

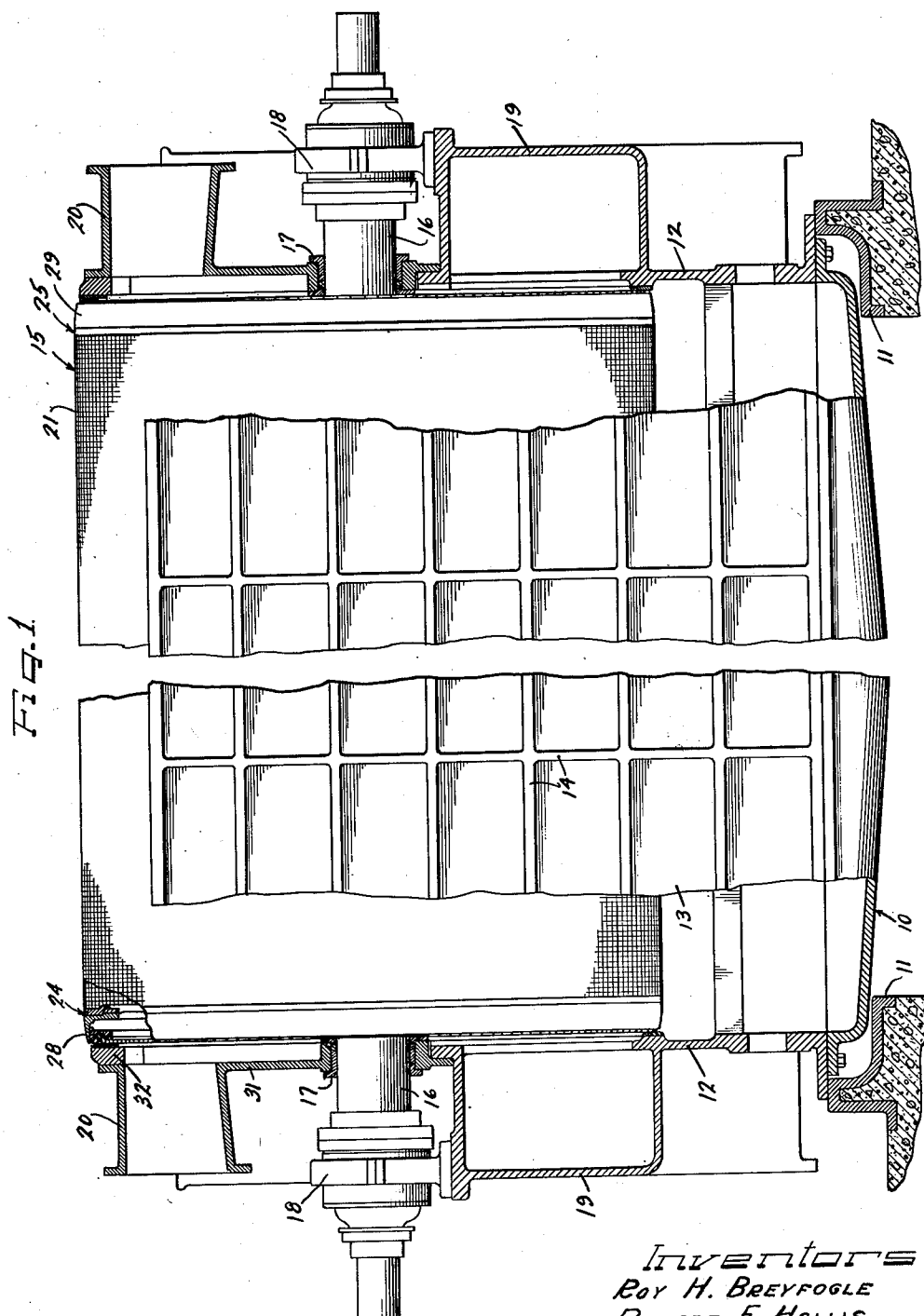
March 25, 1952

R. H. BREYFOGLE ET AL
CYLINDER TYPE PAPER MACHINE

2,590,288

Filed April 19, 1947

3 Sheets-Sheet 1



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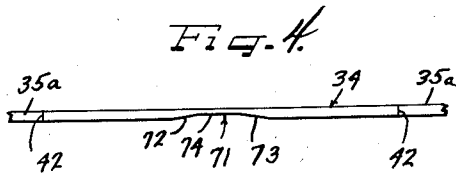
