May 22, 1951 H. A. DAMERON 2,554,090

CONTINUOUS BLEACHING APPARATUS

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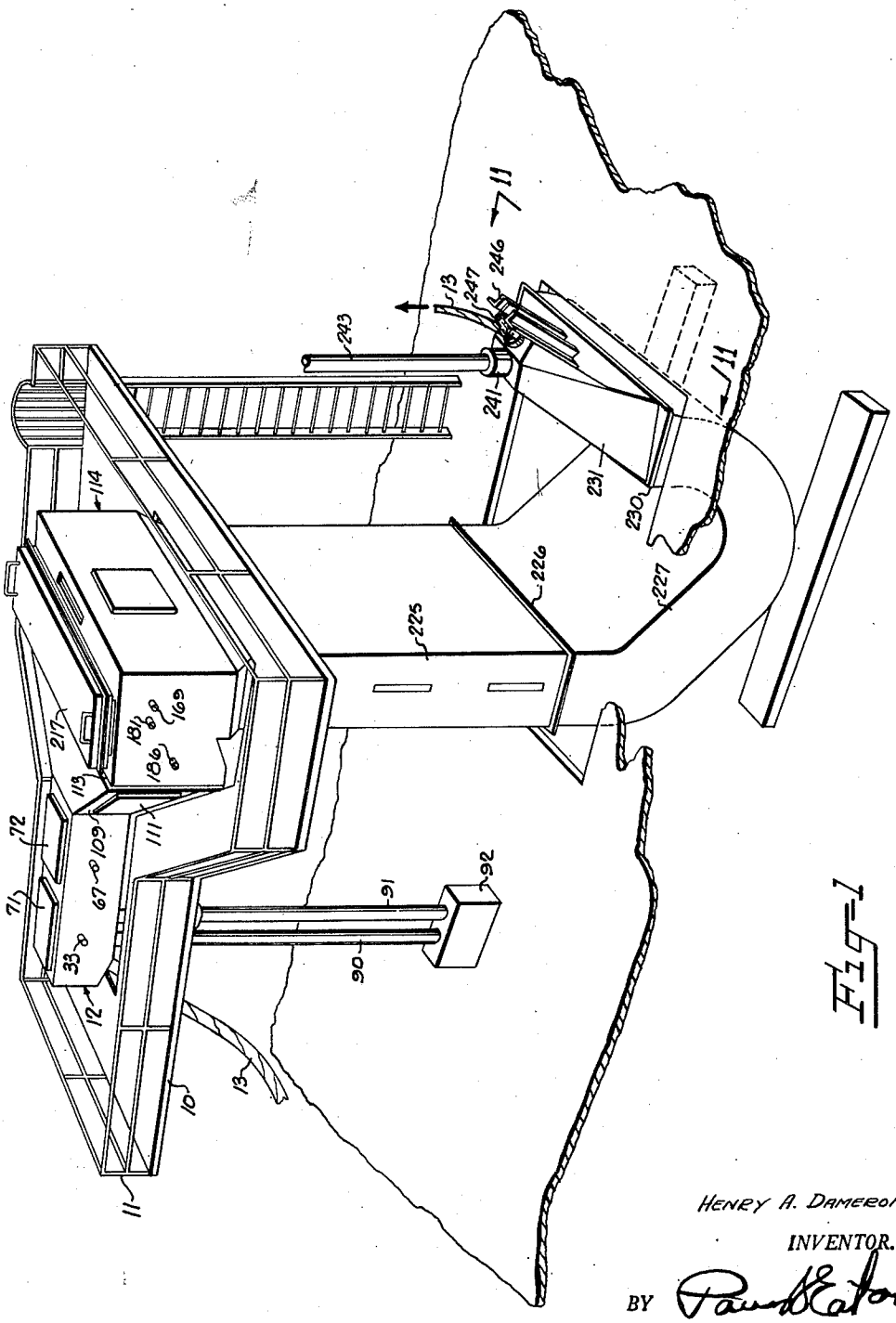


Fig. 1

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CONTINUOUS BLEACHING APPARATUS

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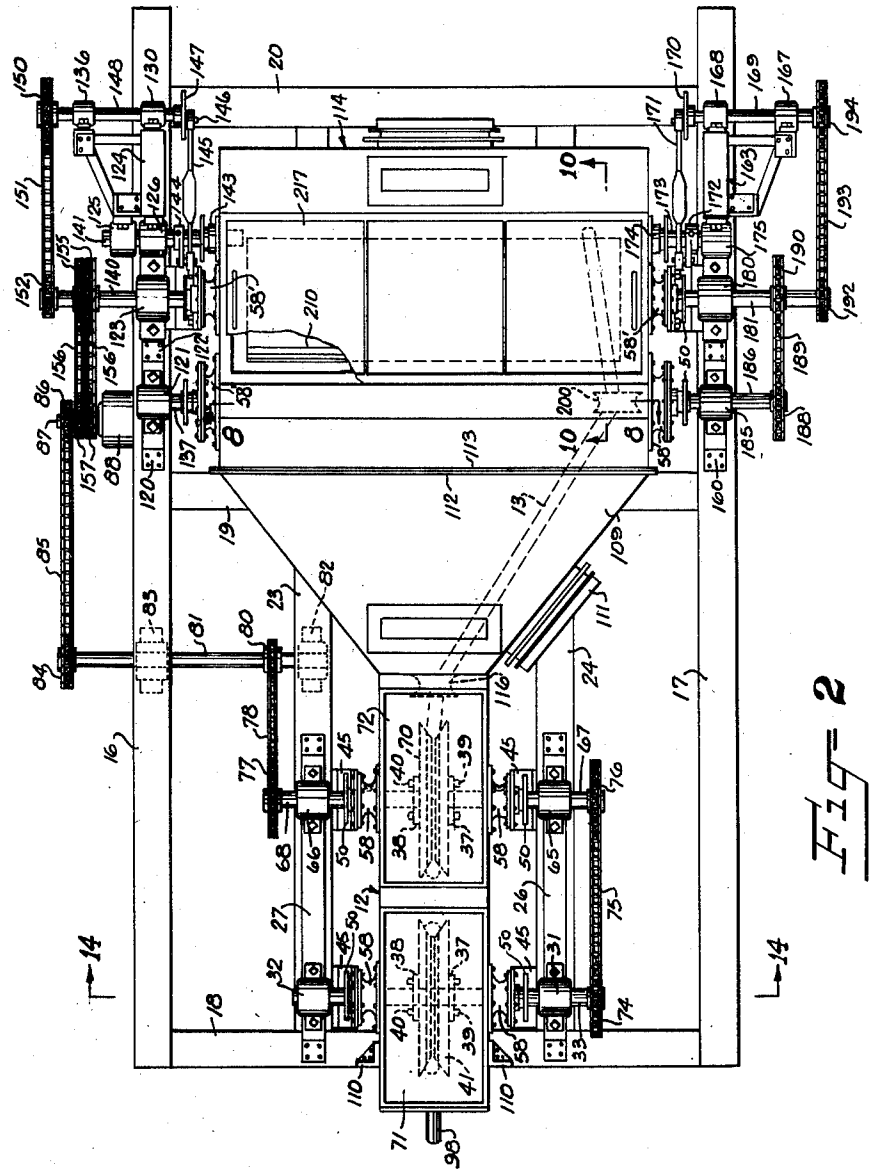


FIG. 2

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CONTINUOUS BLEACHING APPARATUS

