Sept. 19, 1933. S. WOOD 1,927,694

ATMOSPHERIC ROLL DRIER

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FIG. 1

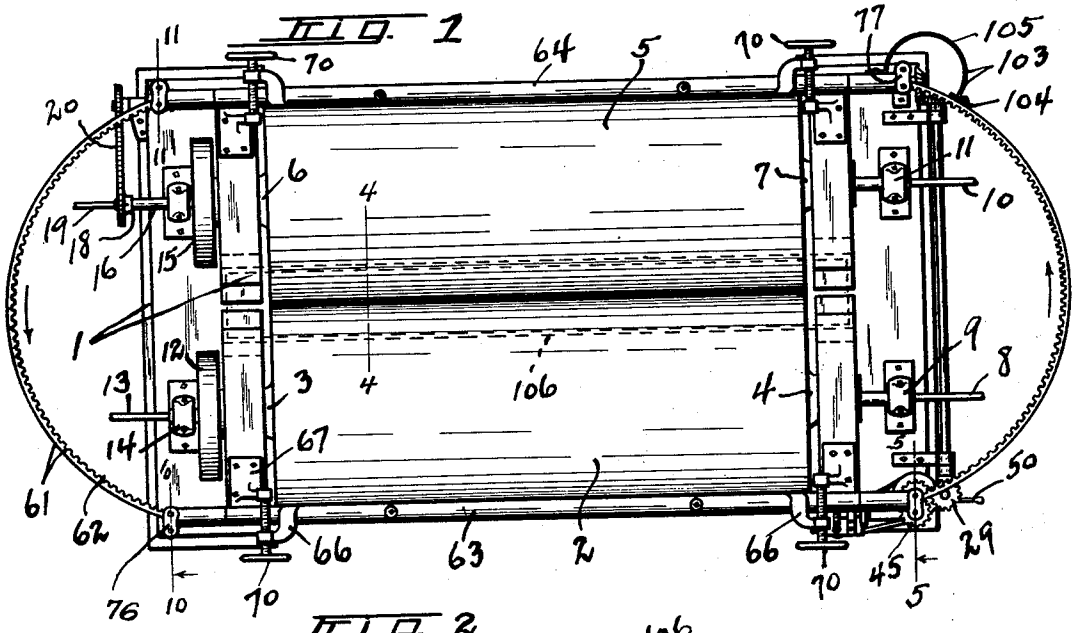


FIG. 2.