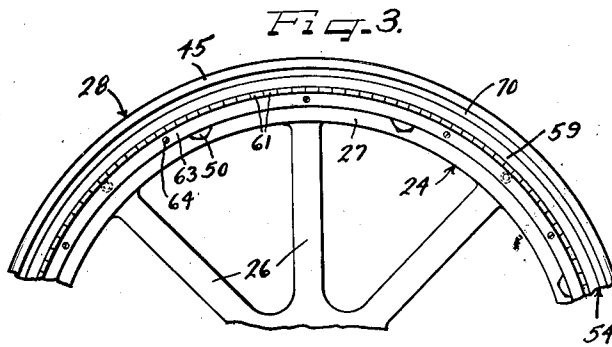
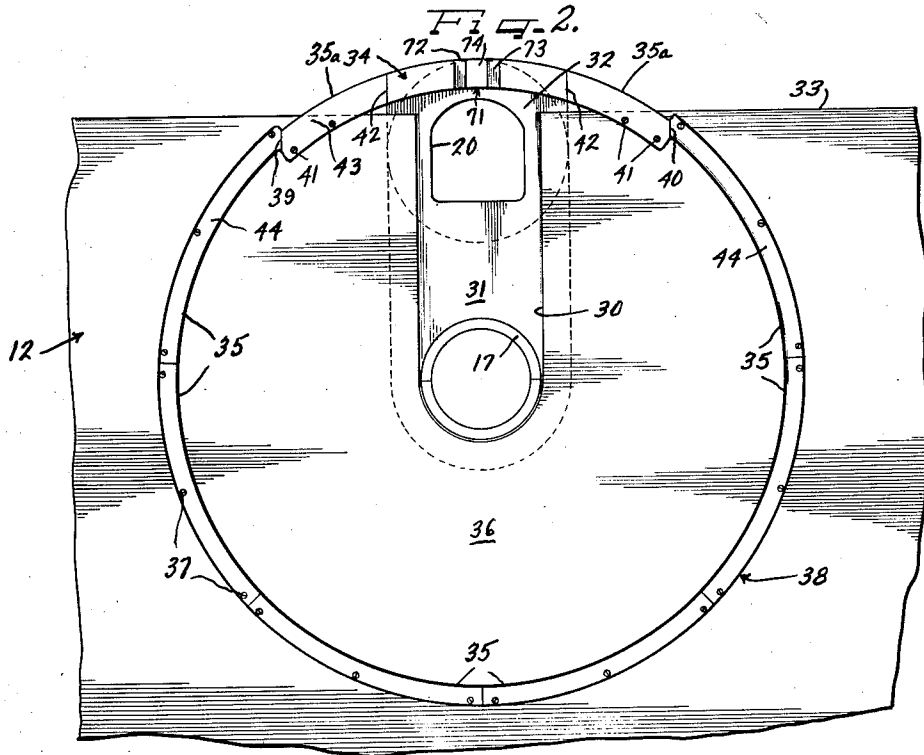
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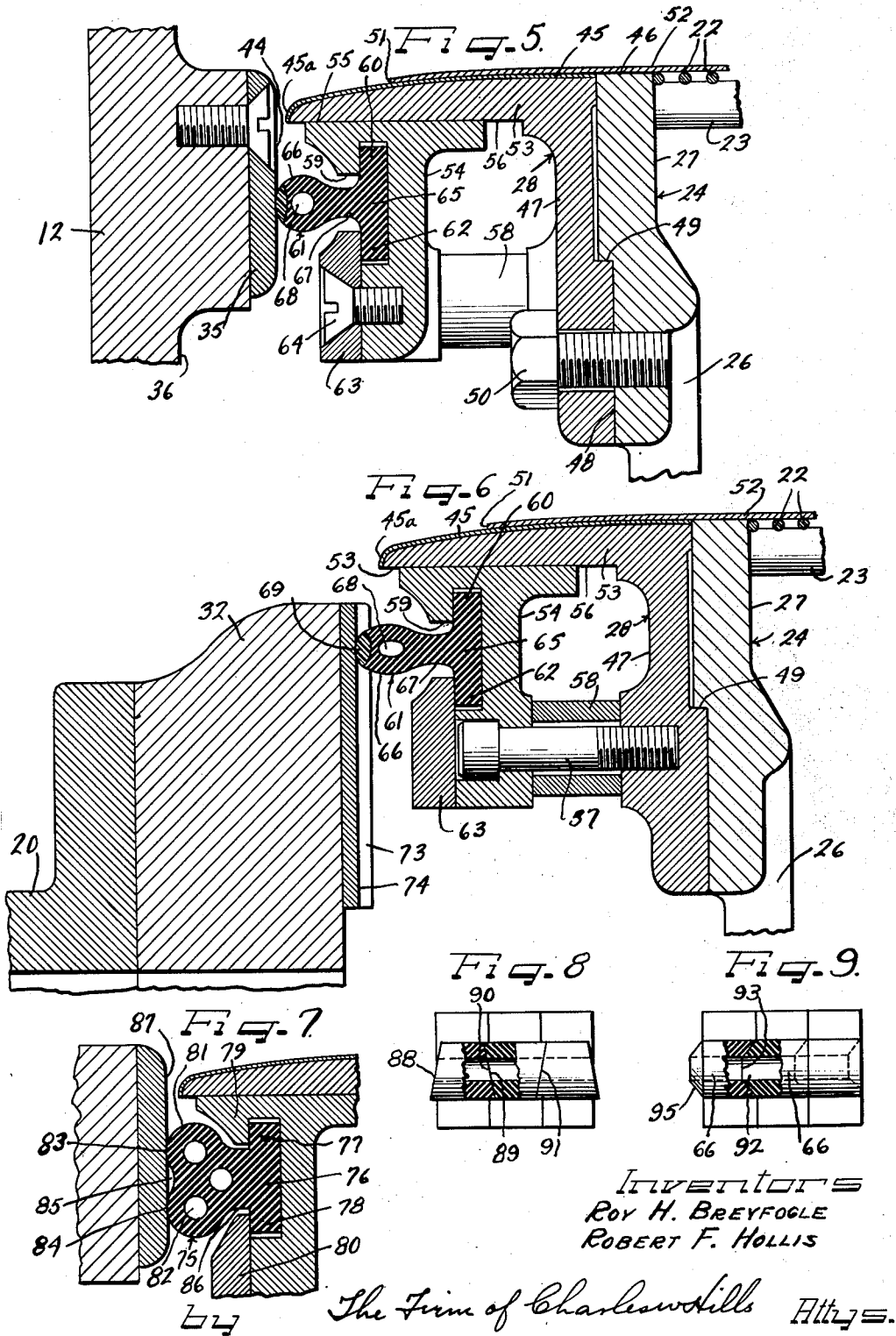
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UNITED STATES PATENT OFFICE

