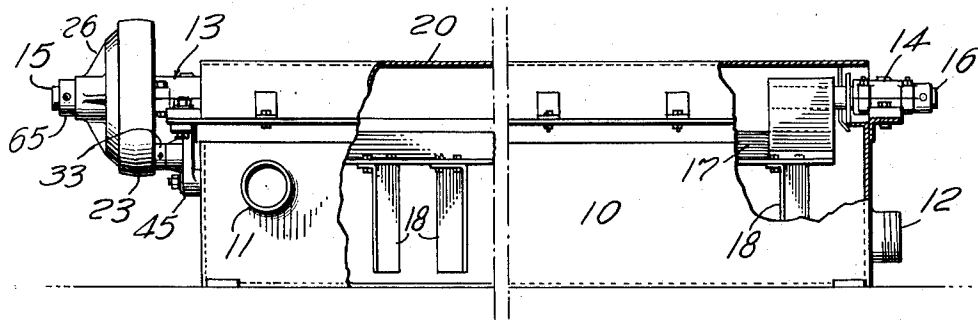


Fig. 1.

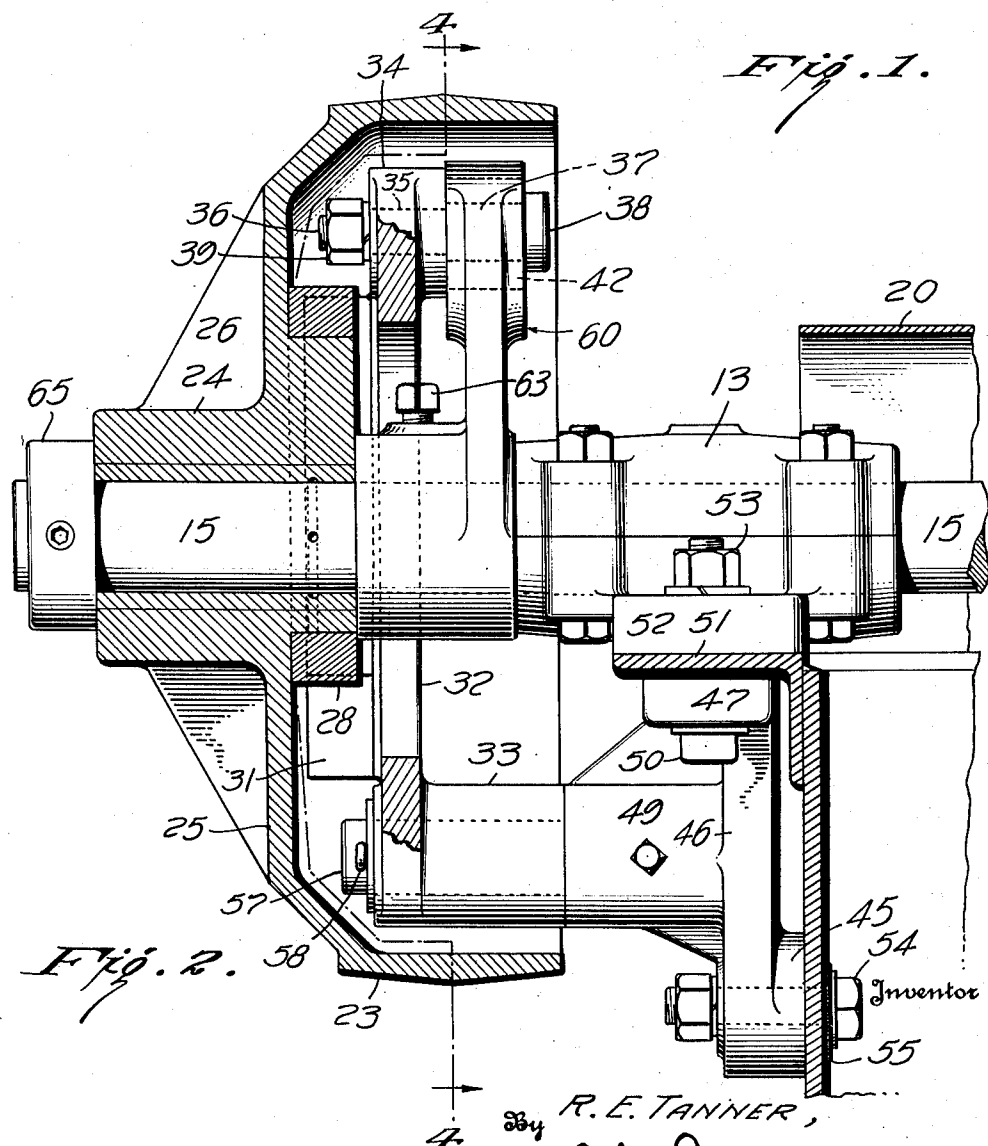


Fig. 2.

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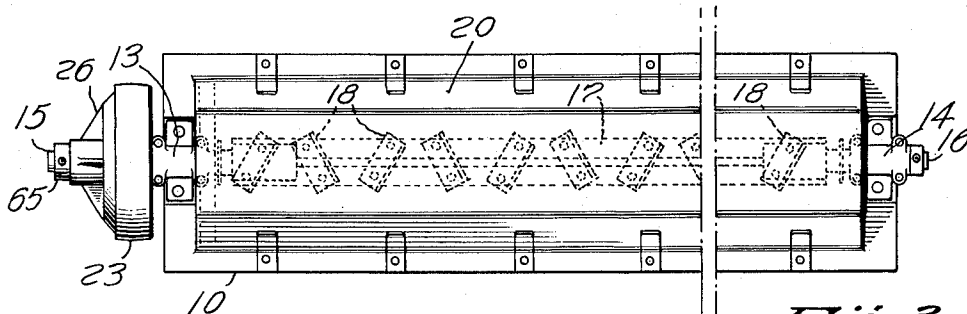


Fig. 3.

