April 13, 1943. C. O. LAVETT 2,316,176

ATMOSPHERIC DRUM DRIER

Filed Aug. 1, 1940 2 Sheets-Sheet 1

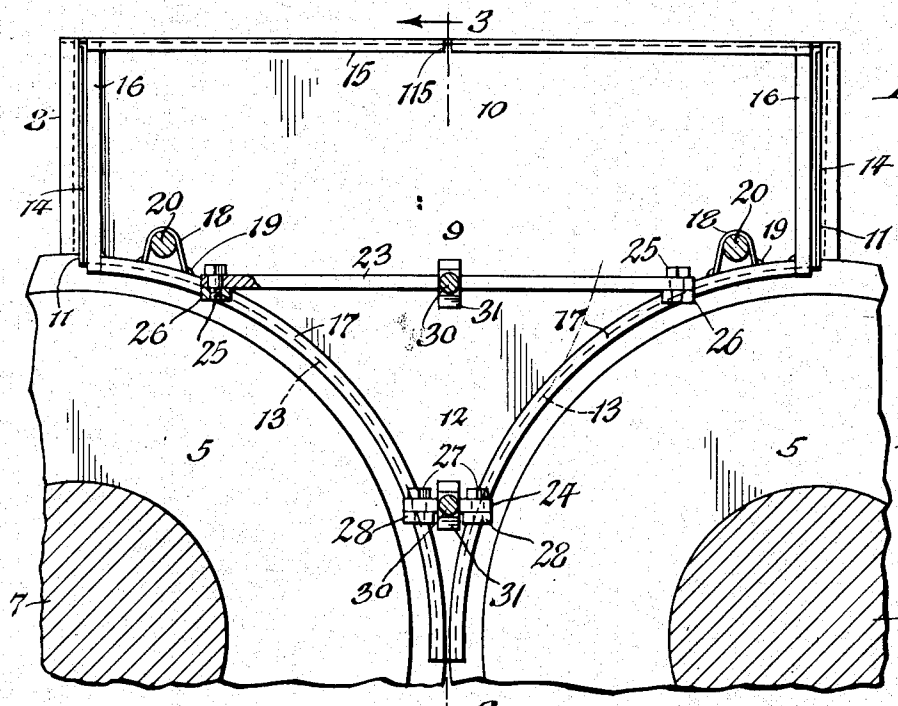


Fig. 1.

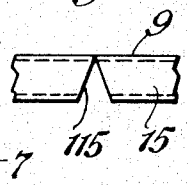


Fig. 5.

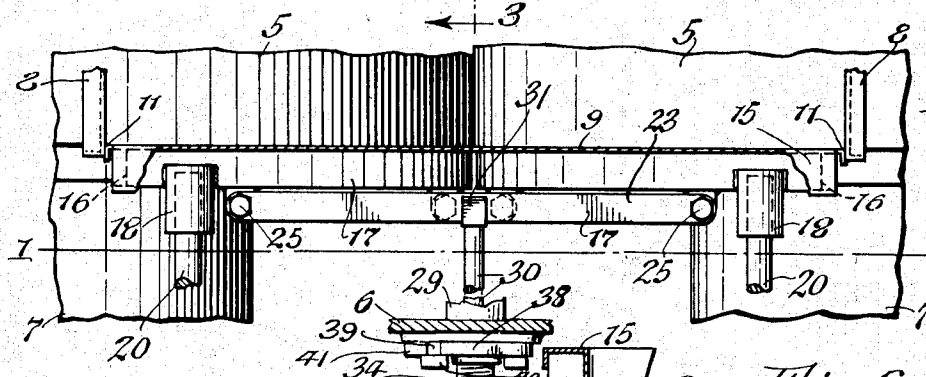


Fig. 2.

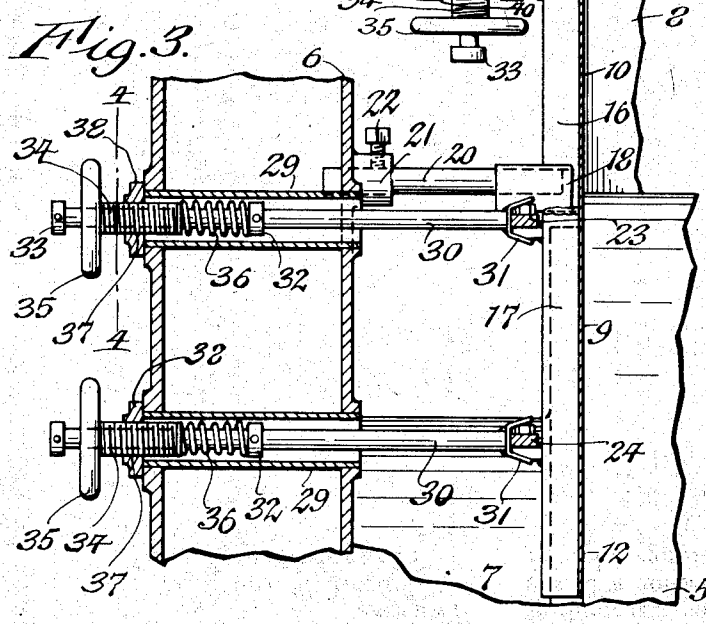


Fig. 3.

