March 11, 1952 J. AKINS 2,588,903

LOG PEELING AND SHAPING APPARATUS

Filed Jan. 23, 1947 2 SHEETS—SHEET 1

FIG. 1

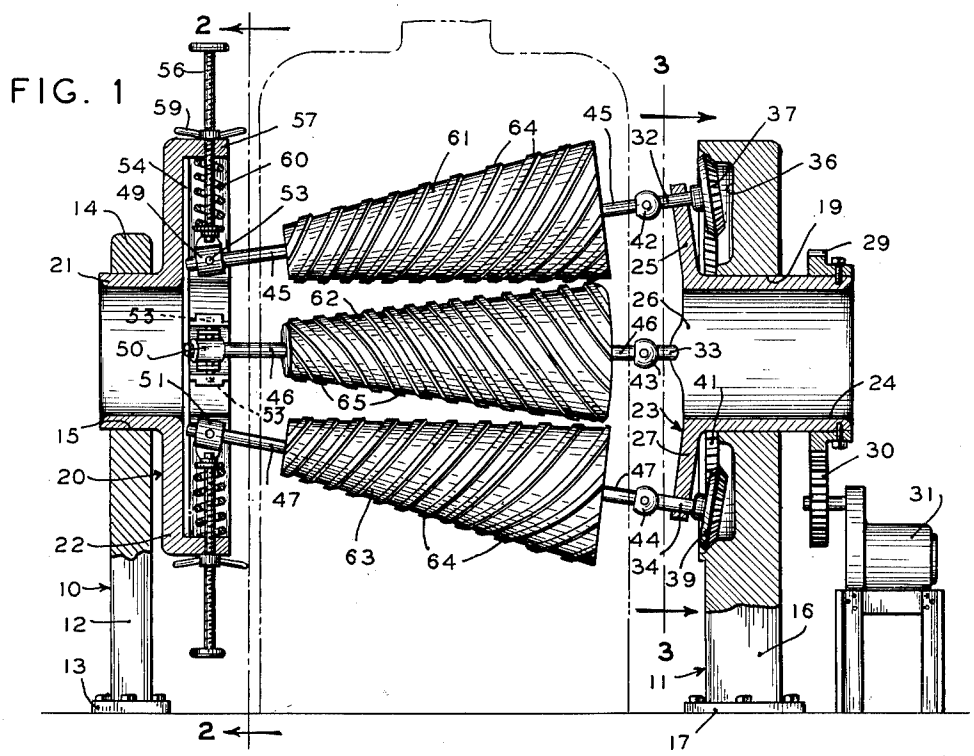
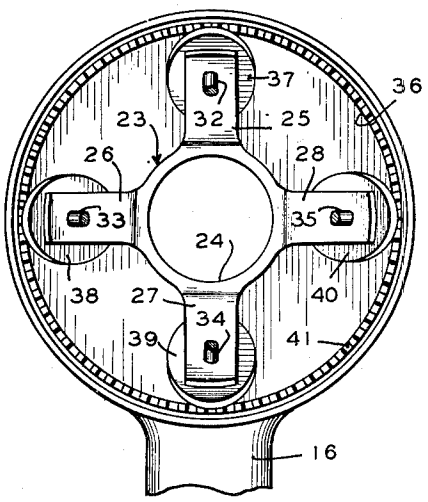