2,590,288

CYLINDER TYPE PAPER MACHINE

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Application April 19, 1947, Serial No. 742,708

7 Claims. (Cl. 92-43)

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This invention relates to a cylinder type paper machine and more particularly to an improved cylinder mold construction and arrangement for sealing the ends of the cylinder mold relative to the side walls of the vat in which the mold rotates.

In the operation of a typical cylinder type paper machine, the cylinder mold rotates in a stock vat which retains a pond of pulp stock in which the cylinder mold is partially immersed. As the cylinder mold rotates, the pond liquid passes through the screen, or forming wire, surface of the mold and out of the ends of the mold into drain boxes carried by the vat walls. As the liquid passes through the forming wire surface, it deposits its fibers as a web on this surface. This web is lifted from the cylinder surface by a pick-up felt which is pressed against the cylinder by a couch roll.

In presently known machines of this type, no satisfactory arrangement is provided for supporting the edges of pick-up felts which extend beyond the normal face width of the cylinder mold. Lack of such an arrangement is primarily due to the garter-belt type of seal which is commonly employed to seal off the ends of the cylinder mold from the pond of liquid in the stock vat to prevent this liquid from by-passing the forming wire surface. This type of seal requires a relatively wide gap or slot between each end of the cylinder mold and its adjacent vat wall to receive a belt which spans a seal ring attached to the end of the cylinder mold and an adjacent seal ring attached to the vat side wall to seal off the ends of the cylinder from the pond. It is found in practice that these slots, one at each end of the cylinder mold, permit the edges of pick-up felts, which are wider than the normal face width of the cylinder, to drop into the slots thereby creasing the pick-up felt adjacent its edges and causing wear on both the felt and the cylinder.

Besides preventing the use of a satisfactory arrangement for supporting the edges of pick-up felts which are wider than the normal face width of the cylinder, this garter-belt type of seal has been found to have numerous other disadvantages. Since it employs a relatively wide belt in which a portion of the flat belt surface rotates against a fixed ring attached to the vat side wall, there is considerable frictional resistance between the belt surface and the surface of the vat ring which is contacted by the belt. This type of contact also causes considerable wear and tear on both the belt and the seal rings, particularly the

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fixed seal rings. Foreign matter may become trapped under the belt and carried into contact with the annular surfaces of the sealing rings thereby causing leakage through the seal and producing undue wear on component parts of the seal. The belt often gets loose on the run and when replacements are to be made it is necessary to dismantle the seal, at least insofar as taking off the belt is concerned, in order to remove the cylinder mold from the vat and the angle type seal rings employed for this type of seal are difficult to replace in the field.

To overcome such disadvantages as these, we have invented a cylinder type paper machine an improved cylinder mold construction for supporting the edges of felts pressed against the cylinder and an improved arrangement for sealing the ends of the cylinder mold relative to the vat side walls, these novel features of our invention being economical to manufacture and resulting in lower maintenance costs during operation. Our seal arrangement has a self-cleaning action and possesses sufficient tightness for use on cylinder type paper or board-making machines, gravity deckers, syrup or slurry cleaners, etc. Whereas in machine utilizing the garter-belt type of seal there is a relatively wide gap slot between each end of the cylinder mold and the vat side walls, we provide a felt support ring forming an extension of the normal face width of the cylinder mold, thereby eliminating any "slot" at this location except for the necessary small running clearance between the ends of these felt support rings and the vat side walls. With our construction, new and wider felts can be carried by the cylinder mold without causing creasing of the felt edges.