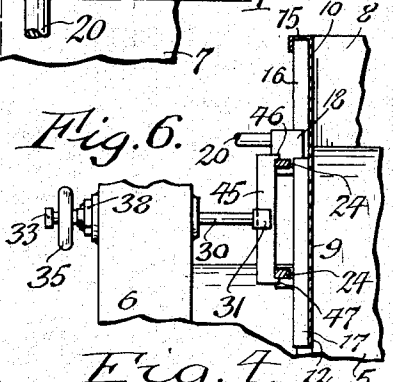


Fig. 6.

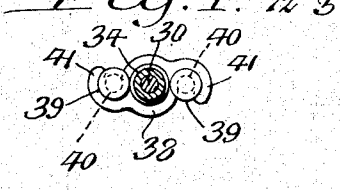


Fig. 4.

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April 13, 1943. C. O. LAVETT 2,316,176

ATMOSPHERIC DRUM DRIER

Filed Aug. 1, 1940 2 Sheets-Sheet 2

Fig. 7.

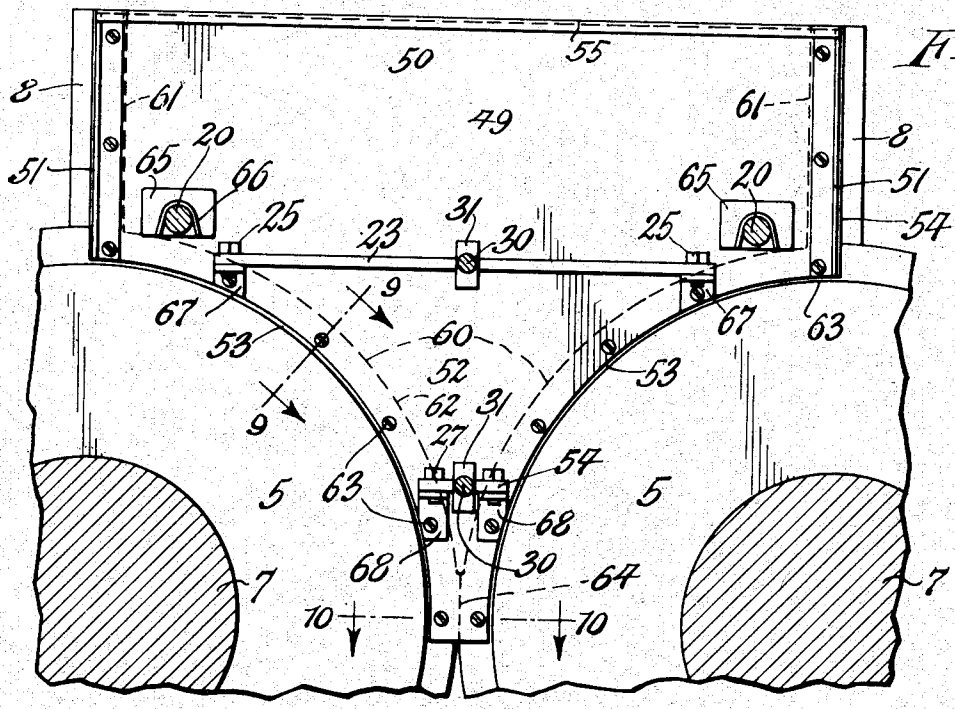


Fig. 8.

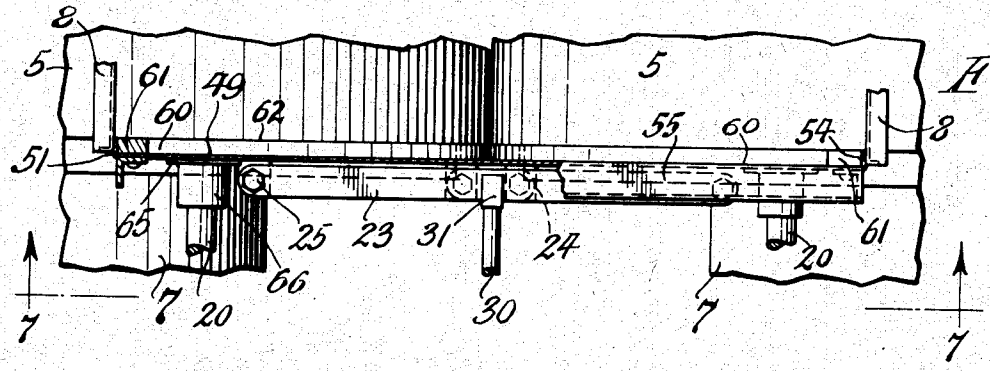


Fig. 9.