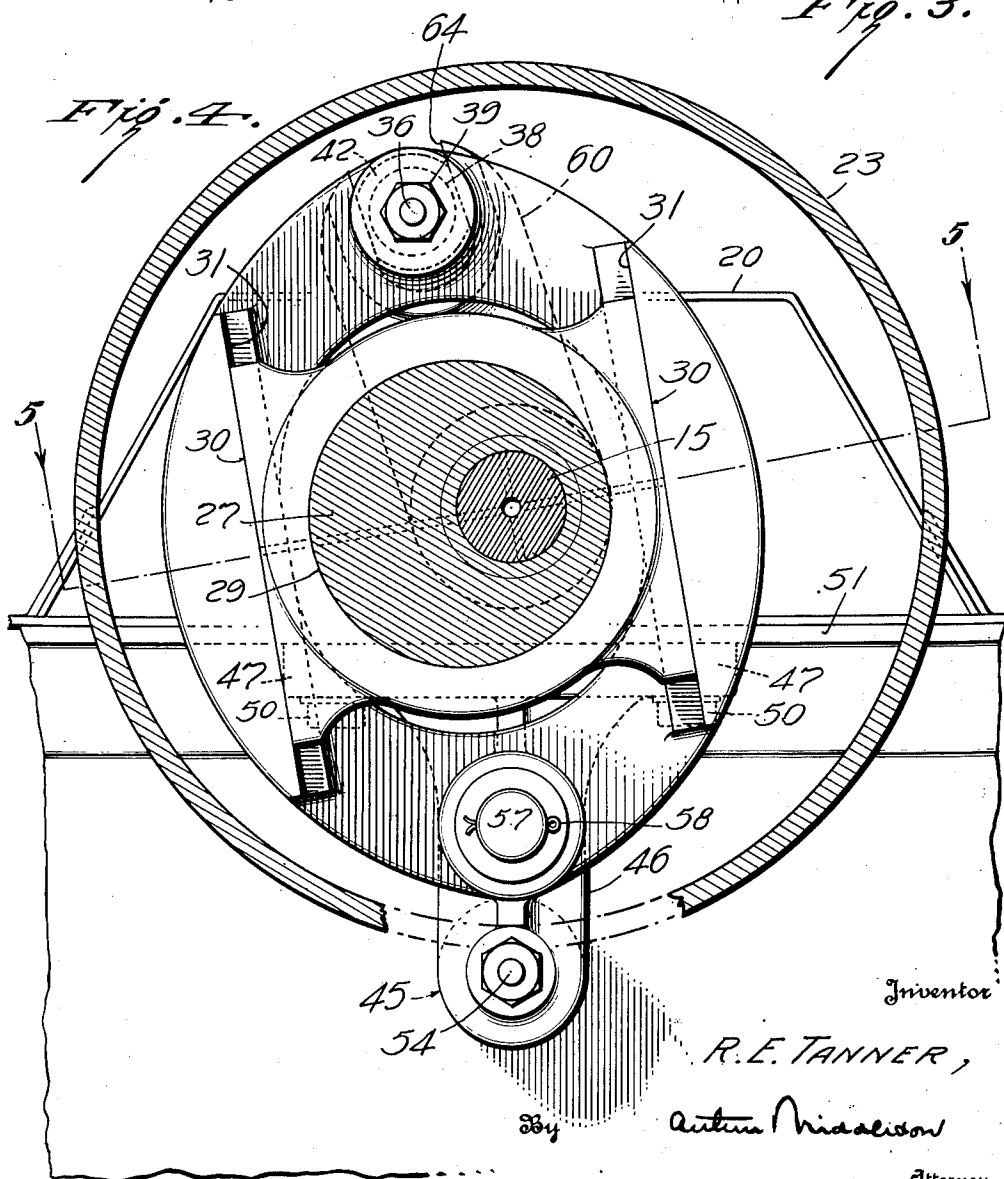


Fig. 4.

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