FIG. 3



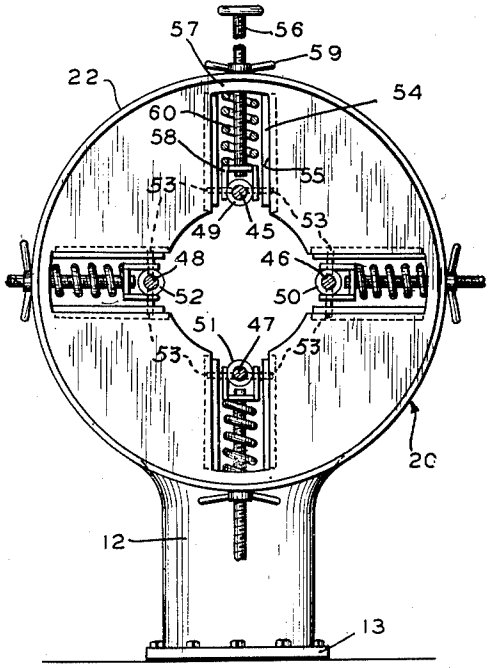


FIG. 2

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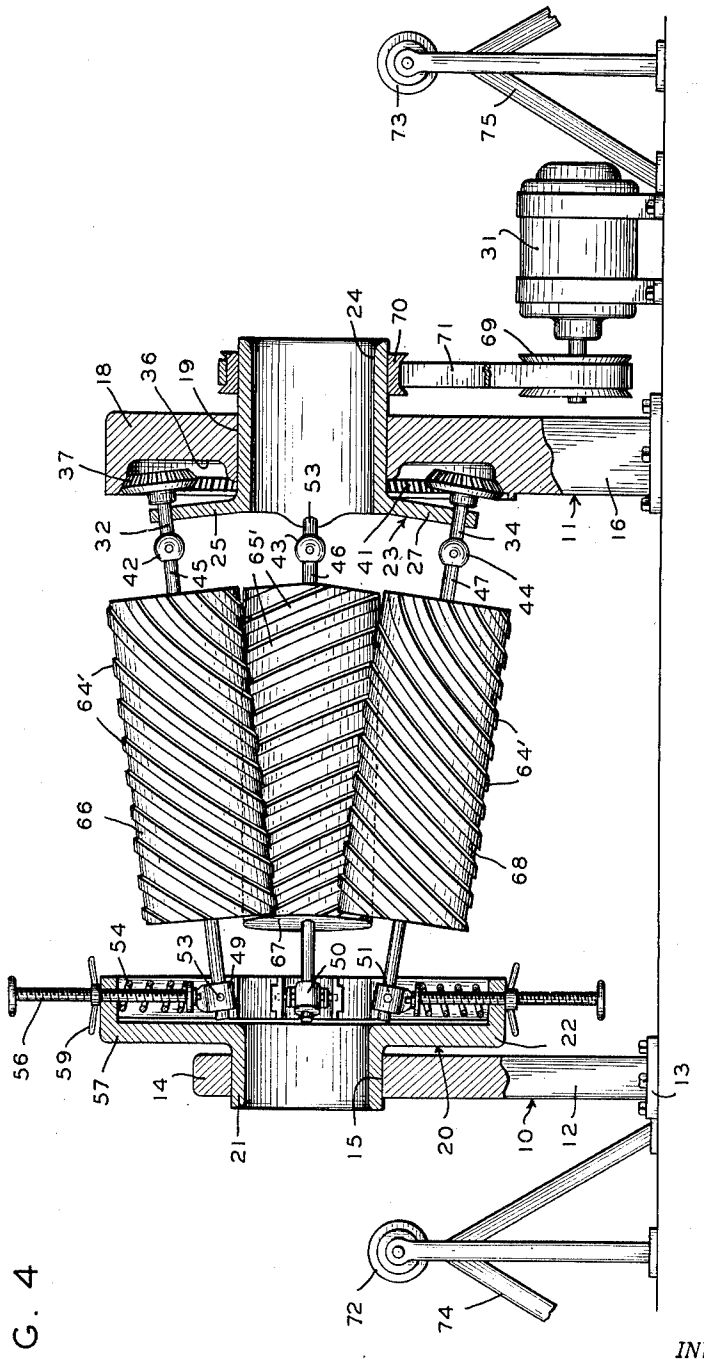


FIG. 4

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LOG PEELING AND SHAPING APPARATUS

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3 Claims. (Cl. 144—208)

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This invention relates to improvements in abrading apparatus and particularly to an improved device for removing bark from logs by a scraping or abrading operation and, if desired, shaping and reducing logs to a substantially cylindrical shape of approximately a desired diameter.