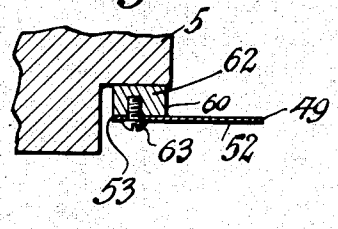
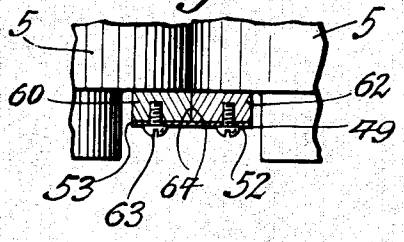


Fig. 10.



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UNITED STATES PATENT OFFICE

2,316,176

ATMOSPHERIC DRUM DRIER

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Application August 1, 1940, Serial No. 349,191

12 Claims. (Cl. 159—11)

This invention relates to an atmospheric drum drier which is provided with two rotary opposed drums adapted to receive between them the material to be dried, and more particularly to a drier of this character having end boards arranged at opposite ends of the space between these drums for the purpose of forming with the upper opposing surfaces of these drums a feed chamber from which this material is supplied to the drums.

With drum driers of this type the thickness of the coating adhering to the drums is usually controlled by adjusting the spacing between the drums, this usually being done while the drums are in operation. It has been customary heretofore to construct the end boards of wood although in some cases materials, such as Bakelite, have been employed. Such end boards made of wood or Bakelite are bolted to a heavy steel or cast iron backing plate to form a unitary structure. The backing plate to which the wood or Bakelite is bolted has been necessarily heavy as the rigidity of the end board has been considered an important factor, it being necessary to apply sufficient pressure to the plate to provide a tight seal between the drums and the end board. Further, end boards so constructed are required to be of such thickness that the end boards will not buckle or deflect.

In adjusting the space between the drums it frequently happens that the drums are not in exact alignment at both ends and with rigid end boards constructed as above the resulting improper fit results in leakage of the liquid. Since wood or Bakelite end boards attached to a rigid metal plate are not free to flex so as to fit the ends of the drum in case of misalignment and as the rigid metal plates are not free to expand and contract with the wood due to alternate wetting, heating, cooling and drying, end boards constructed as above have a tendency to bulge, crack, check and warp, particularly as it is necessary to take the boards out at night for cleaning and to allow them to lie idle over night. With such wood or Bakelite end boards it has therefore been necessary each morning to allow a considerable time to permit the end boards to wear in, and since the end boards do not properly fit the ends of the drums during such wearing in processes, leakage results. The liquid so leaking first dries on the ends of the heated drums and later chars, this charred material in many instances becoming quite gritty and tending to wear the boards rapidly at the area contacted by the drums.

If the leakage continues the material already deposited on the ends of the drums insulates the heating surface to a certain extent. The material leaking out then does not dry completely, but becomes gummy and discolored, the friction tending to force some of this gummy substance to the cylindrical surface of the drum where upon reaching the knife or doctor blade it is removed and thus mixes with the dry product taken from the drums. With such end boards it will also be seen that the friction between the drums and the end boards is very high, mainly due to the fact that an initial proper fit is not obtained and therefore excessive pressure has to be applied to wear the end boards in and prevent leakage as much as possible. This requires excessive power for driving the drums and also results in excessive wear on the drum bearings and the like.

With such end boards it is also necessary to allow for reasonable wear and hence end boards made of wood or Bakelite must be quite thick. As the wood or Bakelite is mounted on a heavy steel or cast iron plate, the unitary end board structure is necessarily heavy and awkward to handle, such end boards requiring two men to remove for cleaning and replacement even on a comparatively small size drier. Extra care must also be taken to avoid damage to the drum surfaces when the boards are removed daily for cleaning.

It is the principal object of the invention to provide end boards which are made entirely of metal and are flexible so as to conform to the drums even when the drums are not properly aligned and thereby avoid the wearing in process accompanying wooden end boards with the resulting leakage and danger of contaminating the product as above described.

Another object of the invention is to provide a unitary metal end board which is not bolted or rigidly held to any member employed for pressing it against the drums.

Another object of the invention is to provide such an end board which is not bolted to its support and is free to expand, contract or flex to fit the ends of the drums as may be required.

Another object of the invention is to provide an end board which is supported in proper relation to the drums and which is pressed against the ends of the drums by independent members which exert the necessary pressure to form a leakproof seal. Such independent pressure exerting members can be applied in one or more

places depending upon the size of the board, the rigidity of the board and other factors.

Another object of the invention is to provide one form of the invention in which the end board made of a sheet metal plate is backed by an independent reenforcing and pressure structure which is curved to conform to the circular contour of the drum, the reenforcing member bearing uniformly against the flat outer surface of the sheet metal plate so as to exert uniform pressure on the part of the sheet metal plate which is in contact with the drums.

Another aim of the invention is to provide such an end board in which the pressure members which hold the end boards against the drums are free to move within certain limits so as to permit the end boards to adjust themselves to the drum ends when the drums are not in perfect alignment.

Another purpose of the inveniton is to provide an end board which is made entirely of metal and light in weight and can be easily removed and replaced by one man.