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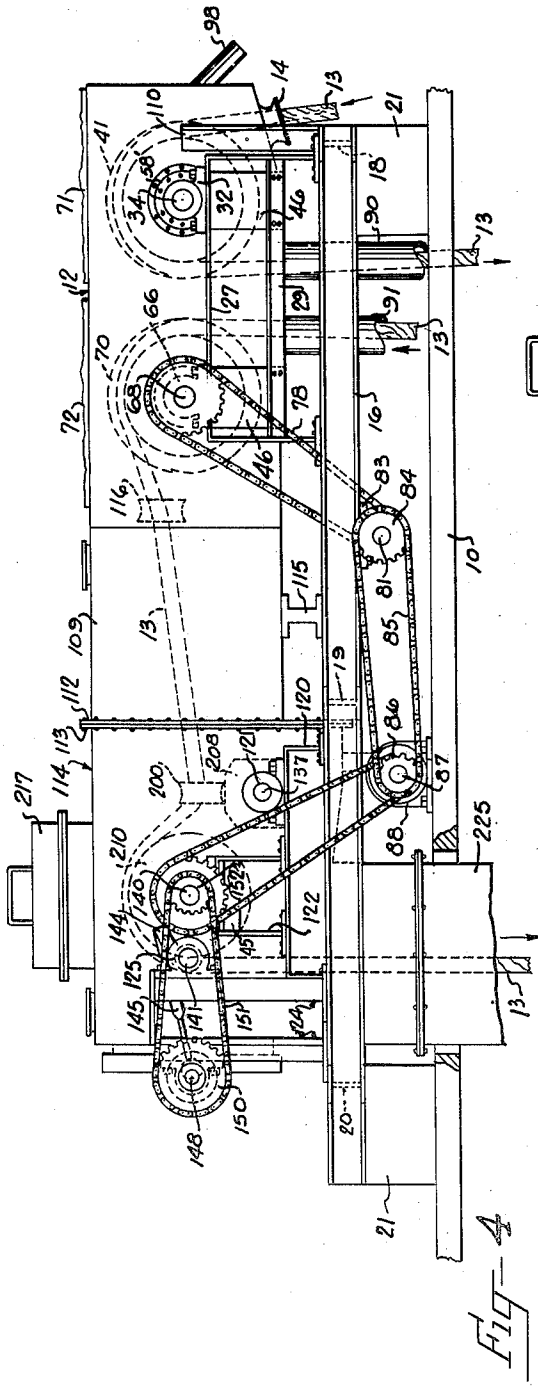


FIG. 4

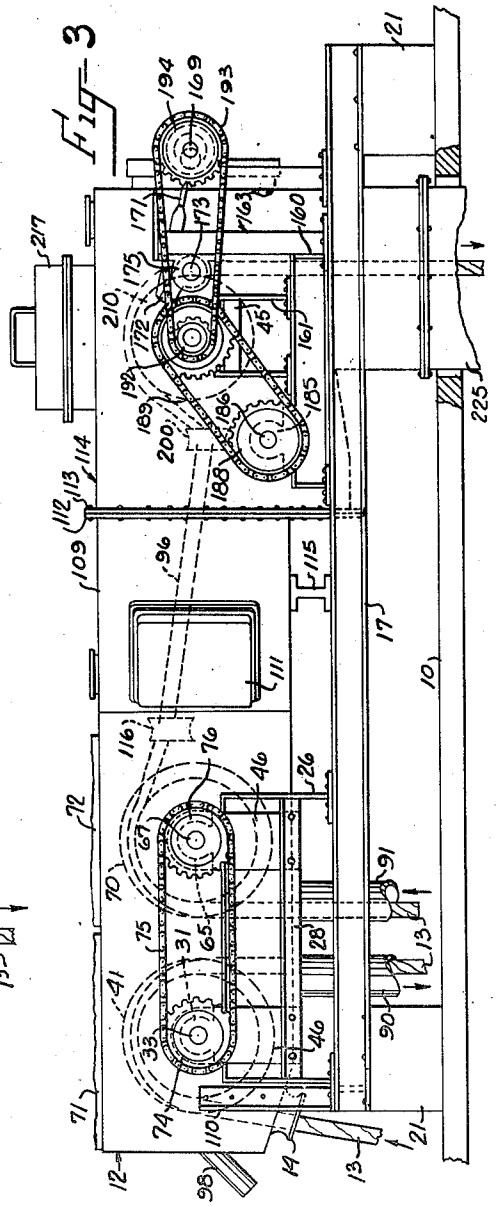


FIG. 3

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CONTINUOUS BLEACHING APPARATUS

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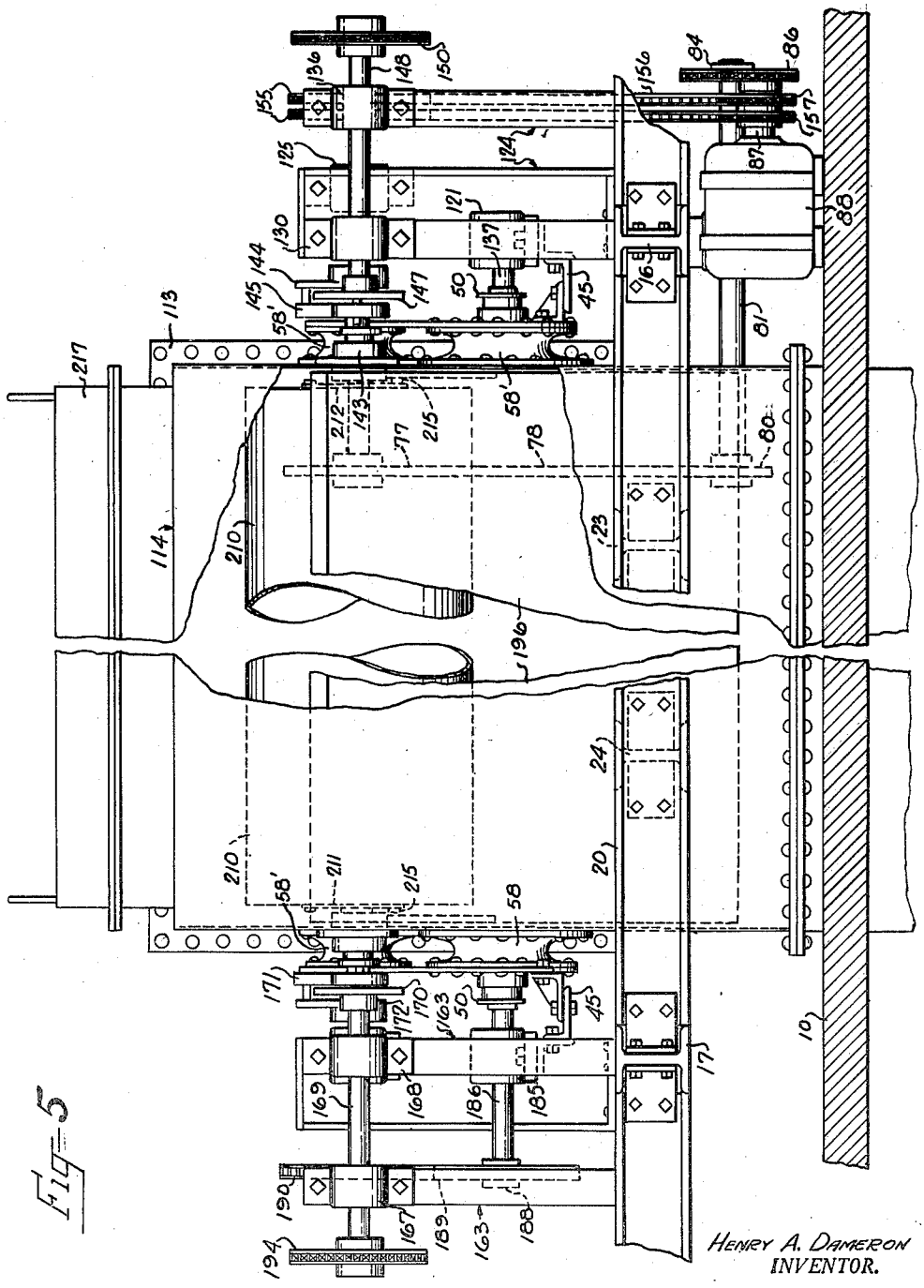