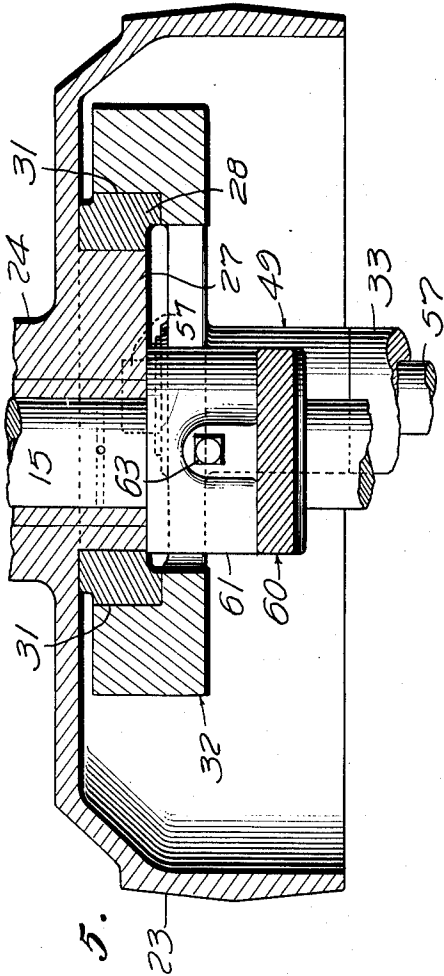
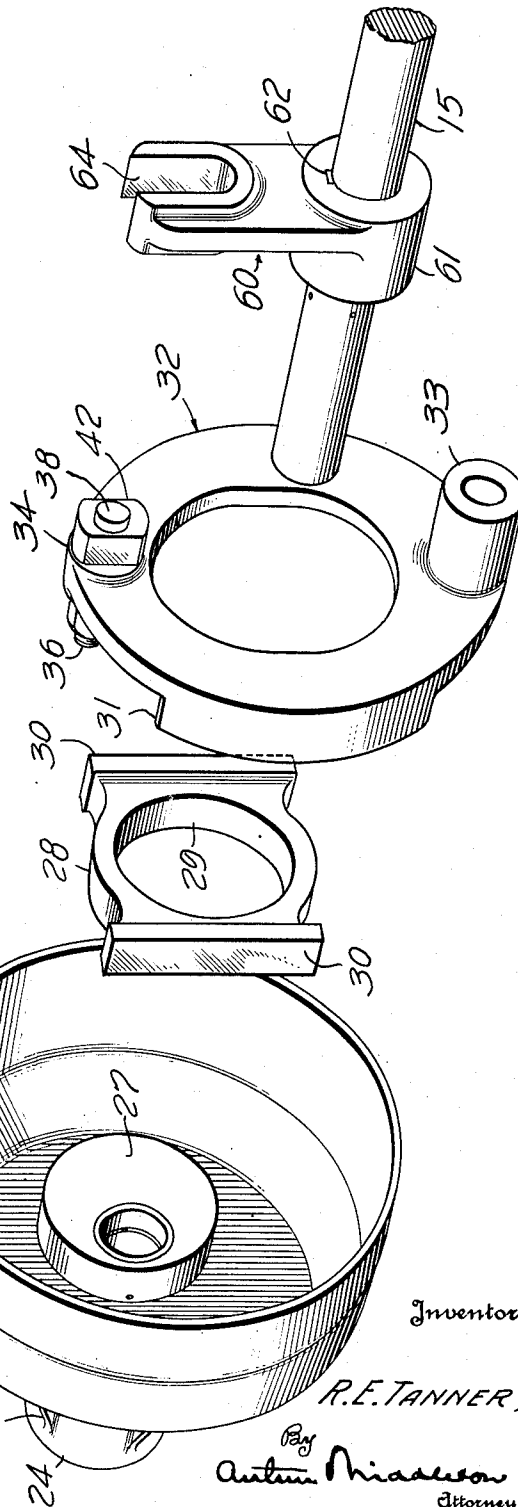