Another object of the invention is to provide such an end board which is so mounted that the means for exerting pressure upon it are independent of the end board and it is necessary to remove only the end board for cleaning purposes.

Another purpose of the invention is to provide an end board constructed entirely of metal wherein the end board has sufficient flexibility to adapt itself to the drum ends and hence requires less pressure to provide an adequate seal and reduces the friction between the drums and the end boards and the power requirements for driving the drums.

Another object of the invention is to provide a board which is low in cost and can be made of any suitable sheet metal such as stainless steel, Monel metal, nickel, copper, steel, aluminum, laminated or unlaminated plastics and so forth; which will stand up under conditions of severe and constant use; which is easily kept in an absolutely sanitary condition; which reduces material losses and the danger of contaminating the dry product and which can readily be replaced without elaborate wearing in processes.

In the accompanying drawings:

Fig. 1 is a fragmentary, vertical, transverse section of a double or two drum atmospheric dryer equipped with one form of end board and means for mounting the same embodying this invention, this section being taken on line 1—1, Fig. 2.

Fig. 2 is a top plan view of the same.

Fig. 3 is a vertical, longitudinal section, taken on line 3—3, Fig. 1.

Fig. 4 is a vertical transverse section, taken on line 4—4, Fig. 3.

Fig. 5 is a fragmentary top plan view of the end boards shown in Figs. 1–4 and showing the manner in which a notch is provided for greater flexibility.

Fig. 6 is a fragmentary view similar to Fig. 3 and showing a modified form of my invention.

Fig. 7 is a view similar to Fig. 1 showing a further modified form of the invention, this section being taken on line 7—7, Fig. 8.

Fig. 8 is a view similar to Fig. 2 showing the modified form of the invention illustrated in Fig. 7.

Figs. 9 and 10 are fragmentary sections, taken on the correspondingly numbered lines of Fig. 7.

In the following description similar characters of reference indicate like parts in the several figures of the drawings:

This invention is applicable to double drum driers which may be of various forms as to the details of construction and the drawings therefore only disclose such parts of a double drum drier which are necessary for the purpose of illustrating those features of such a drier which cooperate with end boards embodying the present invention. As there shown this drier comprises two cylindrical drums 5, 5 which have their axes arranged horizontal and parallel and their opposing cylindrical surfaces close together so as to form a downwardly converging space. The main frame of the drying apparatus includes an upright standard at each of the corresponding ends of the drums, one of these being shown at 6 in Fig. 3, these drums being provided with horizontal trunnions 7 at each of their ends which are journaled in suitable bearings on the adjacent standard 6 of the main frame.

The material to be dried such, for example, as milk, may be fed into the feed chamber or space between the two drums by any suitable means and the rotation of the drums for bringing the peripheral parts of the same successively into contact with the material located between the upper opposing parts thereof may also be effected in various ways. The drums are heated internally and during their rotation some of the material to be dried adheres to the opposing upper peripheral parts thereof and is carried circumferentially thereon a sufficient distance to dry this material after which the dried material is removed from the periphery of the drums by knives and then carried away in a manner well known in this art.

The numeral 8 represents two splash shields or side boards which are arranged lengthwise above the upper part of the drums and extend at their ends slightly beyond the corresponding ends of the drums. These side boards prevent the material from splashing over the upper parts of the drums and are supported by the end boards embodying my invention. These end boards are each made of a plate of sheet material 9, such as sheet steel, copper, aluminum, Monel metal, nickel, stainless steel, or plastics. These plates or sheets 9 are pressed against the opposite ends of the drums 5 so as to form the space or valley between the drums which contains the material to be dried by the drums. Each of these end boards so made of sheet material is constructed to form an upper wide part 10 having vertical edges 11 and a narrow lower part 12 having its opposite edges 13 converging downwardly from the lower ends of the vertical edges 11 to a point somewhat below the axes of the drums. These downwardly converging edges 13 of the lower narrow part 12 of the end board are preferably curved concentric with the axes of the drums and each of these curved edges is pressed flatwise against the respective end of the corresponding drum by a separate backing and reenforcing structure, as hereinafter described. In order to stiffen the vertical edges of the upper part 10 of the plate 9 and also to provide an extended face for supporting the splash shields or side boards 8, these edges are preferably flanged, as indicated at 14, the side boards 8 being secured against the outer faces of these flanges 14 in any suitable manner (not shown).

The upper horizontal edge of the plate 9 is also similarly flanged, as indicated at 15, but this flange is preferably hook-shaped in cross section, its outer edge being bent downwardly for this purpose. This flange 15 can also be notched at its center, as indicated at 115, so as to permit

the plate 9 to freely flex along a vertical central axis and the ends of the flanges 14 and 15 are preferably not connected to one another, thereby to provide greater flexibility for the plate 9.