Fig. 5

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CONTINUOUS BLEACHING APPARATUS

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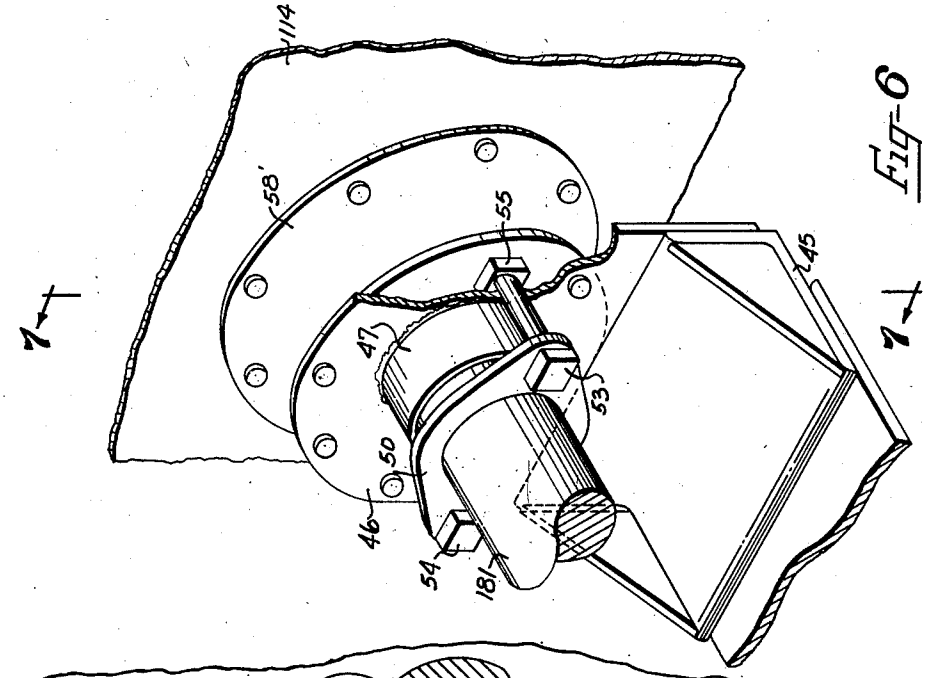


Fig-6

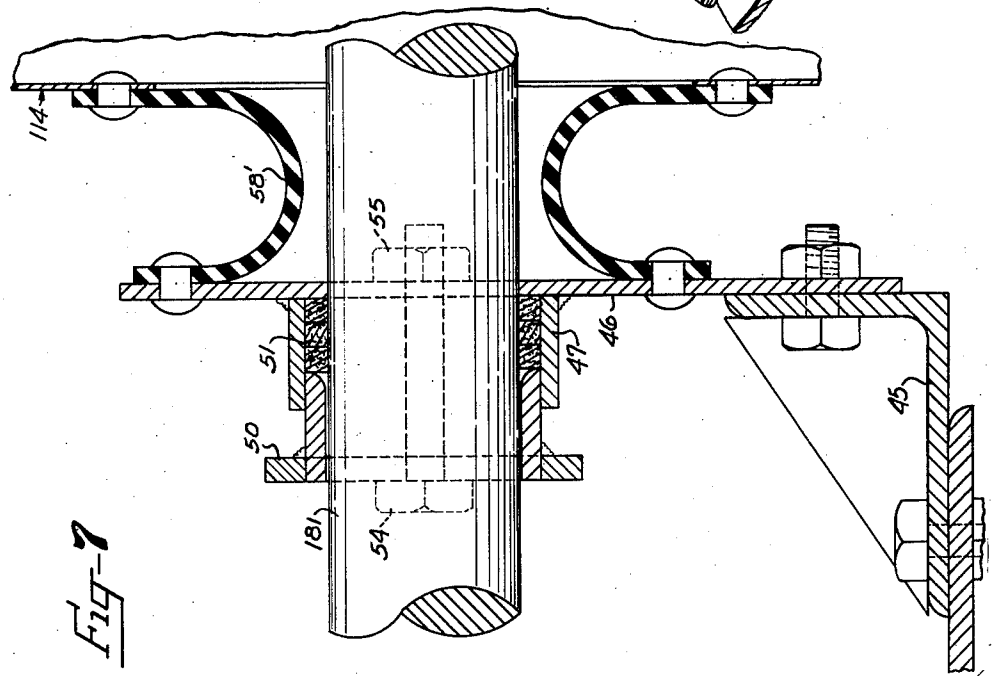


Fig-7

HENRY A. DAMERON
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May 22, 1951 H. A. DAMERON 2,554,090

CONTINUOUS BLEACHING APPARATUS

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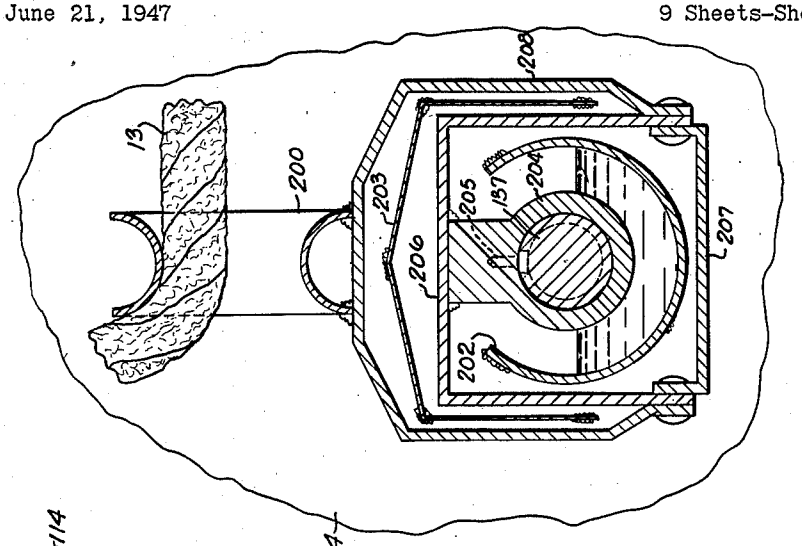