Fig. 5.

Fig. 6.



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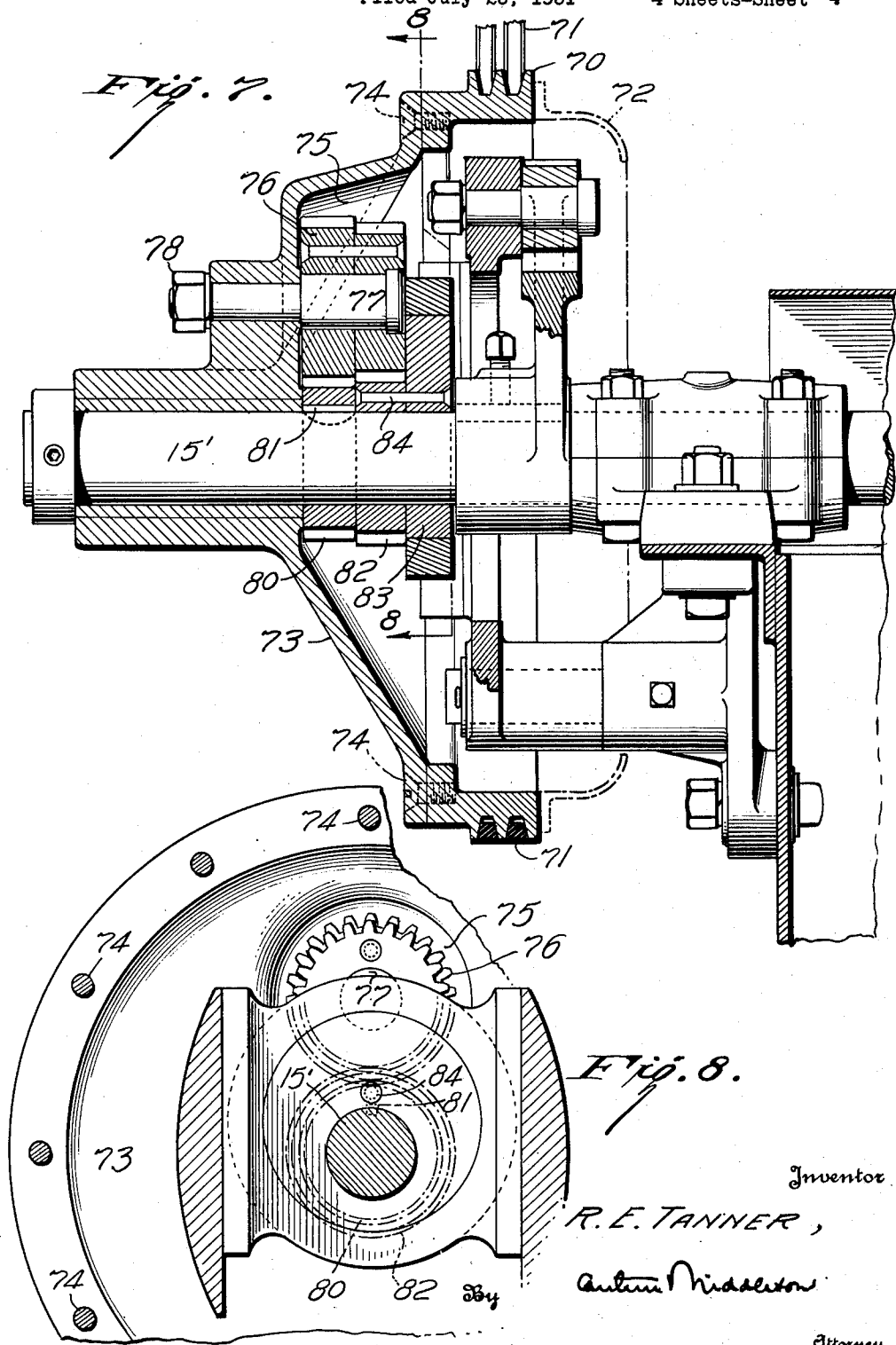
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REFULPER DRIVEHEAD