Each plate 9, as above described, is a separate removable structure which forms the end board for the drier and is held in place by a supporting structure which in turn is carried by the frame of the drier, this supporting structure being yieldingly pressed against the corresponding plate 9 so as to insure a tight seal between each plate 9 and the corresponding ends of the drums. As shown in Fig. 1, each of these supporting structures includes a vertical bar 16 each of which is preferably welded to a lower curving bar 17, the horizontal flange 15 of the sheet or plate 9 hooking over the upper ends of the bars 16 so as to be loosely supported thereby. These bars 16 are disposed along the vertical edges 11 of the plate 9 and the bars 17 are disposed along the lower curving edges 13 of the plate 9 and preferably extend slightly beyond these edges. It will be noted that the two bars 17 for each end board 9 are spaced from one another at their lower ends so as to leave a narrow web of sheet material, the leaving of this web permitting the plate 9 to flex along its central vertical axis, this flexing being further insured by the provision of the notch 115 in the flange 15, as previously described.

Secured to each of the curving bars 17 is a supporting lug 18 each of which is formed to provide a socket and is preferably constructed from a strap of metal which is bent into the shape of an inverted U and secured at the lower ends of its legs to the upper part of the bar 17 by welding, as indicated at 19. Each socket lug 18 is only connected with the adjacent bar 17 and is not connected with the adjacent part of the plate 9. These supporting lugs are carried by short rods 20, each of which is supported in a socket 21 formed in the frame 6 and held in position by a set screw 22 or in any other suitable manner. The free end of these short supporting rods 20 extends into one of the socket lugs 18 so that the bars 16 and 17 are hung upon these rods 20 and the plate 9 in turn hung on these bars, the rods 20 thereby serving as the support for each end board but permitting a limited movement of the bars 16 and 17 so as to permit the end boards to adapt themselves to the ends of the drums.

Each of the end board plates 9 is pressed against the corresponding ends of the drums by spring pressed retaining devices which permit a limited movement of the end board. For this purpose the upper ends of each pair of bars 17 are tied together by an upper cross bar 23 and the lower ends of the curving bars 17 of each end board are connected by a lower horizontal bar 24 which is comparatively short. The upper abutment bar 23 is secured at its opposite ends by means of screws 25 to lugs 26 projecting outwardly from the upper parts of the curved bars 17 and each lower abutment bar is secured at its opposite ends by means of screws 27 to lugs 28 which project outwardly from the lower parts of these curved bars 17, as shown in Fig. 1. The connection between the screws 25 and 27 and the cross bars 23 and 24 is sufficiently loose so that the curved bars 17 are free to move, within certain limits, relative to the cross bars 23 and 24 and thereby adapt themselves to the ends of the drums in exerting pressure against the plate 9.

In the form of the invention shown in Figs. 1–5 the numeral 29 represents two tubes extending horizontally through the upper and lower parts of each standard 6 of the frame and suitably secured thereto so as to form two enclosing casings or housings. A thrust rod 30 extends lengthwise through each of these housing tubes 29 and is shown as provided at its front or inner end with a fork 31, each fork straddling one of the abutment bars 23, 24 at the center of the abutment bar. Within the tubular housing 29 the thrust rod is provided with an outwardly facing shoulder which is preferably formed by means of a collar 32 secured to this rod and at its outer end the rod is provided with a stop collar 33. Surrounding the outer part of the thrust rod and extending partway into the outer end of the housing tube 29 is a tubular adjusting screw 34 which is turned by means of a hand wheel 35 secured at its outer end. A compression spring 36 of helical form is shown as surrounding the thrust rod 30 within the tubular housing and interposed between the collar 32 and the end of the tubular adjusting screw 34, as shown in Fig. 3. The central part of the tubular adjusting screw 34 engages with the threaded opening 37 formed in a nut 38 which is demountably secured to the frame 6. It will be seen that upon turning the screws 34 the pressure upon the upper and lower springs 36 can be varied to produce the desired pressure exerted by the thrust rod 30 against the cross bars 23 and 24. This adjustable spring pressure is in turn applied to the curved bars 17 and thereby yieldingly urges the curved edges 13 of the plate 9 into engagement with the ends of the drums. By this means a plate joint can be produced between the end boards 9 and the ends of the drums without creating a condition of undue friction.

Each of the nuts 38 is preferably made quickly detachable from the frame so that each of the spring loaded retaining devices can be easily and quickly removed from the frame and disengaged from the end board so that the end board can be quickly removed from the drier when it is desired to clean or service the apparatus. The quick detachable means for the nuts 38 include two bolts or studs secured to the outer side of the frame standard 6 on opposite sides of each tube 29 and each stud having an enlarged head 39 and a reduced neck 40. Each nut 38 is formed to provide two hooks 41 at opposite sides, the nut being turnable to move these hooks into and out of engagement with the necks of the studs. As illustrated in Figs. 2 and 4, the nut has been turned so that its hooks 41 engage the necks 40 of the studs so that the nut is held against axial movement and hence causes the screw 34, upon being rotated, to exert or relieve pressure upon the spring 36 to the desired extent. Upon turning each nut 38 to disengage its hooks 41 from the studs 39 and 40, this nut will be released and permit the attached retaining device to be withdrawn outwardly through the tube 29 and disengaged from the corresponding cross bar 23 or 24. Upon so releasing the pressure exerted against the end boards 9 it will be seen that the sheet metal end boards can readily be lifted free from the supporting bars 16, 17 and removed for the purpose of cleaning or replacement.