Fig-9

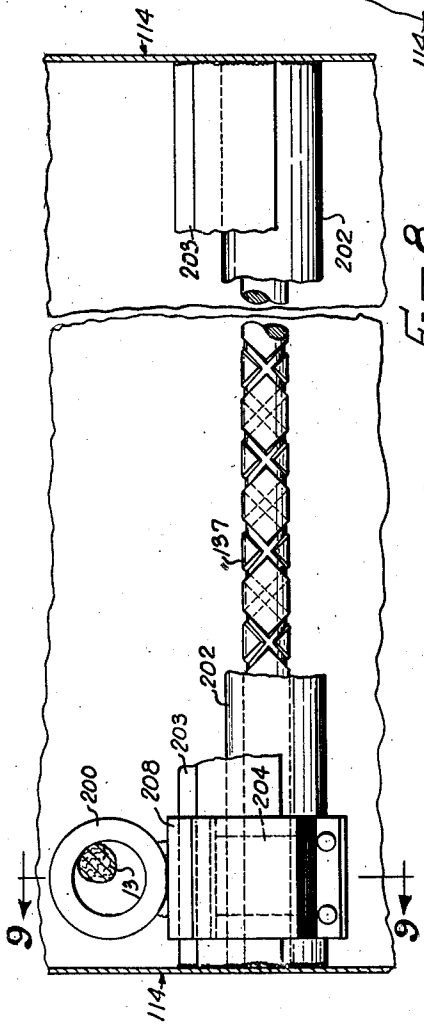


Fig-8

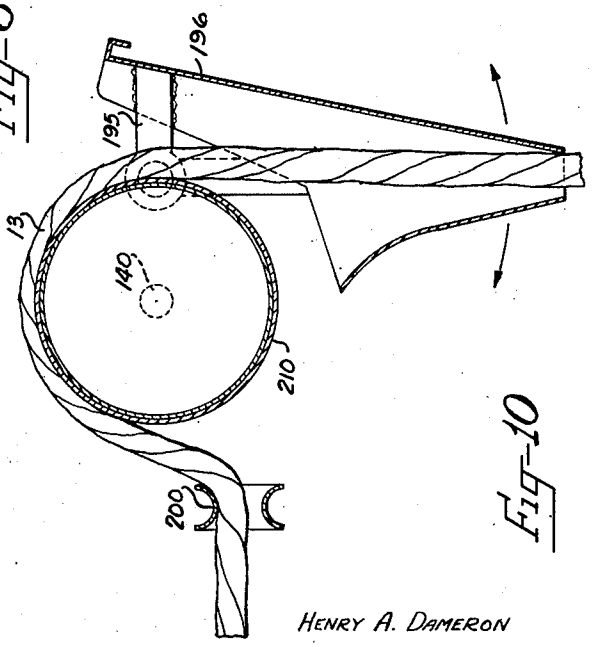


Fig-10

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CONTINUOUS BLEACHING APPARATUS

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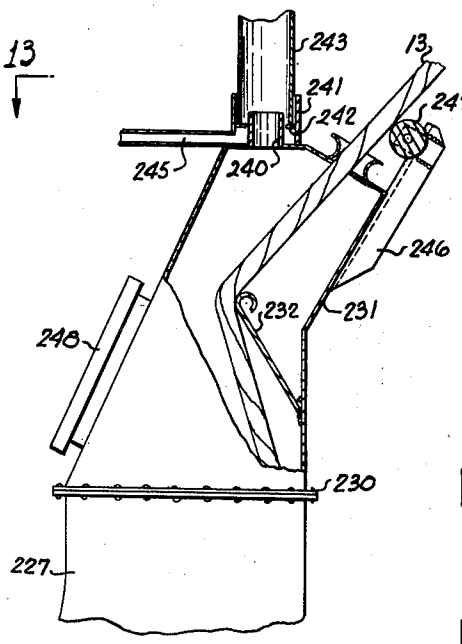


Fig-12

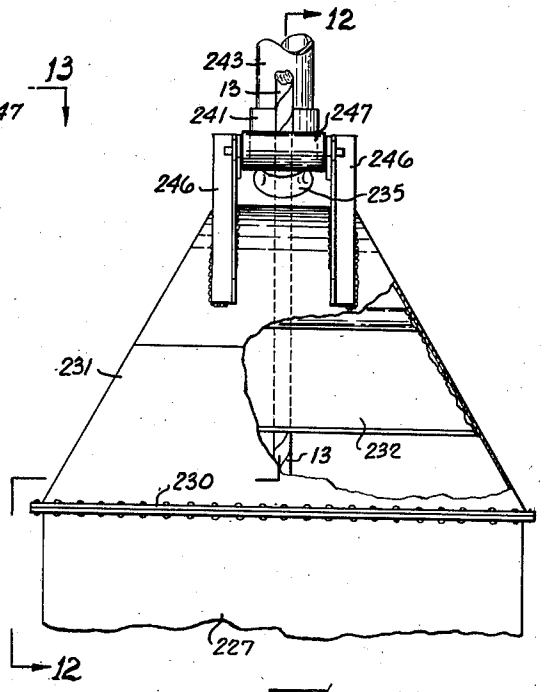


Fig-11

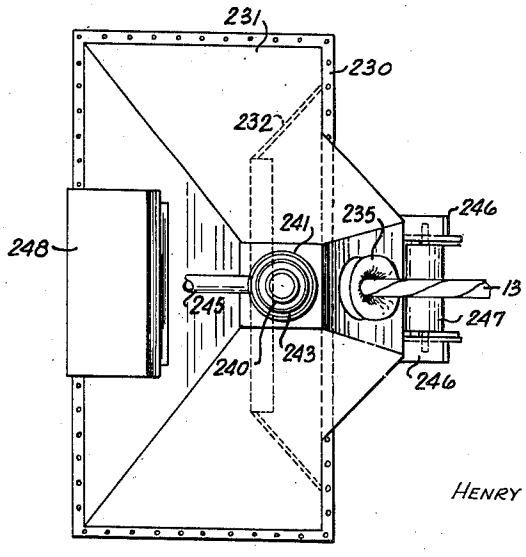


Fig-13

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CONTINUOUS BLEACHING APPARATUS

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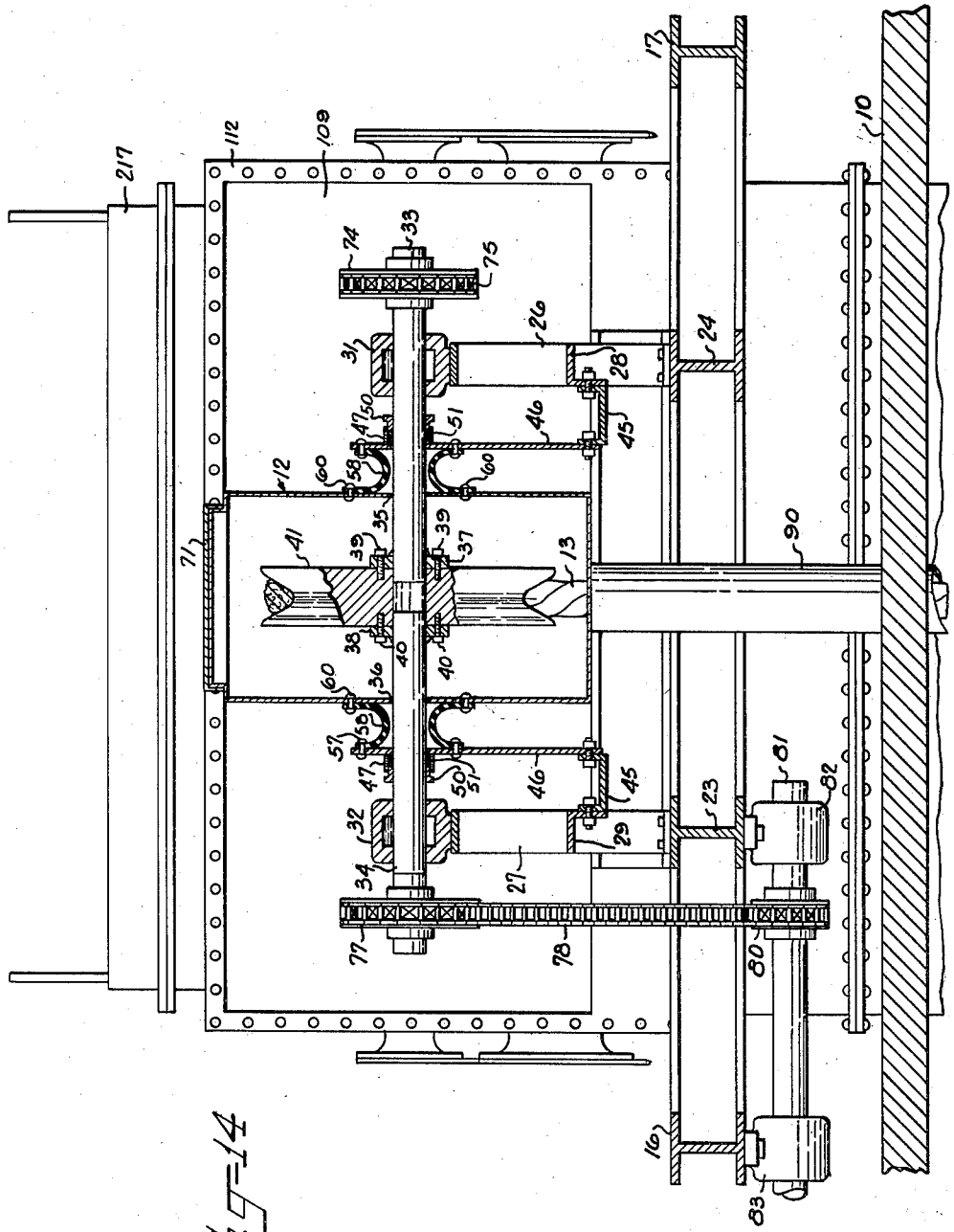