In the preparation of pulp wood logs for the manufacture of paper pulp, it is necessary to remove all of the bark from the logs before the logs are chipped preparatory to digesting the material to produce fiber. Certain other processes also require the removal of bark from logs before succeeding operations, such as, for example, the manufacture of wood veneer for plywood and in the preparation of piling, telephone line poles and fence posts. In the case of posts and poles it is also desirable to reduce the logs to a substantially cylindrical form and to an approximately uniform diameter.

Various methods and different forms of apparatus have been proposed for removing the bark from such logs but most of these have met with such little commercial success that it is still customary to remove the bark by hand, using an axe or drawknife for the purpose.

It is an object of the present invention to provide improved apparatus for removing the bark from logs, which apparatus while highly efficient is sufficiently small in size and economical in cost as to be within the financial reach of relatively small operators supplying logs to the pulpwood market; which is so simple in operation that it may be operated by a relatively unskilled laborer but which, at the same time, will rapidly and effectively remove the bark from logs of varying diameters within a relatively large range of sizes.

A further object resides in the provision of improved power-operated apparatus for removing the bark and shaping logs wherein a plurality of frusto-conical scrapers or cutters are arranged for rotation about their own axes and revolution about a common axis and are provided with adjustable means adjacent their smaller ends urging the smaller ends resiliently inward toward their common axis.

A still further object resides in the provision of improved apparatus for removing bark from pulpwood logs and logs intended for similar purposes, which apparatus is adjustable to accommodate it to the removal of bark from logs having widely varying diametrical dimensions and to provide apparatus which may be easily transported and installed so that it may be provided

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at a location convenient to the logging operation even though such operations be conducted in localities remote from usual transportation means, and also so that the apparatus may be conveniently moved from one logging operation to another when necessary.

It is also an object to provide improved apparatus for reducing poles and posts to a generally cylindrical form and substantially uniform diameter, and to provide apparatus that may be used, if desired, to reduce logs to a chip or shredded condition.

Other objects and advantages will become apparent from a consideration of the following description taken in conjunction with the accompanying drawing, wherein:

Figure 1 is a vertical sectional view of a bark removing and log rounding device illustrative of the invention;

Figure 2, a transverse sectional view on the line 2—2 of Figure 1;

Figure 3, a transverse sectional view on the line 3—3 of Figure 1; and

Figure 4, a vertical sectional view of a somewhat modified form of bark removing and log rounding device illustrative of the invention.

Referring to the drawing in detail, numeral 10 generally indicates a frame member supporting one end of the bark-removing mechanism and the numeral 11 generally indicates a somewhat similar frame member supporting the opposite end of the mechanism.

The supporting member 10 may comprise a generally cylindrical standard or base portion 12 having a bottom flange 13 which may be securely bolted to a floor or machine foundation, and an upper rounded portion 14 provided with an enlarged circular aperture 15.

Frame member 11 is generally similar to frame member 10 but is preferably formed somewhat larger and heavier and has a cylindrical standard portion 16 provided with a bottom flange 17 which may be rigidly secured to the floor or foundation, and with an upper rounded portion 18 provided with an enlarged central aperture 19.

A member, generally indicated at 20, has a hollow cylindrical portion 21 journaled in the aperture 15 in frame member 10 and is provided with a radial flange portion 22, particularly illustrated in Figure 2.

A member, generally indicated at 23, has a hollow cylindrical portion or sleeve 24 journaled in the aperture 19 in support 11 and is provided at its inner end with a plurality of radially extending arms, as indicated at 25, 26, 27 and 28

in Figure 3, each of which is provided near its outer end with an aperture which constitutes a bearing for a shaft. An external spur gear 29 is secured on the cylindrical portion 24 adjacent the end thereof opposite the end from which the arms 25, 26, 27 and 28 extend, and this gear meshes with a spur gear 30 driven by a suitable power plant such as the electric motor 31. The power plant may, however, be a steam or gasoline engine or any other suitable source of power for turning the gear wheel 30.