In the form of the invention shown in Fig. 6 only one adjusting device is provided for each end board. To this end a vertical bar 45 is provided, this bar having a lip 46 at its upper end which engages over the cross bar 23 and having a

lip 47 at its lower end which engages under the lower cross bar 24. At its center the vertical bar 45 is pressed toward the drums by a spring loaded adjusting device which is identical with the two adjusting devices used in the form of the invention shown in Figs. 1–5. Inasmuch as the construction of this adjusting device is identical with those shown in Figs. 1–5, the same reference numerals have been applied. It will be seen that in this form of the invention one adjusting screw is eliminated and at the same time the pressure of the single adjusting screw is applied centrally of the end board and uniformly distributed to the extremities of the curved bar 17 through the medium of the vertical bar 45 and the cross bars 23 and 24.

In applying the end boards to the drum drier, the hand wheels 35 are turned so that the thrust rods 30, cross bars 23 and 24 and the vertical and curved bars 16 and 17 can be backed up sufficiently to slide the plates 9 of sheet material between the bars 16, 17 and the adjacent parts of the ends of the drums. In so placing the end plates 9 in position the hook-shaped upper flange 15 of the plates 9 is caught over the upper edges of the bars 16 so that the plates hang from the upper ends of these bars 16 in the position shown in Fig. 1. Since the bars 16 and 17 are directly supported through the lugs 18 on the short rods 20 it will be seen that the plate 9 is held in proper relation to the space or valley between the drums. The operator then turns the hand wheel 35 to exert pressure against the compression springs 36, the tubular screw 34 of the hand wheels 35 being mounted in the nuts 38 for this purpose. The pressure of the springs 36 is in turn transmitted to the thrust rods 30 and through the forks 31 to the centers of the cross bars 23 and 24. The pressure against these cross bars is in turn transmitted to the upper and lower end of each of the curved bars 17, these curved bars in turn pressing against the curved edges 13 of the plate 9 so as to press these edges of the plate into firm engagement with the corresponding ends of the drums. Since the plate 9 is rendered flexible, especially along its central vertical axis, by the provision of the notch 115 and by the spacing of the lower ends of the curved bar 17 and further by the elimination of any connection between the flanges 14 and 15, and since the lugs 18 are loosely hung upon the ends of the short rods 20 to permit a limited movement of the bars 17 transversely of the axes of the drums, and since the screws 25 and 27 are connected to the lugs 26 and 28 in such manner as to permit a limited amount of movement between the cross bars 23 and 24 and the curved bars 17, it will be seen that the plate 9 can readily adapt itself to variations in the ends of the drums, the entire structure being sufficiently flexible to permit of such adaptation. The plate 9 is therefore yieldingly held against the end of each of the drums to provide an immediate effective seal without undue friction and without danger of a part of the material being dried becoming burnt and discolored so as to impair the final dried product.

To remove the end boards it is merely necessary to back off the screws 34 and relieve the spring pressure against the cross bars 23 and 24. Upon release of such pressure the plates 9 can be lifted upwardly from engagement with the upper ends of the bars 16 and removed from the drier. This can readily be accomplished by one operator. It will also be seen that instead of backing up the screws 34 the same release of spring pressure can be obtained by releasing the nuts 38 from the studs which hold them against axial movement.

In the form of the invention illustrated in Figs. 7–10 the construction of the drying drums and the supporting structure for the end boards is identical to the construction illustrated in Figs. 1–5 and hence the same reference numerals have been applied. The essential difference between the end board illustrated in Figs. 7–10 and the end board illustrated in Figs. 1–5 is that the bars which reenforce the vertical and lower curving edges of the sheet metal plate of the end board are disposed between this sheet metal plate and the drums instead of in back of this plate as in Figs. 1–5.

As with the form of the invention illustrated in Figs. 1–5, the sheet metal plate 49 of each end board is constructed to form an upper wide part 50 having vertical edges 51 and a narrow lower part 52 having its opposite edges 53 converging downwardly from the lower ends of the vertical edges 51 to a point somewhat below the axes of the drums. These downwardly converging edges 53 of the lower narrow part 52 of the plate are preferably curved concentric with the axes of the drums. To stiffen the vertical edges of the upper part 50 of the plate 49, and also to provide an extended face for supporting the splash shields or side boards 8, these edges are preferably flanged, as indicated at 54, the side boards 8 being secured against the outer faces of these flanges 54 in any suitable manner (not shown). The upper horizontal edge of the plate 49 is also shown as similarly flanged, as indicated at 55, but this flange is preferably hook-shaped in cross section, its outer end being bent downwardly for this purpose.