To effect sealing between the ends of the cylinder mold and the vat side walls, we provide a resilient annular seal projecting axially from each end of the cylinder mold and bearing endwise against a wearing ring mounted on each vat side wall. Since the annular seal contacts against the wearing ring throughout a substantially unbroken annular area of contact, the otherwise open end of the cylinder mold is rather completely sealed with the result that an education fan can operate more effectively in producing suction through the interior of the cylinder mold. Suitable materials are chosen to minimize the initial cost of our improved structure to keep maintenance costs low, and to minimize the frictional load caused by contact between the annular seal and the wearing ring. Provision is made for periodically relieving compression on segmen-

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tal portions of the resilient annular seal to maintain said resiliency and to foster the self-cleaning action of the seal arrangement. With our arrangement, the felt support ring and the resilient seal assembly are readily demountable and replaced in the field and furthermore, in contrast to the garter-belt type of seal, the cylinder mold can be taken from or replaced into the vat without requiring manipulation of the end seals.

It is, therefore, an object of our invention to provide an improved cylinder mold construction and seal assembly for a cylinder type paper machine which is economical to manufacture, easy to maintain, and readily demountable.

It is another object of our invention to provide an improved cylinder mold construction and seal assembly for a cylinder type paper machine which enables the cylinder mold to be readily removed from or placed into the stock vat without requiring special manipulation of the seal assembly.

It is another object of our invention to provide a seal assembly for a cylinder type paper machine in which the assembly has a self-cleaning action and is sufficiently tight to render more effective the action of an eduction fan in producing suction through the interior of the cylinder mold.

It is another object of our invention to provide an improved cylinder mold construction for a cylinder type paper machine in which the cylinder mold can support felts wider than the normal face width of the cylinder without creasing the edges of said felts.

It is another object of our invention to provide a seal assembly for a cylinder type paper machine in which a resilient annular seal member bears against a cooperating surface provided on a wall of the stock vat.

It is another object of our invention to provide a seal assembly for a cylinder type paper machine in which a resilient annular seal member bears against a cooperating surface provided on the wall of the stock vat, and in which friction between the annular seal member and said cooperating surface is minimized.

It is another object of our invention to provide a seal assembly for a cylinder type paper machine which includes a plurality of resilient seal units arranged concentric with each end of the cylinder mold and projecting endwise therefrom.

It is another object of our invention to provide a seal assembly for a cylinder type paper machine which includes a plurality of resilient seal units positioned in a ring formation at each end of the cylinder mold, said seal units being capable of being compressed against a cooperating surface provided on a wall of the stock vat.

It is another object of our invention to provide a seal assembly for a cylinder type paper machine which includes resilient seal units arranged in a ring formation at each end of a cylinder mold and compressed against a cooperating surface provided on a wall of a stock vat, and means to maintain the resiliency of said seal units despite such compression.

These and other objects and advantages of our invention will become apparent from the following detailed description taken in conjunction with the attached drawings in which,

Fig. 1 is an end elevational view of a cylinder type paper machine with an end wall of the stock vat being broken away in part to expose the cyl-

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inder mold and showing the side walls of the stock vat in vertical cross section.

Fig. 2 shows a portion of a side wall of the stock vat, in elevation, and as viewed from the interior of the vat, and a wear plate ring attached to said wall.

Fig. 3 is an end view, broken away in part, of the cylinder mold.

Fig. 4 is a top view of a portion of the wear plate ring shown in Fig. 2.

Fig. 5 is an enlarged cross-sectional view of the felt support ring and seal assembly, with a resilient seal unit being shown compressed against the main portion of the wear plate ring shown in Fig. 2.

Fig. 6 is a view similar to that of Fig. 5 in which the resilient seal unit is shown as being relieved of compression by extending into a depression formed in the wear plate ring shown in Fig. 2.

Fig. 7 is a side view similar to that of Fig. 5 and shows an alternate type of resilient seal unit.

Fig. 8 is a frontal view, with a portion being exposed in cross section, showing the side by side arrangement of the resilient seal units.

Fig. 9 is a view similar to that of Fig. 8 showing an alternate type of side by side arrangement.