Fig. 14

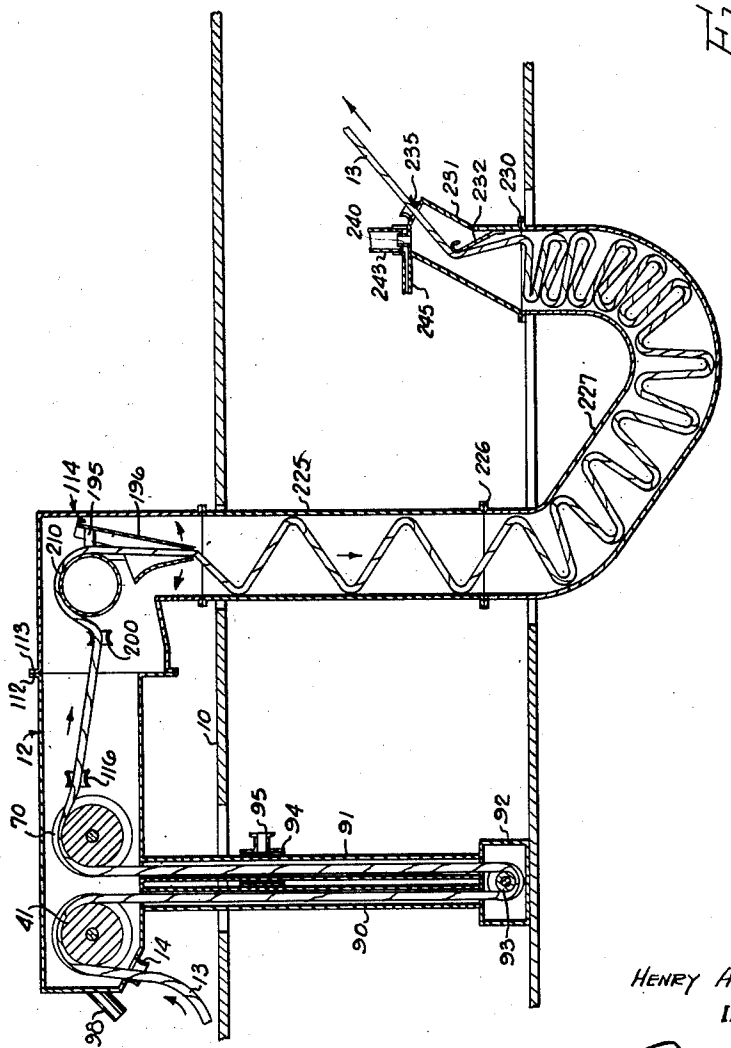
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May 22, 1951 H. A. DAMERON 2,554,090

CONTINUOUS BLEACHING APPARATUS

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Fig-15



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Patented May 22, 1951 2,554,090

UNITED STATES PATENT OFFICE

2,554,090

CONTINUOUS BLEACHING APPARATUS

Henry A. Dameron, Greenville, S. C., assignor to Greenville Steel & Foundry Company, Greenville, S. C., a corporation of South Carolina

Application June 21, 1947, Serial No. 756,254

7 Claims. (Cl. 68—5)

1

This invention relates to continuous bleaching apparatus and more especially to a continuous bleaching apparatus employing a J-box and wherein the cloth, after being treated with bleaching materials, is passed through a steam chamber or boxes and then deposited into a J-box while live steam is being forced into the steam chamber and into the J-box for the cloth passing therethrough.

In apparatus of this type, the steam chamber or box into which the cloth is introduced before it is deposited into the J-box is provided with driven grooved pulleys or rollers over which the cloth passes and these pulleys are driven by shafts which extend through the sides of the steam box and due to expansion and contraction of the steam box in which the pulleys are mounted, there is a certain amount of wear which takes place which causes a breathing of the steam box and allows escape of steam therefrom and entrance of air thereinto.

It is an object of this invention to provide a stuffing gland or flexible diaphragm through which these shafts supporting the pulleys pass to the exterior of the steaming box so that they can be driven without any leakage whatever between the shafts and the openings in the walls of the steam box.

The cloth is usually introduced into one end of the steaming box and passes over a pulley and then passes downwardly through a tube and over another pulley and then upwardly through another tube and over the second pulley in the steam box from whence it is led into a larger portion of the steam box over an elongated driven roller and through a reciprocating pot eye which moves the cloth laterally back-and-forth as it is being fed through the apparatus, and the cloth then passes through a suitable elongated funnel-shaped member which oscillates so that the cloth is moved back-and-forth as it is deposited into the longer neck or the upper end of a J-box, and is moved forwardly and rearwardly also to deposit it substantially in a figure 8 form. The cloth is deposited in this J-box and the steam which is forced into one end of the steaming chamber follows the cloth and passes into the upper end of the J-box and is forced through the cloth in the J-box out through the exit end of the J-box where the cloth passes through a suitable opening which is just of the right size to permit the cloth to be passed therethrough without any substantial leakage of steam.

At the exit end of the J-box a suitable venting apparatus is employed to prevent condensation

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of the steam as it passes through the vent from falling back onto the cloth in the J-box, but is delivered to the exterior of the exit end of the J-box.

Furthermore, by providing the flexible diaphragms covering enlarged holes in the side walls of the steaming box, not only is leakage between the shafts supporting the grooved pulleys eliminated, but the shafts can be removed laterally through the enlarged holes in the J-box, and the pulleys can be disconnected from the shafts and removed through the top of the box when a substitution of pulleys is necessary.