Interposed between the sheet metal plate 49 and the ends of the drums 5 is a sealing bar 60 each of these sealing bars conforming to the side edges of the plate and thereby having an upstanding straight part 61 extending along the corresponding vertical edge 51 of the plate and a lower arcuate part 62 extending along the corresponding curved edge 53 of the plate. These bars can be secured to the plate 49 in any suitable manner, as by screws 63, and the lower opposing ends of these bars are provided with machined contacting faces 64. These lower contacting ends of these bars 60 are not secured together, however, except through their mutual connection with the plate 49 itself, and hence these bars do not in any way interfere with the free flexing of the plate 49 about its central vertical axis as previously described.

To support the plate 49 on the rods 20 of the supporting structure, a pair of plates 65 are shown as welded on the outer face and at the opposite sides of the plate 49 and each being formed to provide a saddle-shaped extension 66 which fits over and rests upon the corresponding supporting rod 20 of the supporting structure. Similarly, to connect the opposite ends of the upper cross bar 23 with opposite sides of the plate 49 in rear of the upper ends of the curved parts 62 of the sealing bars 60, angle pieces 67 are secured to the rear face of the plate 49 by two of the screws 63, these angle pieces forming ears to which the ends of the upper cross bar 23 are pivotally secured by the screws 25. At its extreme lower end, a pair of angle pieces 68 are secured to the plate 49 in rear of the bars 60, these angle pieces being pivotally connected by the screws 27 to the ends of

the lower cross bar 24 of the presser mechanism carried by the supporting structure.

It will be seen that the plate 49 is supported by the rods 20 and pressed at four points against the ends of the drums 5 by the bars 23 and 24 in the same manner as in the form of the invention shown in Figs. 1–5, the only essential difference being that the side bars 60 which reenforce the side edges of the plate 49 are secured to the inner face of the plate to engage the drum 5 instead of being merely pressed against the outer face of the plate 49 as in Figs. 1–5. It will therefore be seen that in the form of the invention illustrated in Figs. 7–10, these side bars 60 form the sealing surfaces between the end board and the drums and are removed with the plate 49 when cleaning is required.

From the foregoing it will be seen that the present invention provides a very simple end board which is light in weight and can be easily removed from and applied to a drier by one operator with a minimum of effort. It will further be seen that by the flexible form of the sheet metal used as the end board and by the flexibility provided in the support for this flexible backing plate and in the spring devices for holding the plate in engagement with the ends of the drums, the plate can readily adapt itself to minor irregularities in the ends of the drums and hence provide an immediate effective seal in contradistinction to the wearing in processes required with wood or Bakelite end boards. It will be further seen that by the all metal construction the disadvantage of warping and swelling in the end boards is eliminated and that by the use of metal the friction between the end board and the drums is reduced, thereby reducing wear as well as reducing the power requirements for turning the drums. It will also be seen that by providing an end board of simple construction, the end board can be very easily kept in a completely clean and sanitary condition, and it will further be noted that such an end board can be made of stainless steel or other sheet material without rendering it prohibitively expensive.

While I have shown a specific embodiment of my invention it will be understood that the embodiment shown and described can be varied widely without departing from the spirit of my invention. For example, the cross bars 23 and 24 can be made of spring steel so as to eliminate the necessity for the springs 36 and means other than the forks 31 can be employed between the ends of the thrust rods 30 and these cross bars 23 and 24. The invention is therefore to be accorded the full range of equivalents comprehended by the accompanying claims.

I claim as my invention:

1. An atmospheric drier, comprising a frame, two rotary drums arranged side by side on said frame and adapted to receive the material to be dried between them, and means for closing each end of the space between the opposing sides of said drums, including an end board comprising a sheet of flexible material and reenforcing bars adjacent the opposite side edges of said sheet, means for guidingly supporting said end board on said frame and a pressure device carried by said frame and pivotally connected with said reenforcing bars at opposite sides of said end board and urging said end board into sealing engagement with the adjacent ends of said drums.

2. An atmospheric drier, comprising a frame, two rotary drums arranged side by side on said frame and adapted to receive the material to be dried between them, and means for closing each end of the space between the opposing sides of said drums, including an end board, comprising a sheet of flexible material and rigid reenforcing bars arranged along the opposite side edges of said sheet and separate from each other at the central vertical axis of said sheet to provide flexibility in said end board along said central vertical axis, and a pressure device carried by said frame and urging each of said reenforced side edges of said end board into sealing engagement with the adjacent edges of said drums.

3. An atmospheric drier, comprising a frame, two rotary drums arranged side by side on said frame and adapted to receive the material to be dried between them, and means for closing each end of the space between the opposing sides of said drums, including an end board comprising a sheet of flexible material, the lower portion of each side edge of which is substantially concentric with the corresponding drum and rigid curved reenforcing bars arranged along the concentric edges of said sheet and separate from each other at the central vertical axis of said sheet to provide flexibility in said end board along said central vertical axis and a pressure device carried by said frame and urging each of said reenforced concentric edges of said end board into sealing engagement with the adjacent edges of said drums.