Referring to the general assembly shown in Fig. 1 of the drawings, a stock vat 10 is shown as being supported upon base rails 11 and as including side walls 12 and end walls 13, the latter being provided with outwardly projecting strengthening flanges 14 arranged in grid formation. A cylinder mold, denoted generally by the reference numeral 15, is positioned in the stock vat 10 and supported for rotation in said vat by shaft ends 16 which extend through packing rings 17 mounted in the side walls 12 of the stock vat into suitable journal boxes 18 adjacent each side wall. Through suitable connections to a power source, not shown, the cylinder mold 15 is rotated in the stock vat 10. Each side wall of the stock vat includes a drain box 19 for receiving the drainage from the interior of the cylinder mold 15 and outlets 20 for connection with an eduction fan, not shown.

The cylinder mold 15 has a foraminous or screen surface 21 composed of forming wires 22. Round bars 23, which extend between the end spiders 24 and 25 of the cylinder mold, support the forming wires. Each of the end spiders includes a plurality of radial arms 26 which extend from the spider hub to the spider ring 27, the latter having its outer curved surface 28 substantially flush with the forming wire surface 21. As can be observed from Fig. 1 of the drawings, the ends of cylinder mold 15, as represented by end spiders 24 and 25, are adjacent the vat side walls 12. The space between an end of the cylinder mold and a side wall of the stock vat, for example, the space between end spider 24 and vat wall 12, would, with the garter-belt type of seal, be a slot into which the edges of felts extending beyond the end spiders would drop. This, as we have previously mentioned, is a serious disadvantage of the garter-belt type of seal. We eliminate this disadvantage by providing felt support rings 28 and 29 at each end of the cylinder mold 15. From an inspection of Fig. 1 of the drawings, it can be seen that these felt support rings extend substantially to the vat side walls 12 thereby eliminating the relatively wide slot found in machines utilizing the garter-belt type of seal.

Adjacent each end of the cylinder mold 15, the vat side walls 12 are provided with an open-

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topped slot 30 extending downwardly from the top of the vat to a rounded bottom at a level above the drain boxes 19. A removable wall portion 31 is mounted on the side wall to cover the slot. In the drawings, and referring particularly to Fig. 2, it can be seen that the slot 30 extends vertically upward from the packing ring 17 and that the removable wall portion 31 fits snugly within this slot. This removable wall portion 31 includes the outlet 20 which, as has been previously mentioned, can be connected to an education fan. The removable wall portion 31 also includes a portion 32 which extends above the upper edge 33 of the vat side wall 12.

This last mentioned portion 32 has attached thereto a ring segment 34 and a plurality of other ring segments 35 are attached to the inner wall surface 36 of the vat side wall 12. While any suitable means of attachment might be used, we illustrate countersunk metal screws 37 as securing the radially outward portions of segments 35 to the wall surface 36. The segments 35 are positioned end to end, as shown in Figure 2, and terminate in spaced offset end segments 35a receiving the segment 34 therebetween to complete a ring 38 which we denote as a wear plate ring.

The end segments 35a are inwardly offset with respect to the ends 39 and 40 of the adjacent ring segments 35 and are secured to the vat side wall 12 by screws 41 which are radially inward of the screws 37. The segments 35a have vertical ends 42 closely adjacent or abutting the vertical edges of the segment 34. Also, the width, or radial depth, of the faces 43 of ring segments 34 and 35a is greater than the corresponding width of the face 44 of each of the other ring segments 35. With the width of faces 43 of segments 35 and 35a being greater than the width of the face of each of the other ring segments 35, and since the abutting ends 42 abut along vertical lines, it is possible to vertically adjust the position of the wall part 31 and hence vary the position of ring segment 34 without destroying the continuity of the ring formed by segments 34, 35, and 35a. This provides flexibility in operation since even if a cylinder mold is substituted which is not centered exactly as the preceding mold, the continuity of the wear plate ring 38 on the vat side wall need not be interrupted because a portion of this ring, i. e., segment 34, is adjustable to compensate for the difference in centering. Of course, it is realized that variations between molds should not be so great as to be beyond the adjustment possibilities of segment 34. Further, the seals to ride on the wear plate will be inwardly of the screws 37 and outwardly of the screws 41 so that the heads of the screws will not tear the seals.

Details of the felt support ring construction and the seal assembly are best obtained from Figs. 5 and 6 of the drawings. As illustrated there, the felt support ring 28 includes a felt support surface 45 which is substantially flush with the outer surface 46 of end spider 24 and with the forming wire surface 21. Preferably the surface 45 slopes downwardly toward the edge 45a of the felt support ring as is shown in Figs. 5 and 6. The support surface 45 is preferably a hard, stainless metal cover sprayed on the periphery of the ring 28.

The felt support ring 28 also includes a flange 47 which is abutted against the end face 48 of spider 24. A shoulder interlock is provided, as is shown at 49, between flange 47 and end face 48 and bolts 50 secure the flange 47 securely to

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the end face 48 of spider 24. As can be observed from Figs. 5 and 6, the edge 51 of a pick-up felt 52 extends over onto and is supported by the felt support surface 45.