Stub shafts, as indicated at 32, 33, 34 and 35 are journalled in the bearing apertures in arms 25, 26, 27 and 28, respectively, and each of these shafts carries on its end at the side of the arm adjacent the support 11 a respective beveled planet gear, as indicated at 37, 38, 39 and 40. These planet gears mesh with a fixed ring gear 41 carried by the support 11 within the enlarged rounded portion 18 concentric with the center of aperture 19. The rounded portion of the support is provided with an annular groove or recess 36 within which the planet gears travel, and the outer edge of this recess may be machined to provide the teeth of the ring gear 41 or a separate ring gear may be secured to the support as may be desired.

By this arrangement, when the power plant 31 rotates the gear 30 and the member 23, the shafts, such as 32 to 35, inclusive, carried by the radial arms of member 23, will be carried around the axis of rotation of the member 23. Thus all of the shafts will revolve about a common axis. Engagement of the planet gears with the fixed ring gear 41 will cause the various stub shafts to rotate about their own individual axes as they are revolved about the common axis by rotation of the member 23.

At their ends opposite the respective planetary gears the stub shafts are provided with universal joint connections as indicated at 42, 43, and 44 in Figure 1 to which the ends of respective shafts 45, 46, 47 and 48 are connected. The opposite ends of shafts 45 to 48, inclusive, are rotatably supported in respective bearings 49, 50, 51 and 52. The bearing 49 is pivotally connected by means of a pair of transverse coaxial pins 53 to the inner end of a slide block 54 slidably mounted in a radially extending guideway 55 provided in the flanged portion 22 of member 20. The guideway 55 is provided with lateral grooves in the sides thereof, and the slide or block 54 is provided with integral ribs or keys which fit into these grooves to retain the block in position in the guideway. A screw shaft 56 extends laterally through the outer portion 57 of flange 22 and through the hollow interior of the slide block 54 to a swivel connection with a stirrup 58 through the depending legs of which pivot pins 53 pass whereby the stirrup connects the inner end of the screw shaft directly to the shaft supporting bearing 49. The pivot pins also connect the stirrup 58 and bearing 49 to the slide block 54.

With this arrangement, if the wing nut 59 is turned down or inwardly on the screw shaft 56, the bearing 49 will be moved radially outwardly away from the axis of rotation of the member 20. When the wing nut 59 is turned outwardly on the screw shaft, the bearing 49 will be moved radially inwardly toward the axis of rotation of member 20 by a coil compression spring 60 which surrounds the screw shaft between the stirrup 58 and the continuous portion 57 of the flange 22. The other bearings 50, 51 and 52 are supported for radial adjustment by mechanism identical with that above-described in connection with the adjustment of the bearing 49 so that all of the bearings may be adjusted toward and away from the axis of rotation of member 20.

Between the corresponding universal joints and pivotally supporting bearings each of the shafts 45, 46, 47 and 48 carries a respective frustro-conical member, three of these members being shown in Figure 1 and indicated at 61, 62 and 63. The larger ends of these frustro-conical members are adjacent the rotatable member 23 and the smaller ends adjacent the rotatable member 22, and each frustro-conical member is provided with spiral blades or scraper elements as indicated at 64 and 65.

The larger ends of the frustro-conical members surround an opening of substantially the same diameter as the opening through the cylindrical portion 24 of member 23, but the inner ends of these frustro-conical members may be let radially inwardly to enclose an opening materially smaller than the opening in the cylindrical portion 21 of member 20.

With this arrangement logs with the bark on are fed endwise through the portion 24 of member 23 and between the larger ends of the frustro-conical members. The smaller ends of the frustro-conical members will be radially adjusted to a position such that a log of average size is contacted about midway of the length of the frustro-conical members, and the smaller ends of these members will be forced radially outwardly as the log passes between them, the bark being removed from the log as it passes between the revolving and rotating frustro-conical members. The debarked logs are delivered through the cylindrical portion 21 of the member 20 of the machine.