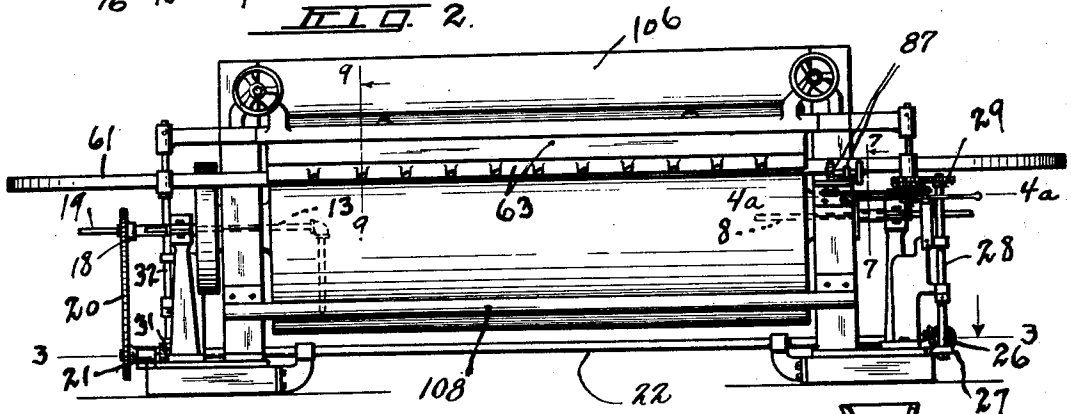


FIG. 3

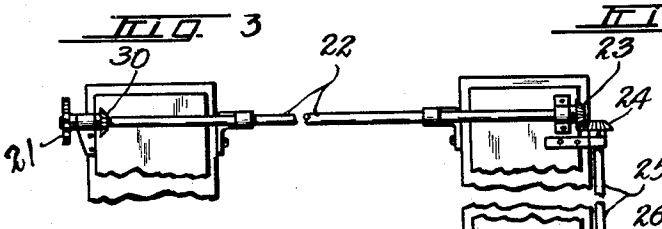


FIG. 4

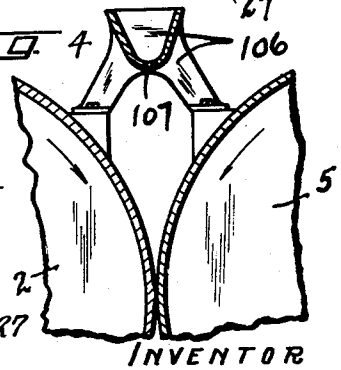
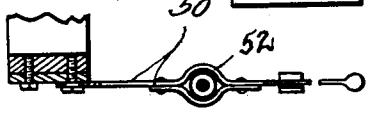