Positioned concentric with the circular flange 53 of the felt support ring 28 is a second ring 54 which has its outer circumference 55 abutted against the inner circumference 56 of flange 53. The ring 54 is bolted to the flange 47 of felt support ring 28 by means such as bolts 57, and sleeves 58 are provided intermediate the ring 54 and flange 47 to maintain these parts spaced from each other. By selecting different lengths of sleeves 58, it is obvious that different spacings could be provided. Ring 54 is provided with a downwardly extending lip 59 which grips a flange 60 of a resilient seal unit denoted generally by the numeral 61 and preferably composed of rubber or a synthetic rubber-like material. An oppositely extending flange 62 of the resilient seal unit 61 is gripped by a retaining ring 63 which is suitably secured to the ring 54 by means such as countersunk screws 64. A T-groove lock is thereby provided. If necessary, shims can be used to secure a tight grip on the flanges 60 and 62.

The oppositely extending flanges 60 and 62 are parts of a base portion 65 of the resilient seal unit 61. This base portion 65 is integrally connected with a head portion 66 by a reduced neck portion 67. The head portion 66, as viewed from the side, is of bulbular shape and has an aperture 68 extending therethrough. The head portion 66 is also provided with a hardened end, which can be called a tip or nose, and which is indicated at 69. This tip or nose can be a vulcanized insert of hardened rubber or the like. In Fig. 5 of the drawings, the resilient seal unit 61 is shown compressed endwise against face surface 44 of a segment 35 of the wear plate ring 38 shown in Fig. 2. The hardened nose 69 is in contact with face surface 44. Since the head portion 66 of seal unit 61 is apertured, it tends to bulge uniformly to either side of the hardened nose 69 instead of buckling off-center.

These resilient seal units 61 are positioned in sealed-together side by side relation as shown in Fig. 3 of the drawings and form a resilient annular seal concentric with the felt support rings, such as felt support ring 28, and also concentric with the end spiders such as end spider 24. The circumferential dimension of each seal unit 61 is only a small fraction of the radius of the resilient annular ring formed by the contiguous units. In this manner they substantially completely seal off the small space that exists between the ends of the felt support rings and the vat side walls. Referring to Fig. 5, such a space is shown as existing between the edge 45a of felt support surface 45 and the face 44 of wear plate ring segment 35.

If the resilient seal units were maintained compressed at all times, they would soon become "set" and lose their resiliency thereby impairing the efficiency of the seal. To prevent this from occurring, we provide a means for relieving the compression on these seal units. This means is a depression 71 which is provided in the face surface 43 of wear plate ring segment 34. Referring to Figs. 2, 4 and 6, this depression is shown as including beveled walls 72 and 73 and the flat wall 74 therebetween. The depression 71 extends the width of the face 43 of wear plate ring segment 34 so as to be effective despite variation in the positioning of this ring segment with respect to its adjacent wear plate ring segments 35.

With this arrangement, as the cylinder rotates,

the individual resilient seal units 61 are permitted to expand lengthwise during each revolution of the cylinder mold into contact with the surface 74 of depression 71, thereby relieving the stress on these units and flexing them. For example, in Fig. 6 of the drawings, the resilient seal unit 61 is shown as being relieved of compression by extending into the valley provided by the beveled walls 72 and 73 of the depression 71. Of course, the wall surface 74 of this depression is not sunk far enough inward to provide a large gap between the wall and the ends of the seal units 61, but is sunk far enough inward to relieve at least some of the compression load of these units. In addition to relieving compression on the resilient seal units 61, the depression 71 also provides an outlet for pieces of string and other debris that might be caught by the seal and which would otherwise have no means of escape. Hence the seal assembly is self-cleaning in action.

An alternate form of resilient seal unit is shown in Fig. 7 of the drawings. This seal unit, denoted generally by the reference numeral 75, includes a base portion 76 having oppositely extending flanges 77 and 78 which are retained by a ring 79 and an auxiliary ring 80 in a manner similar to that described above for the resilient seal units 61. The seal unit 75 also includes a head portion 81 which has a plurality of apertures 82 there-through. This head portion 81 has its end surface arranged as two humps 83 and 84 which are separated by a valley 85. The head portion 81 is integrally connected with the base portion 76 by a reduced neck portion 86. The resilient seal units 75 are positioned side by side in the manner illustrated for resilient seal units 61 in Fig. 3 of the drawings. Being so positioned, and since the individual units 75 are identical, the humps 83 and 84 form concentric rings so that, when the seal units are abutted against a face surface such as face surface 87 indicated in Fig. 7 of the drawings, they will contact this face surface along two concentric annular areas of contact. Hence, with the type of resilient seal unit shown in Fig. 7 of the drawings, a double contacting surface is provided. A means for relieving compression similar to that described for resilient seal units 61 can be provided for the resilient seal units 75.