Some of the objects of the invention having been stated, other objects will appear as the description proceeds when taken in connection with the accompanying drawings, in which:

Figure 1 is an isometric view of a continuous bleaching apparatus with which the invention is associated with the diaphragms and other parts omitted;

Figure 2 is a top plan view of the apparatus omitting portions of the J-box;

Figure 3 is an elevation looking from the lower side of Figure 2;

Figure 4 is an elevation looking from the upper side of Figure 2;

Figure 5 is an end view with parts broken away and looking at the left-hand end of Figure 2;

Figure 6 is an isometric view of one of the stuffing glands associated with the apparatus;

Figure 7 is a vertical sectional view taken along the line 7—7 in Figure 6;

Figure 8 is a vertical sectional view taken along the line 8—8 in Figure 2;

Figure 9 is a vertical sectional view taken along the line 9—9 in Figure 8;

Figure 10 is a vertical sectional view taken along the line 10—10 in Figure 2;

Figure 11 is an elevation looking at the lower right-hand portion of Figure 1 and from along the line 11—11 in Figure 1;

Figure 12 is a vertical sectional view taken along the line 12—12 in Figure 11;

Figure 13 is a sectional plan view taken along the line 13—13 in Figure 12;

Figure 14 is a section along line 14—14 in Figure 2;

Figure 15 is a vertical sectional schematic view of the continuous bleaching apparatus.

Referring more specifically to the drawings, the numeral 10 indicates a suitable platform supported by any suitable structure such as a plurality of vertically disposed angle bars with re-

inforcing struts therebetween and which is not shown. This platform 10 is provided with railings 11 and mounted on this platform 10 is a steaming chamber 12 into which cloth 13 in rope form is admitted through a pot-eye 14. Supported on the platform 10 are longitudinal struts 16 and 17 bound together by transverse struts 18, 19 and 20. These struts 16 and 17 are supported at their ends in spaced relation to the platform 10 by means of angle supports 21. Disposed between and secured to the proximate faces of cross angles 18 and 19 are horizontally disposed angle bars 23 and 24.

The bars 23 and 24 have mounted on the upper surface thereof rectangular supports 26 and 27. Spanning the distance between the upright portions of these supports 26 and 27 are horizontally disposed angle bars 28 and 29. On the upper ends of these supports 26 and 27 are mounted bearings 31 and 32 in which shafts 33 and 34 are rotatably mounted. These shafts project through suitable openings 35 and 36 in the side walls of the box 12. The proximate ends of the shafts 33 and 34 have plates 37 and 38 welded thereto which are adapted to be secured by means of screws 39 and 40 to a pulley 41.

The shafts 33 and 34 in steaming boxes of this type heretofore have passed through a small opening in the side walls of the box 12, and as heretofore stated, due to contraction and expansion of the box, there would be a wear take place around the shafts 33 and 34, and this would admit atmosphere to the interior of the box 12. In order to eliminate this disadvantage, there is secured to the angle bars 28 and 29 a channel or angle bar 45, the structure on both sides of the box to be presently described being the same and like reference characters will apply. To this channel bar 45 are secured uprising plates 46 which have an opening near the upper end thereof through which the shafts 33 and 34 pass. Around this opening is welded a sleeve member 47. Disposed around the shafts 33 and 34 is a packing member 50 which slidably fits inside the annular member 47 and this member 50 is adapted to engage suitable stuffing material 51 disposed inside the annular sleeve 47 and around the shafts 33 and 34.

Each of these members 50 has oppositely projecting ears penetrated by bolts 53 and 54 which not only slidably penetrate the members 50 but also slidably penetrate the plates 46 and have nuts 55 spot welded to the interior surface of the plates 46 and whereby by tightening of the bolts 53 and 54 the member 50 can be pressed into the sleeve 47 to tighten the packing or stuffing material 51 therein and to prevent leakage around the shafts 33 and 34. Bolted to the side of the plates 46 adjacent the steam box 12 by means of suitable bolts 57 is an annular flexible diaphragm or sleeve 58 of any suitable material, such as synthetic rubber, and the other end of the annular member 58 is bolted as at 60 to the side walls of the box 12 surrounding the openings 35 and 36. By this arrangement, it is seen that no leakage of steam or passage of atmosphere can occur around the shafts 34 and 35 with relation to the interior of the box 12.

Mounted on top of the supports 26 and 27 are also bearing blocks 65 and 66 which rotatably receive stub shafts 67 and 68 which shafts 67 and 68 have identically the same diaphragm and other parts as has been described for the shafts 33 and 34, and like reference characters will apply. The proximate ends of shafts 67 and 68 have plates 37 and 38 secured thereto, and in the same manner as shown in Figure 15, these plates are secured to a grooved pulley 70.

The top of the steam box 12 has enlarged openings therein which are sealed by suitable covers 71 and 72 which are clamped in closed position by any suitable means not shown. The shaft 33 has fixedly secured thereon a sprocket wheel 74 which has mounted thereon a sprocket chain 75 which is also mounted on a sprocket wheel 76 secured on shaft 67. The outer end of shaft 68 has secured thereon a sprocket wheel 77 on which is mounted a sprocket chain 78 which in turn is mounted on a sprocket wheel 80 disposed on an idler shaft 81 mounted in bearings 82 and 83 secured on the lower sides of I-beams 23 and 16 respectively. This shaft 81 has mounted thereon a sprocket wheel 84 which has mounted thereon a sprocket chain 86 which in turn is mounted on a sprocket wheel 85 secured on motor shaft 87 of an electric motor 88 by means of which rotation is imparted to the grooved pulleys 41 and 70.

Projecting downwardly from the bottom of box 12 are tubes 90 and 91 which communicate with the interior of box 12, and the lower end of these tubes communicate with a small box 92 which has mounted therein an idler pulley 93. The tube 91 is surrounded by a housing 94 and inside the housing 94 the tube 91 is perforated. The housing 94 has an inlet pipe 95 which is adapted to be connected to a suitable source of steam under low pressure, say around one or two pounds per square inch, and thus steam is admitted into the inside of tube 91 to engage the cloth in its upper travel as it approaches grooved pulley 70. The box 12 is also supplied with an opening 98 by means of which steam can also be introduced to the interior of the box 12.

The steam box 12 is supported by suitable vertical angles 110 which rise upwardly from the cross I-beam 18, and at its other end there is connected to the open end of steam box 12 an outwardly flaring funnel portion 109 which has an inspection door 111 in one side thereof, and whereby access can be gained to the interior of the outwardly flaring portion 109. This outwardly flaring portion is made integral with the right-hand end of steam box 12 in Figures 2 and 3.

The right-hand end of outwardly flaring portion 109 has a flanged portion 112 therearound which is riveted or bolted to a flanged portion 113 of a larger steam box 114. The funnel portion 109 is supported by a transversely disposed I-beam 115 which rests on the longitudinally extending I-beams 23 and 24.

The right-hand end of steam box 12 has a fixed pot eye 116 therein through which the cloth rope 13 passes into the flaring portion 109.

The longitudinally extending I-beam 16 has mounted thereon a framework 120 on which is mounted a bearing 121. The framework 120 has extending upwardly therefrom another framework 122 which has mounted thereon a bearing 123. There is a vertically disposed framework 124 rising upwardly from I-beam 16 which has bearings 125 and 126 mounted on one side thereof.