It will be noted that the spiral scrapers or cutters 64 on the diametrically opposed frustro-conical members 61 and 63 are spiraled in the opposite direction from the corresponding scrapers 65 on the frustro-conical member 62. The scrapers on the frustro-conical member, not illustrated, diametrically opposed to the member 62 are spiraled in the same direction as the scrapers 65. This arrangement results in the spiraled cutters or scrapers on two of the frustro-conical members or rollers urging a log lengthwise in one direction as it passes through the machine and the scrapers or cutters on the other two diametrically opposed frustro-conical members urging the log in the opposite direction. As the opposed forces substantially balance each other, the log may be manually forced through the cutter with a very slight effort at the speed desired by the operator to obtain complete removal of the bark from the log. Since all of the frustro-conical members rotate in the same direction, the log will be rapidly rotated between these members as it passes through the machine but since the surface speed of the frustro-conical members varies between the large and small ends thereof, portions of these members will at all times move relative to the log, thereby moving the spiral scrapers or cutters along the surface of the log and removing the bark therefrom.

The modified arrangement shown in Figure 4 is generally similar to the arrangement shown in Figure 1 except that the rotatable members or rollers as indicated at 66, 67 and 68, are generally cylindrical rather than frusto-conical as

are the corresponding rollers 61, 62 and 63 of Fig. 1. In Fig. 4 an alternative power connection has been shown including belt pulleys 69 and 70 and drive belt 71 with pulley 70 mounted on cylindrical part 24 of member 23 and pulley 69 on shaft of motor 31. Supporting rollers 72 and 73 journalled on respective frames 74 and 75 may be provided, disposed one at each end of the abrading device, to facilitate the passing of logs through the device. The spiral splines or cutters 64' and 65' are the same in general as the corresponding splines on members 61, 62 and 63 and the splines on the two pair of opposed rollers being spiraled in opposite directions.

What is claimed is:

1. A log peeling and shaping apparatus comprising a plurality of frusto-conical members rotatable about their own axes and revolvable about a common axis, spiral cutting elements on said rotatable members, rotatable means supporting said members adjacent the ends thereof and arranged for the passage of logs therethrough and between said members, and adjustable means resiliently urging the smaller end of said frusto-conical members toward said common axis.

2. Abrading apparatus comprising two pair of diametrically opposed members rotatable about individual axes and revolvable about a common axis; spiral abrading elements on said rotatable members arranged in opposite spiraled directions on said two pair of diametrically opposed members; rotatable means supporting said members adjacent the ends thereof and arranged for the passage of logs therethrough and between said members; and means providing resiliently resisted freedom of movement of at least one end of each of said members away from said common axis.

3. Log peeling and shaping apparatus comprising a pair of opposed frame members each having a bearing aperture therein; a pair of hollow cylindrical members journaled one in each apertured frame member, one of said cylindrical members having at one end a plurality of radially extending arms each having a bearing aperture

therein, drive means for rotating said one cylindrical member, the other of said cylindrical members having an annular flange at one end provided with angularly spaced radial guideways each having lateral grooves; slides mounted one in each guideway and guided therein by said grooves; a screw shaft and compression spring operatively associated with each slide to position it radially in the respective guideway; a bearing pivotally secured to the inner end of each slide; a plurality of stub shafts journaled one in each arm aperture and each having a universal joint at the inner end thereof; a plurality of shafts each having one end journaled in one of said bearings and the opposite end secured to a corresponding stub shaft carried universal joint, a gear on the end of each stub shaft; a fixed ring gear carried by the corresponding frame member surrounding and meshing with said shaft carried gears to rotate said shafts when said one cylindrical member is rotated in the respective frame member; a frusto-conical member on each shaft; spiral scraping blades on the surface of each frusto-conical member with the blades on two diametrically opposed frusto-conical members spiraled in a direction opposite to the spiraled direction of the blades on the other two diametrically opposed frusto-conical members.

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