Since the resilient seal units 61 are positioned side by side, it is desirable that their head portions 66 be restrained against sideways movement with respect to each other in order that a substantially uniform annular seal will be provided. In other words, individual seal units 61 should not move radially of the cylinder with respect to each other so as to become offset from each other. In one side by side arrangement illustrated in Fig. 8 of the drawings, the sides of the head portions are partially interlocked by dove-tailing the head portions together. The sides 88 and 89, and 90 and 91, of the adjacent head portions 66 of the individual seal units 61 shown in Fig. 8 are, for each head portion, oppositely inclined. However, in positioning the seal units side by side, sides having the same inclination such as sides 88 and 91, 89 and 90, are placed against each other, thereby producing a dove-tail arrangement as is shown in Fig. 8.

In the interlocking arrangement disclosed in Fig. 9 of the drawings, instead of utilizing the dove-tail arrangement, the individual head portions 66 of the resilient seal unit 61 are provided with a generally conical projection centered at one side and a generally conical recess centered

at the other side. This enables the projection of one unit to seat in the recess of its adjacent unit to interlock the head portions against movement with respect to each other in a direction radially of the cylinder. For example, in Fig. 9, a head portion 66 is shown as having a projection 92 seated in a recess 93 of the adjacent head portion 66 of the adjacent seal unit and this adjacent head portion likewise has a side projection 95. For this type of interlock, it is desirable that the rotation of the cylinder mold be such that the seal units travel in the direction of their side projections, i. e., to the left as viewed in Fig. 9.

The individual seal units, such as seal units 61 and 75 should be formed of a material which possesses sufficient resiliency to allow for compression of these units against the wear plate ring 38 and which, nevertheless, does not cause an excessive friction load despite the pressing of the seal units against the wear plate ring. We have found it satisfactory to provide molded rubber seal units, a buna compound synthetic rubber having been found to be particularly satisfactory both from a standpoint of resiliency and minimizing friction with the wear plate ring. For the type of seal unit illustrated in Figs. 5 and 6 of the drawings, that is, seal units 61, we find that friction between the seal units and the wear plate ring can be further reduced by providing a hard rubber nose, indicated at 69 in Figs. 5 and 6, on each of the seal units and this nose is the portion of the seal unit which contacts against the wear plate ring. In forming the seal units, the hard rubber nose is preferably vulcanized to the rest of the seal unit so that there is little danger of the nose becoming loose from the body of the seal unit. Instead of utilizing a hard rubber nose, a suitable metal or plastic nose could be used. Also, instead of using the rounded type of nose indicated at 69, other suitable nose shapes could be employed such as a ribbed or fluted construction. We have disclosed an alternate form in Fig. 7.

Since the wear plate ring 38 has travelling against it a plurality of seal units which are wetted by the pond of pulp stock, and since a portion of the wear plate ring actually extends below the surface of this pond, the wear plate ring should be formed of a material which will maintain a smooth surface despite the presence of this liquid. Accordingly, we prefer to use Monel metal for the wear plate ring. Parts such as the bolts 50 and 57 and screws 37 and 64 are also preferably formed of Monel metal in order to prevent their sticking in place due to rusting which, of course, would hamper replacement work and increase maintenance costs. While we mention these specific parts of our structure and identify materials which we find suitable for these parts, it should be quite evident that parts not specifically mentioned by us will be also formed of a material suitable for the purpose which the particular part is intended to meet.

From the foregoing description, it can be seen that the cylinder type paper machine described by us overcomes many of the disadvantages now present in existing machines of this type known to the prior art. In our machine it is relatively simple to remove the cylinder mold from the stock vat. Specifically, the removable wall part 31 can be taken from above the packing ring 17, and, when this wall part is so removed, the segment 34 of wear plate ring 38 is also moved to provide a clear path upward from the bearing ring. Hence, the shaft ends 16 can be readily lifted

clear of the stock vat. Note further that the resilient seal units, such as units 61, need not be dismantled from the ends of the cylinder mold since the seal units will simply slide against the wear plate ring 38 as the cylinder is lifted out of the stock vat. As has been previously mentioned, this is quite an advantage over machines employing the garter-belt type of seal where the seal itself, at least the belt portion thereof, has to be manipulated in order to permit removal of the cylinder mold from the stock vat.

The type of seal which we provide enables us to utilize a felt support ring having a felt support surface substantially flush with the forming wire surface of the cylinder mold thereby eliminating any relatively wide slot between the ends of the cylinder mold and the side walls of the stock vat. Hence, pick-up felts which have edges extending beyond the normal face width of the cylinder mold are not creased as has heretofore occurred. The advantages of having a seal arrangement which is self-cleaning in action, i. e., will tend to get rid of objects such as string, sticks, etc., caught by the seal, and which substantially closes off the entire end of the cylinder mold, also contributes greatly to the efficiency of the apparatus which we disclose. It is apparent that the components of the seal assembly and the felt support ring construction are readily demountable thereby facilitating maintenance in the field and keeping maintenance costs low.