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4 Sheets-Sheet 4



UNITED STATES PATENT OFFICE

1,977,653

REPULPER DRIVEHEAD

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Application July 25, 1931, Serial No. 553,138

14 Claims. (Cl. 74-75)

My invention relates to repulpers in general, and particularly to a novel means of driving the same.

One of the principal objects of my invention is the provision of an extremely simple, highly effective, and self-contained driving means, which may be conveniently located with respect to the repulper and its drive shaft, whereby the repulper beam may be effectually driven with the medium amount of power.

A further object of my invention resides in the construction of a repulper trough and its associated driving means, whereby the repulper blades are given a reciprocating movement by means of a continuously driven housing. The invention therefore, may be said to contemplate the provision in a repulper of housing within a driven pulley means for converting rotation of the pulley into oscillatory motion of the repulping elements.

Features of this invention relate to the arrangement in the drive mechanism of an oscillating yoke surrounding a projecting end or stub portion or extension of the repulper beam, to the manner of mounting the yoke relative to the adjacent structural elements of the repulper, furthermore to the manner of compactly and yet accessibly combining and arranging the elements of the mechanism relative to each other and to the repulper, and in view of such arrangements the manner of housing the elements in a driving pulley or casing which is concentric with the rotary axis of the repulper beam.

In the drawings, in which the same reference characters refer to the same parts throughout, preferred embodiments of my invention are illustrated. In the drawings

Figure 1 shows a side elevation partly broken away, illustrating a repulper embodying my invention;

Figure 2 shows a longitudinal sectional view taken from a portion of the trough and illustrating the driving head;

Figure 3 shows a top plan view showing my improved repulper with the oscillatory mounted shaft and its respective blades in dotted lines;

Figure 4 shows a transverse sectional view taken on the line 4-4 of Figure 2;

Figure 5 shows a horizontal sectional view taken on the line 5-5 of Figure 4;

Figure 6 shows a view in perspective illustrating several members of the rotatable head or driving mechanism in their separated position;

Figure 7 shows a longitudinal sectional view similar to Figure 2, showing another embodiment of my invention; and

Figure 8 shows a detail sectional view taken on the line 8-8 of Figure 7, and looking in the direction of the arrows.