4. An atmospheric drier, comprising a frame, two rotary drums arranged side by side on said frame and adapted to receive the material to be dried between them, and means for closing each end of the space between the opposing sides of said drums, including an end board symmetrical about its central vertical axis and comprising a sheet of flexible material having an upper rectangular part and a lower part each side edge of which lower part is substantially concentric with the corresponding drum and rigid reenforcing bars having lower curved parts arranged along the concentric edges of said sheet and upstanding vertical parts arranged along the side edges of said upper rectangular part of said sheet, said reenforcing bars being separate from each other at said central vertical axis of said sheet to provide flexibility in said end board along said central vertical axis, and a pressure device carried by said frame and urging each of said reenforced concentric edges of said end board into sealing engagement with the adjacent edges of said drums.

5. An atmospheric drier, comprising a frame, two rotary drums arranged side by side on said frame and adapted to receive the material to be dried between them, and means for closing each end of the space between the opposing sides of said drums, including an end board comprising a sheet of flexible material and reenforcing bars secured to the inner face of said sheet along the edges thereof, means for guidingly supporting said end board on said frame and a pressure device carried by said frame and urging the reenforced edges of said end board into sealing engagement with the ends of said drums.

6. An atmospheric drier, comprising a frame, two rotary drums arranged side by side on said frame and adapted to receive the material to be dried between them, and means for closing each end of the space between the opposing sides of said drums including an end board comprising a sheet of flexible material and reenforcing bars bearing against the outer face of said sheet along the edges thereof and disconnected therewith, means for guidingly supporting said end board

on said frame and a pressure device carried by said frame and connected with said reenforcing bars at a plurality of points and urging the reenforced edges of said end board into sealing engagement with the ends of said drums.

7. An atmospheric drier, comprising a frame, two rotary drums arranged side by side on said frame and adapted to receive the material to be dried between them, and means for closing each end of the space between the opposing sides of said drums, including an end board comprising a sheet of flexible material and reenforcing bars adjacent the side edges of said sheet, means for removably supporting said end board on said frame and a pressure device including a bar jointedly connecting the opposite reenforced side edges of said end board and permitting said reenforced edges of said end board to flex relative to each other in adapting themselves to fit the adjacent ends of said drums, and means for urging said bar toward the adjacent ends of said drums.

8. An atmospheric drier comprising two rotary drums arranged side by side and adapted to receive between them the material to be dried, a frame on which said drums are journaled, an end board engaging corresponding ends of said drums and extending across the space between them, means for guidingly supporting said end board on said frame, and a structure for pressing said end board toward the adjacent ends of said drums and including an abutment member associated with said end board, a thrust rod engaging said abutment member and provided with a shoulder, a tubular screw which receives said rod, a spring interposed between said shoulder and said screw, a bracket mounted on the frame and provided with a threaded opening which receives said screw, and a tubular housing which is mounted on the frame and which receives said rod, screw and spring.

9. An atmospheric drier comprising a pair of opposed rotary drums adapted to receive the material to be dried between them, an end board having its edges engaging corresponding ends of said drums, and means for pressing said board against the ends of said drums including an abutment bar arranged across the outer side of the end board and having its opposite ends pivotally connected with the opposite edges thereof, a thrust member connected with the central part of said abutment bar, and spring means interposed between said thrust member and the frame and operating to press said thrust member against said abutment bar.

10. An atmospheric drier comprising parallel rotary drums having a downwardly converging space between them for the reception of the material to be dried, an end board which extends across said space at corresponding ends of said drums and which has a wide upper part and a narrow lower part, a comparatively long abutment bar pivotally connected at its opposite ends with the outer side of the upper wide part of said board, a relatively short abutment bar pivotally connected at its opposite ends with the outer side of the lower wide part of said board, upper spring pressure means interposed between the central part of said upper abutment bar and the frame, and lower spring pressure means interposed between the central part of said lower abutment bar and the frame.

11. An atmospheric drier comprising parallel rotary drums having a downwardly converging space between them for the reception of the material to be dried, an end board which extends across said space at corresponding ends of said drums and which has a wide upper part and a narrow lower part, a comparatively long abutment bar pivotally connected at its opposite ends with the outer side of the upper wide part of said board, a relatively short abutment bar pivotally connected at its opposite ends with the outer side of the lower narrow part of said board, a vertical bar bearing against the central parts of said upper and lower bars and adjustable spring pressure means bearing against the central part of said vertical bar to hold said end board in tight engagement with the ends of said drums.

12. An atmospheric drier, comprising a frame, two rotary drums arranged side by side on said frame and adapted to receive the material to be dried between them, and means for closing each end of the space between the opposing sides of said drums, including an end board comprising a sheet of flexible material and reenforcing bars adjacent the opposite side edges of said sheet, means for guidingly supporting said end board on said frame and a pressure device carried by said frame and including a member pivotally connected with said reenforcing bars at opposite sides of said end board, and means connected to the central part of said member and urging said member toward the adjacent ends of said drums whereby said end board is pressed into sealing engagement with the adjacent ends of said drums.

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