While we have described particular embodiments of our invention, we do not intend to be restricted solely to the exact constructions disclosed, but do intend to cover all modifications thereof which would be readily apparent to one skilled in the art and which come within the spirit and scope of our invention as set forth in the appended claims.

We claim as our invention:

1. In a cylinder type paper machine having a stock vat including oppositely disposed walls, and a cylinder rotatable in said vat with the ends of said cylinder being adjacent opposite walls of said vat, apparatus for sealing off the space between an end of said cylinder and a wall of said vat comprising an annular rubber-like seal compressed between the vat wall and the cylinder end, said seal being attached to and rotatable with said cylinder, said vat wall having a part defining a course for said seal, said course being non-uniformly spaced from said cylinder end.

2. In a cylinder type paper machine having a stock vat including oppositely disposed walls, and a cylinder rotatable in said vat with the ends of said cylinder being adjacent opposite walls of said vat, means for sealing the ends of said cylinder to the walls of said vat comprising a ring formed by a plurality of adjacent rubber-like resilient seal units arranged concentric with each end of said cylinder, said seal units being attached to said cylinder and projecting endwise therefrom, a wear plate ring mounted on each of said vat walls in extension of the seal units at each end of said cylinder, said seal units being abutted endwise against said wear plate rings, and said wear plates having a localized shallow depression whereat the axial space bridged by said sealing units is greater than elsewhere.

3. A paper making machine comprising a stock vat for receiving a pond of pulp stock, said vat having side and end walls, a foraminous cylinder, means supporting said cylinder for rotation in the vat with the ends of said cylinder adjacent the vat side walls, a felt support ring attached to

each end of said cylinder, said felt support ring having a cylindrical surface in axial extension of the surface of said foraminous cylinder, a ring formed of a plurality of resilient seal units at each end of said cylinder, said ring of seal units being arranged concentric with the cylinder ends and projecting beyond the felt support ring, a wear plate ring attached to each vat side wall, each of said wear plate rings being positioned in extension of the seal units projecting from the ends of said cylinder, and said seal units being abutted endwise against said wear plate rings throughout an annular area of contact at each of said wear plate rings to seal the ends of the cylinder from the pond of pulp stock within the vat.

4. A paper making machine comprising a stock vat for receiving a pond of pulp stock, said vat having side and end walls, a foraminous cylinder, means supporting said cylinder for rotation in said vat with the ends of said cylinder adjacent the vat side walls, a felt support ring attached to each end of said cylinder, said felt support ring having a cylindrical surface in axial extension of the surface of said foraminous cylinder, a plurality of resilient seal units at each end of said cylinder, said seal units being arranged concentric with the cylinder ends and projecting beyond the felt support ring, a wear plate ring attached to each vat side wall, each of said rings being positioned in extension of the seal units projecting from the ends of said cylinder and defining a course for said seal units, said seal units being compressed between a wear plate ring and the end of the cylinder adjacent thereto to seal the ends of the cylinder from the pond of pulp stock within the vat, and said wear plate ring having a depression in the course of said seal units to periodically relieve the compression on each of said seal units as the cylinder rotates.

5. In a cylinder type paper machine in which felt of a width greater than the cylinder mold is employed, a cylinder mold having a forming wire surface and having attached, at each end of said cylinder mold, a ring having a flange secured to the corresponding end surface of the cylinder mold and also having a felt support surface substantially flush with and in axial extension of the forming wire surface of said cylinder mold, and a seal carried by said ring radially inward of said felt support surface.

6. In a cylinder type paper machine, a cylinder mold having a forming wire surface, a felt support ring attached to each end of said cylinder mold, each of said felt support rings having a felt support surface substantially flush with the forming wire surface of said cylinder mold, a second ring positioned adjacent each end of the cylinder mold, each of said second rings being attached to its corresponding felt support ring, and a plurality of resilient seal members supported by each of said second rings and extending axially beyond the ends of their corresponding felt support rings.

7. In a cylinder type paper machine having a stock vat having parallel side walls for receiving a pond of pulp stock and a cylinder rotatable in said vat between said side walls, means for internally evacuating said cylinder, and means for sealing the ends of said cylinder from said pond comprising a multiplicity of separate rubber-like seal units arranged in circumferential contiguity to form a ring, the circumferential dimension of each seal unit being a small fraction of the radius of said ring, said ring being com-

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pressed axially between the end of said cylinder
and the adjacent side wall of the vat.

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