My invention, in the forms or embodiments shown in the drawings may be briefly described as comprising a repulper trough 10, having suitably located inlet and outlet openings 11 and 12, and a pair of bearings 13 and 14, preferably mounted at the upper ends thereof, for the purpose of receiving the oscillatory mounted stub shafts 15 and 16. These stub shafts 15 and 16, it will be noted, are bolted or otherwise secured at each end of the beam 17. A plurality of reversely deflected blades 18, are secured to the lower side of the beam 17, for the purpose of thoroughly agitating the contents within the tank 10.

A cover 20, is fitted to the upper surface of the trough 10, and preferably extends along the substantial length thereof, for the purpose of preventing any splashing when my improved repulper is in operation.

Referring now particularly to Figures 2, 4, 5 and 6, which illustrate one embodiment of my invention for oscillating the beam and its respective blades 17 and 18, by means of a continuously driving wheel or pulley. The pulley 23, of the driving head is provided with an outwardly extending hub portion 24, which may be provided with a suitable bushing to permit of its free rotation upon the stub shaft 15. The pulley 23, may be provided with a closed outer end, indicated as at 25, and suitably spaced strengthening ribs 26, integrally formed therewith.

An eccentric hub extension 27, is formed on the inner side of the end wall 25, upon which is mounted an eccentric block 28. The eccentric block 28, is provided with a bore 29, and is adapted to be fitted upon the outer surface of the eccentric 27, for movement in a predetermined circular path. The eccentric block is further provided with a pair of parallel guide members 30, which are properly machined and fitted for reciprocatory movement between the guideways 31, formed upon one side of the yoke, indicated generally as at 32.

The yoke 32, which is substantially elliptical in form, is provided on its lower end with an inwardly extending lug or trunnion 33, adapted to serve as a pivotal means for the yoke. The upper end of the yoke 32, is provided with a slightly enlarged boss 34, through which is formed an opening 35, for the reception of the bolt 36. This bolt 36, is formed with a slightly enlarged cylindrical portion 37, and a headed end 38, which will permit of its being securely held against its re-

spective boss 34, by means of the nut 39. A block 42, having a pair of parallel bearing surfaces is provided with a bore and is adapted to freely oscillate upon the enlarged end of the bolt 36, and to be confined between the outer surface of the boss 34, and the head 38, of the bolt 36.

The bracket, indicated generally as at 45, is firmly secured near the upper end of the trough 10, adjacent to the drive pulley 23, for the purpose of rigidly supporting the yoke 32, and its adjacent bearing 13, thereby eliminating all undue vibration. This bracket 45, is provided with a body portion 46, having a pair of horizontally disposed lugs or extensions 47, an enlarged boss 48, at its lower end and a forwardly extending integrally formed hub 49. The lugs 47, are provided with suitable openings for the reception of the bolts 50, which are extended upwardly and through the angle 51, and the base portions 52, of the bearing 13, are securely held in their assembled position by means of their respective nuts 53. In like manner the bolt 54, secures the boss 48, to the end of the trough 10. A suitable gasket 55, may be employed adjacent the bolt 54, for the purpose of absorbing vibration and at the same time seal that portion of the trough against leakage. A pin 57, is supported from the hub 49, and is adapted to support the yoke 32, through the medium of its integrally formed trunnion 33. The yoke is now held in its operative position upon the pin 57, against accidental displacement by means of the cotter pin 58. It is thus to be noted that the bracket is arranged to fit into the angular space available below the angle or flange 51 for secure, convenient and rigid mounting. It can be seen that the novel driving mechanism is capable of being adapted to standard parts at the end of the repulper without essential structural changes thereof.

It will now be obvious that the rotation of the pulley 23, and its eccentric 27, will impart a circular path of movement to the eccentric block 28, which in turn causes the rocking or oscillation of the yoke 32, upon its pivotal lug or trunnion of 33. The limit of the side motion or the extreme position of the yoke 32, in one direction may be clearly seen by referring to Figures 4 and 5 of the accompanying drawings.

Having already described how the rotation of the pulley 23, oscillates the yoke 32, independent of the stub shaft 15, I now describe my novel means for reciprocating the stub shaft 15, and the beam 17, with its associated depending blades 18. A forked arm 60, is provided with a hub 61, through which may be fitted a suitable key 62, and a set screw 63, for securely clamping this arm to the stub shaft 15. The upper end of this arm 60, is slotted, as shown at 64, the opposing side walls thereof, being fitted with respect to the flattened sides of the block 42, so that the block may readily slide with respect thereto. The collar 65 is securely mounted upon the outer end of the stub shaft 15, for the purpose of confining the pulley 23, upon the shaft 15.