Member 124 also has bearings 130 and 136 secured thereon. Mounted in the bearing 121 is a shaft 137 which has the same packing gland arrangement as previously described for steam box 12 and like reference characters will apply with prime notation added. Mounted in bearing 123 is a shaft 140 which likewise extends into the

steam box 114 and has the same packing gland arrangement as shown and described for the steam box 12 and like reference characters will apply. A shaft 141 is mounted in a bearing 143 secured in the side wall of steam box 114 and this has a bell crank 144 mounted thereon to which is connected a link 145 which is connected to an eccentrically disposed pin 146 on a disk 147 secured on a shaft 148 mounted in bearings 130 and 136. Shaft 148 has a sprocket wheel 150 secured thereon and a sprocket chain 151 which is also mounted on a sprocket wheel 152 secured on shaft 140. Shaft 140 has secured thereon a pair of sprocket wheels 155 having sprocket chains 156 thereon which are also mounted on a double sprocket 157 mounted on motor shaft 87.

On the other side of steam box 114 there is disposed a framework 160 which is disposed on horizontal I-beams 17, and on this frame is disposed another frame 161. There is also disposed from I-beam 17 an upright framework 163. Member 163 has mounted thereon bearings 167 and 168 in which a shaft 169 is rotatably mounted which has a disk 170 secured thereon to which is eccentrically connected a link 171 which is connected to an arm 172 on a shaft 173 pivoted in bearing 174 in the other side wall of the steam box 114 and also oscillatably mounted in a bearing 175 disposed on the side of frame 163.

On top of frame 161 is disposed a bearing 180 in which a shaft 181 is rotatably mounted which extends into a packing gland arrangement similar to that described for the steam box 12 and like reference characters with prime notations will apply.

The framework 160 has also mounted thereon a bearing 185 in which is rotatably mounted a shaft 186 which extends through a packing gland arrangement to the interior of the steam box 114 similar to that described for steam box 12 and like reference characters with prime notations added will apply.

The shaft 186 had fixed thereon a sprocket wheel 188 on which is mounted a sprocket chain 189 which is also mounted on a sprocket wheel 190 disposed on the shaft 181. The shaft 181 has a sprocket wheel 192 fixed thereon on which is mounted a sprocket chain 193 which is also mounted on a sprocket wheel 194 fixed on the shaft 169. The shafts 148 and 169 give oscillatory movement to the shafts 141 and 173 respectively. These shafts 141 and 173 respectively project to the inside of the steam box 114 and have secured adjacent the side walls of the steam box 114 but on the interior thereof arms 195 which are fixedly secured to a funnel shaped member 196 which extends across practically the whole width of the steam box 114 and through which the cloth rope 96 is adapted to be passed. The cloth rope however after passing through the pot eye 116 in the end wall of steam box 12 passes through a movable pot eye 200 which is mounted for oscillation back-and-forth on a reversely threaded shaft 137.

The shaft 137 extends through the bearing glands on each side of the steam box 114 which are the bearing glands nearest the steam box 12. This shaft can be removed through the packing glands when it is desired by causing the traveling pot eye to be disengaged therefrom.

Surrounding the shaft 137 and welded to the side walls of steam box 114 is a trough 202 and overshadowing this trough in spaced relation thereto is a cover 203 which likewise is welded to the interior surfaces of the vertical side walls of the steam box 114.

Adapted to travel on the reversely threaded shaft 137 is a fitting 204 having a reversible pin 205 therein adapted to traverse the grooves in the reversely threaded shaft 137. The member 204 has secured thereto an inverted channel member 206 which has secured to its lower end a transverse member 207, the member 206 being inside the cover 203 and outside the trough 202. Secured to the exterior surfaces of the member 206 is an inverted U-shaped member 208 which projects upwardly and has the pot eye 200 welded thereto.

It is therefore seen that rotation of the shaft 137 will cause the pot eye 200 to move back-and-forth from one side of the steam box 114 to the other, and the cloth rope 13 will pass over a roller 210 which is secured at its ends to the shafts 140 and 181 by means of plates 211 and 212 being fixed on the ends of these shafts which project through the packing glands and to the inside of the steam box 114, these plates being secured by any suitable means to the ends of the drum 210 such as bolts 215 so that the bolts 215 can be removed and the drum 210 removed upwardly out of the steam box when the door 217 is removed and likewise the shafts 140 and 181 along with their plates 211 and 212 can be brought out through the packing glands since the openings covered by the packing glands are large enough to allow these plates to be withdrawn through the packing glands in the same manner as fully described relative to the steam box 12.

It is thus seen that the pot eye 200 gives a back-and-forth movement of the cloth rope 13 and directs it into the funnel shaped member 196 which has a breadth substantially the same as the steam box 114. And it is also seen that this funnel shaped member 196 is oscillated back-and-forth, that is, towards and away from the steam box 12 while the cloth rope 13 is passing therethrough. This funnel shaped member 196 projects downwardly into a downwardly projecting portion of the steam box 114 and this downwardly projecting portion is connected to the long leg of a J-box 225 which has connected thereto as at 226 a curved irregularly U-shaped portion 227. The cloth, by the back-and-forth movement of the funnel shaped member 196, such as to the right and left as indicated by the arrows in Figure 13, and the transverse movement imparted to the pot eye 200, causes the cloth rope to be deposited into the J-box in a substantially figure 8 pattern where there will be substantially slack and provides an ample quantity of the cloth during a steaming and bleaching operation, as the steam is forced downwardly in the J-box portion 225 and into the portion 227. The portion 227 projects upwardly and has connected thereto as at 230 a cap or closure portion 231 which has a vane 232 extending transversely thereof and over which the cloth rope 13 rides. The upper end of the cap member 231 has a pot eye 235 therein which is substantially closed by the outgoing rope 13 and thus prevents any substantial amount of steam leakage therethrough. Secured on the uppermost portion of the cap 231 is a vent pipe 240 which is surrounded by an annular member 241 of substantially a greater diameter than the portion 240. This member 241 has an annular member 242 secured to its inner side wall and stopping short of the exterior of annular member 240.

Secured to the annular member 242 is an upwardly rising vent pipe 243 so that the steam may escape through member 240 and into pipe 242 and its condensate will fall downwardly between the annular member 242 and the member 240 and drain outwardly through a drain pipe 245.

The member 231 has secured thereto a pair of angle members 246 which have secured therein a roller 247 over which the cloth rope 13 passes as it leaves the J-box. The cap member 231 has an inspection opening closed by an inspection door 248 and whereby access can be secured to the cap member 231.

It is thus seen that I have provided a continuous bleaching apparatus in which the cloth can be treated with any desired chemical such as peroxide, or any other suitable chemical and led through a steaming box and then deposited into an elongated J-box where the bleaching process is carried to completion.

One of the main advantages of the present apparatus is the steaming boxes having the rotary portions thereof housed for rotation in the steaming boxes and having the driving shafts or supporting shafts penetrating the side walls of the steaming boxes and having a packing gland and an enlarged opening whereby the rollers, pulleys and the like can be removed from the shafts, and the shafts brought through the enlarged openings in the side walls of the box and the rollers, pulleys, and the like can be lifted out through the openings in the tops of the boxes, and thus no leakage occurs whatever between the shafts penetrating the side walls of the boxes and the walls of the openings through which they project.

In the drawings and specification there has been set forth a preferred embodiment of the invention, and although specific terms are employed, they are used in a generic and descriptive sense only, and not for purposes of limitation, the scope of the invention being defined in the claims.