Although provision has been made for the location of suitable lubricating devices such as grease cups and various communicating channels for conveying the lubricant to the various bearing surfaces, it is not deemed of sufficient importance to describe them in detail.

In Figures 7 and 8, I disclose another embodiment of my invention, wherein a grooved pulley 70, is shown as being driven by a suitable belting 71. The guard 72, as shown in dotted lines, may be employed if desired. In this embodiment of

my invention is disclosed planetary gearing which has been found desirable in connection with my improved driving means for speed reduction purposes. The grooved driving wheel 70, is provided with an end plate or housing 73, to which it may be secured by means of screws or the like, indicated at 74.

A portion of the housing 73, is provided with a substantially secured depression 75, for which is mounted a pair of gears 76, upon the headed bolt 77. The reduced shank portion of the headed bolt 77, is, of course, fitted through an opening in an enlarged portion of the housing 73, and secured against accidental displacement by means of the nut 78. The gear 80, is keyed, as indicated at 81, to the stub shaft 15', whereas the gear 82, is loosely mounted upon the shaft 15', adjacent the gear 80. The eccentric 83, is likewise mounted upon the shaft 15', and is secured to the gear wheel 82, by means of a pin or rivet 84, so that it will rotate simultaneously therewith.

It will be obvious that the ratio of the pair of gears 76, together with their respective mating pinions or gear wheels 80 and 82, may be suitably pitched to obtain the required speed reduction. Although I have disclosed a pulley 23, which is to be driven by the ordinary belting and a grooved pulley 70, adapted to be driven by its associated belting 71, it is to be understood that I am providing gear teeth on the periphery of the pulley or housing which in turn may be driven by means of a link chain or suitable gear.

The remaining details of this particular embodiment in my invention being similar to the construction of the embodiment of my invention already described, a repetition of this description is not thought necessary.

The various elements of the embodiments have been described together with their relationship to their associated parts, but to make the invention clear, the operation of the device may be briefly described as follows: The eccentric 27, continuously rotating in either one direction or the other will cause the movement of the eccentric block 28, which is freely mounted thereon, to assume a course in a circular direction. The apparently parallel side members 30, of the eccentric block, by reason of their sliding movement with respect to the guideways 31, of the yoke 32, will cause the oscillation of this yoke upon its pivot pin 57. This oscillatory movement will be transmitted to the forked arm 60, through the medium of the loosely mounted block 42, mounted near the outer end of the yoke 32. The forked arm 60, being keyed or otherwise to the stub shaft 15, which in turn is rigidly supported at one end of the beam 17, the oscillation of its beam and its respective blades 18, will be readily appreciated.

The invention is not intended to be necessarily restricted to the particular constructions and arrangements of parts, nor to the particular applications of such constructions, herein shown and described, as the same may be modified in various particulars or be applied in many varied relations without departing from the spirit and scope of the invention, practical embodiments herein illustrated and described attempting merely to show some of the various forms and modifications in which the invention might be embodied.

What I claim is:

1. A repulper comprising a trough, a beam mounted to oscillate therein, said beam having a stub portion extending through one end of said trough, and a drive unitary with said repulper

trough, and supported thereby comprising a yoke pivoted at one end to the trough and arranged to surround said stub, the free end of the yoke disposed for predetermined oscillation, an arm having one end thereof secured to said stub portion the opposite end thereof being loosely connected to the free end of said yoke, and an eccentric rotatable upon said stub shaft and operable by rotation to oscillate said yoke and thereby to oscillate said beam.