I claim:

1. In a continuous cloth bleaching apparatus having a steam box provided with means for passing cloth therethrough in rope form, and having means for admitting steam to the steam box, a pair of grooved pulleys in the steam box over which the cloth is passed, a shaft connected to each side of each pulley and projecting through the walls of the steam box, said side walls of the steam box having an enlarged opening through which the shafts project, a flexible annular member having one end secured to the exterior of the box and surrounding the openings through which the shafts pass, a vertically disposed support separate from the steam box through which the shafts also pass and being in spaced relation outwardly from the walls of the steam box, means for securing the other end of the annular flexible member to said vertically disposed support, a packing gland supported by the vertically disposed support for preventing passage of steam or air through the packing gland, the connection of said shafts to said pulleys comprising a plate secured on the proximate ends of the shafts and means for securing the plates to the opposed sides of the pulleys whereby when it is desired to remove the shafts the pulley can be separated from the shafts and the shafts and plates associated with the ends thereof can be moved through said openings covered by the annular flexible member.

2. In a continuous cloth bleaching apparatus having a steam box provided with means for passing cloth therethrough in rope form, said steam box having a pair of downwardly projecting spaced tubes having their upper ends communicating with the bottom of the steam box and having a pulley at their lower ends, a pair of pulleys mounted in the steam box, the cloth being adapted to enter one end of the steam box and pass over one of said pulleys and down through one of said tubes and back up through the other tube and over the second pulley, the side walls of the steam box having enlarged openings in its side walls, a pair of shafts for each pulley extending from the exterior of the steam box to the interior thereof, the proximate ends of the shafts having plates thereon slightly smaller in diameter than the diameter of the openings in the side walls of the steam box, means for securing the plates to opposed sides of said pulleys, the shafts projecting outwardly through the openings in the side walls of the steam box a substantial distance, an annular flexible member disposed around each of the shafts and having one end secured to the exterior of the side walls of the steam box, a vertically disposed plate member having an opening through which the shafts project on each side of the steam box, a packing gland associated with the vertically disposed plates and surrounding said shafts, the annular flexible member having its outer end secured to the interior surface of said vertically disposed plates, the top of the steam box having openings therein closed by suitable lids whereby when it is desired to remove one of the pulleys or the shafts, the shafts can be separated from the pulleys and the pulleys can be removed through the top of the steam box and the shafts can be moved outwardly through the openings in the side walls of the steam box after removal of one end of the annular flexible member from its supports.

3. In a continuous cloth bleaching apparatus, having a steam box provided with means for passing the cloth therethrough in rope form, a pair of pulleys mounted for rotation in the steam box and over which the cloth is passed, the side walls of the steam box having alined openings of substantial size therein, bearings disposed outside the steam box and in which a pair of shafts are mounted, the inner ends of the shafts having plates secured thereto of lesser dimensions than the dimensions of the holes in the sides of the steam box, means for securing the plates on the proximate ends of the shaft to the sides of the pulley, a tubular flexible diaphragm having one end secured to the exterior of the steam box and surrounding the opening in the steam box at each side thereof, a vertically disposed plate member disposed exteriorly of the steam box and in spaced relation to the side walls thereof and supported by means separated from the steam box, means for securing the outer end of the tubular diaphragm member to said plate member whereby the leakage of steam or air through the openings in the side walls of the steam box is eliminated and whereby the pulleys can be detached from the shaft and removed from the top of the steam box and the shaft can be removed through the holes in the side of the steam box by removing the tubular diaphragm members.

4. In a continuous cloth bleaching apparatus having a steam box provided with means for passing the cloth therethrough in rope form in a continuous bleaching operation, said steam box having a pair of spaced pulleys mounted therein and having a pair of downwardly projecting tubes having a pulley mounted at the lower ends there-

of, means enclosing the latter named pulley and the lower ends of the tubes whereby the cloth can be passed into the steam box and over one pulley and down one tube and over the pulley at the lower end of the tubes and upwardly through the other tube and over the second pulley, means for mounting the pulleys comprising the side walls of the steam box each having a pair of openings therein of substantial size, a framework for supporting the steam box and having uprising portions on each side of the steam box disposed outside of the steam box and a pair of stub shafts mounted in the uprising portions of the framework on each side of the steam box and projecting through said openings, the proximate ends of the shafts which penetrate the openings in the steam box having plates thereon of lesser dimensions than the openings in the sides of the steam box, means for securing the plates to the sides of the pulleys, a flexible tubular diaphragm member surrounding the stub shafts on the outside of the steam box and having one end secured to the exterior of the steam box, a plate adjacent each opening and spaced therefrom, and means for securing the outer end of the flexible diaphragm member to said plate, said plate having an opening therethrough through which stub shaft passes and a packing gland associated with the last-named plate and with said shaft for preventing steam or air from escaping from or entering the steam box through the openings in the side thereof.

5. A steam box having side walls and a door in the top thereof and a framework disposed exteriorly of and in spaced relation to each of the side walls, means for passing cloth in rope form through the steam box, each of the side walls having an enlarged opening therein, a shaft rotatably mounted on each side of the side walls and exteriorly thereof and extending through the opening in the side walls, a grooved pulley secured to each of the proximate ends of the shafts and over which the cloth is passed, said pulley being removable through the door disposed in the top of the steam box, a tubular flexible member having one end removably secured to the exterior of the side walls of the steam box and surrounding the opening therein, the tubular flexible member extending away from the steam box and having its other end extending a substantial distance away from the steam box, a plate member supported independently of the steam box and penetrated by the shaft, means for securing the other end of the tubular flexible member to the plate member, and a packing mechanism supported by the plate member and surrounding said shaft for preventing ingress or egress of air to the interior of the steam box.

6. In a continuous bleaching apparatus for cloth in rope form comprising a steam box means for passing the cloth through the steam box, a pair of spaced pulley disposed in the steam box, and over which the cloth is adapted to pass, a shaft secured to each of the sides of the pulleys

and extending away from each other, each of the side walls of the steam box having an enlarged opening therethrough through which the shafts project, a framework supporting the steam box, a pair of plates supported by the framework and extending upwardly in substantially vertical position and in spaced relation to the exterior of the side walls of the steam box, a tubular flexible member having one end secured to the exterior of the side walls of the steam box and having its other end secured to the plate member and surrounding said shaft, the shaft penetrating the plate member, each of the plate members having a packing gland assembly associated therewith and through which the shaft passes whereby ingress or egress of steam or air is prevented from entering the steam box through the said openings and whereby the shafts can be removed from the steam box after being separated from the pulleys by passing the same through the enlarged openings in the side walls of the steam box.

7. An enclosure having means for passing cloth therethrough in rope form and having a pair of side walls provided with enlarged openings opposed to each other, a pulley disposed within the enclosure, a pair of shafts having plates on their proximate ends and means for securing the plates to the pulleys, the shafts projecting outwardly through said openings a substantial distance away from the enclosure, a pair of bearings for each shaft for rotatably mounting the shafts exteriorly of the enclosure, a vertically disposed plate disposed between each bearing and each of the side walls of the enclosure and supported independently of the steam box and through which the shafts pass a tubular flexible member surrounding each of the shafts and disposed between the side walls of the enclosure and each of said plates and having the ends thereof secured to the exterior of the side walls of the enclosure and to the plate and a packing gland assembly disposed on each plate member and surrounding said shaft for preventing leakage of steam or air into or out of the enclosure through the openings in the side walls of the enclosure.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
733,408	Mack	July 14, 1903
759,980	Fries	May 17, 1904
814,124	Fish	Mar. 6, 1906
911,560	Gantt	Feb. 2, 1909
1,564,468	Conrad	Dec. 8, 1925
1,854,526	Rowley	Apr. 19, 1932
2,267,718	Campbell	Dec. 30, 1941
2,304,474	Poesl	Dec. 8, 1942
2,371,166	Harcourt	Mar. 13, 1945
2,395,305	Vincent et al.	Feb. 19, 1946