2. In a repulper having a trough, a beam mounted to oscillate therein, and a bearing support for said beam in one end of the trough, one end of said beam extending beyond the bearing support, a drive mechanism comprising a yoke surrounding said beam extension and pivoted at one end to the end of the trough at a point located adjacent to the beam extension and disposed for predetermined oscillation, an arm having one end thereof secured to said beam extension the opposite end thereof being loosely connected to the free end of said yoke, a casing rotatably mounted upon the free end of said beam extension and arranged to surround said yoke and said arm, and means between said casing and said yoke for causing oscillation of the yoke.

3. In a repulper having a trough, a beam mounted to oscillate therein, a bearing support for said beam in one end of the trough, one end of said beam extending beyond the bearing support, a drive mechanism comprising a yoke surrounding said beam extension and pivoted at one end to the end of the trough at a point located adjacent the beam extension and disposed for predetermined oscillation, an arm having one end thereof secured to said beam extension, the opposite end thereof being loosely connected to the free end of said yoke, an eccentric rotatable upon said beam extension and cooperatively engaged with said yoke for causing oscillation thereof, and a casing rotatably mounted upon the free end of said beam extension and effective by its rotation to drive said eccentric, said casing arranged to surround said eccentric, said yoke, and said arm.

4. In a repulper having a trough, a beam mounted to oscillate therein, a bearing support for said beam in one end of the trough, one end of said beam extending beyond the bearing support, a drive mechanism comprising a yoke surrounding said beam extension and pivoted at one end to the end of the trough at a point located adjacent the beam extension and disposed for predetermined oscillation, an arm having one end thereof secured to said beam extension, the opposite end thereof being loosely connected to the free end of said yoke, an eccentric rotatable upon said beam extension and cooperatively engaged with said yoke for causing oscillation thereof, a rotary casing directly associated with said eccentric for driving the same said casing arranged to substantially surround said eccentric, said yoke, and said arm.

5. A drive mechanism according to claim 4 in which the eccentric is integral with the casing.

6. In a repulper having a trough, a beam mounted to oscillate therein, a bearing support

for said beam in one end of the trough, one end of said beam extending beyond the bearing support, a drive mechanism comprising a yoke surrounding the beam extension and pivoted at one end to the end of the trough and disposed for oscillating movement, an arm having one end thereof secured to said beam extension, the opposite end thereof being loosely connected to the free end of said yoke, an eccentric rotatable upon the free end portion of said beam extension and cooperatively engaged with said yoke for causing oscillation thereof, and rotary means carried by said beam extension for driving the eccentric.

7. A drive mechanism according to claim 6, in which the arm and the yoke are substantially upwardly co-extending from their respective center of oscillation.

8. A drive mechanism according to claim 6, with the addition of a slide block interposed between the eccentric and the yoke for transmitting oscillating movement from the eccentric to the yoke.

9. A drive mechanism according to claim 6, in which the arm extends between the bearing support and the yoke.

10. A drive mechanism according to claim 6, in which the arm has a hub by which it is fixed to the beam extension, said hub extending into the free space within the yoke and serving as a spacer between the bearing support and the eccentric.

11. In a repulper having a trough, a beam mounted to oscillate therein, a bearing support for said beam mounted upon one end of the trough, said beam extending beyond the bearing support, a drive mechanism comprising a yoke surrounding said beam, a bracket mounted upon the end of the trough substantially symmetrically below and adjacent said bearing support, the latter having pivoted thereon one end of the yoke for oscillation thereof, an arm having one end thereof secured to said beam extension, the opposite end thereof being loosely connected to the free upper end of the yoke, and means for oscillating said yoke.

12. A drive mechanism according to claim 11, in which the bearing support comprises a horizontal bearing member mounted on the top face of an outwardly flanged top portion of the end of the trough, and in which the bracket is arranged in the space available underneath the flange.

13. A drive mechanism according to claim 11, in which the bearing support comprises a horizontal bearing member bolted to the top face of an outwardly flanged top portion of the end of the trough, and in which the bracket is arranged in the space available underneath the flange and held in place by the bolts of said bearing member.

14. A drive mechanism according to claim 11, in which the bearing support comprises a horizontal bearing member mounted on top of an outwardly flanged top portion of the end of the trough, and in which the bracket is of angular shape to fit into the angular space available underneath the flange.

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