FIG. 4a



INVENTOR
Samuel Wood

WITNESS
J. J. Mains

BY
Denison & Thompson
ATTORNEYS

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FIG. 5

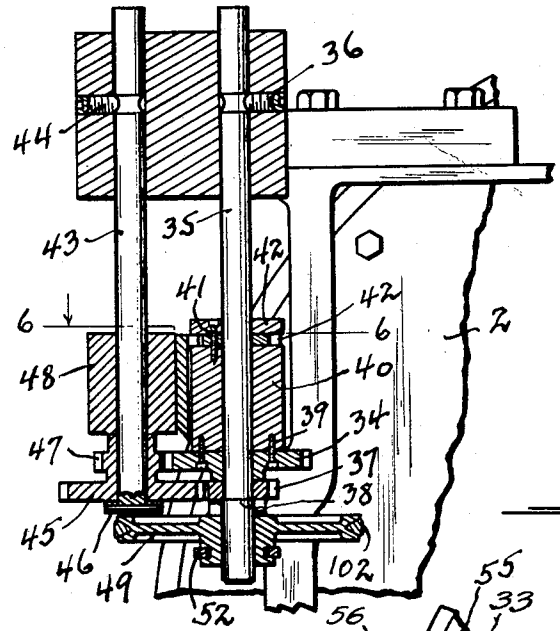


FIG. 6

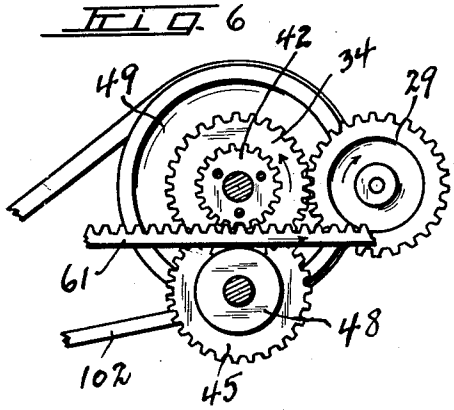


FIG. 8

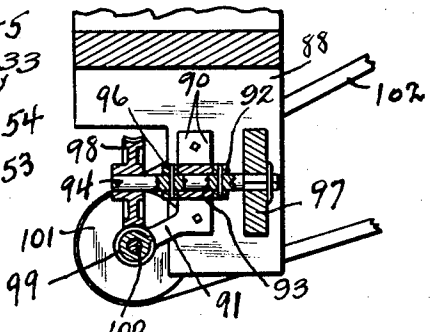


FIG. 11

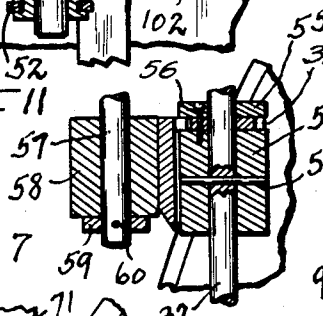


FIG. 7

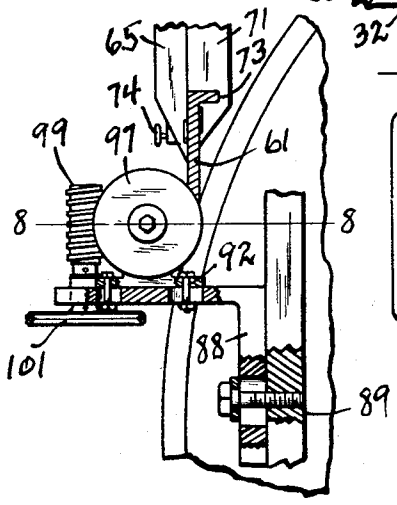


FIG. 9

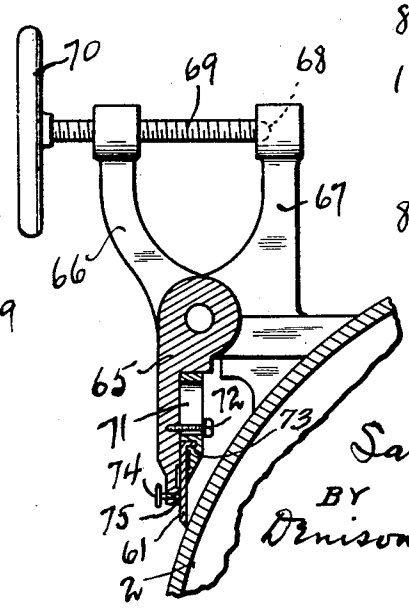
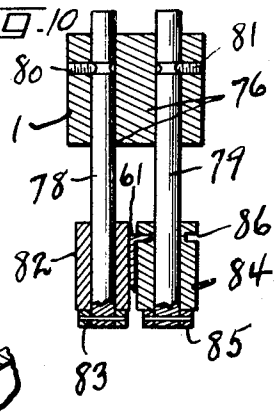


FIG. 10



WITNESS

J. J. Mains

INVENTOR

Samuel Wood

BY

Dennison & Thompson

ATTORNEYS

Patented Sept. 19, 1933 1,927,694

UNITED STATES PATENT OFFICE

1,927,694

ATMOSPHERIC ROLL DRIER

Samuel Wood, West Allis, Wis.

Application April 29, 1931. Serial No. 533,728

11 Claims. (Cl. 34—4)

This invention relates to a new and improved atmospheric roll drier.

The main object of my invention is to provide a drier of this character having a scraper or doctor plate which is much more efficient in operation than anything known to the art.

Another object is to provide a drier in which a single scraper or doctor plate will function to scrape material from two simultaneously rotating rolls.

Another object is to provide apparatus of this character in which the scraping edge of the scraper or doctor plate may be sharpened while the apparatus is in operation, and while the scraper is functioning as such.

Other objects and advantages relate to the size, shape and arrangement of parts, all as will more fully appear from the following description taken in connection with the accompanying drawings in which:—

Figure 1 is a top plan view of the drier.

Figure 2 is a side elevation of the same.

Figure 3 is a plan view, partially broken away, on line 3—3 of Figure 2.

Figure 4 is a section on line 4—4 of Figure 1.

Figure 4*a* is a section on line 4*a*—4*a* of Figure 2.

Figure 5 is a section on line 5—5 of Figure 1.

Figure 6 is a section on line 6—6 of Figure 5.

Figure 7 is a section on line 7—7 of Figure 2.

Figure 8 is a section on line 8—8 of Figure 7.

Figure 9 is a section on line 9—9 of Figure 2.

Figure 10 is a section on line 10—10 of Figure 1.

Figure 11 is a section on line 11—11 of Figure 1.

My device comprises the main frame 1 and a hollow roll 2 having tubular journals 3 and 4 positioned in suitable bearings in the opposite ends of the frame 1.

A second roll 5 is positioned in parallel relation with roll 2, and has tubular journals 6 and 7 positioned in suitable bearings at the opposite ends of frame 1.

A conduit 8 connected to a suitable source of steam, passes through a support 9 and extends through journal 4 a short distance into the interior of roll 2.

A similar conduit 10 also connected to a source of steam, extends through a support 11 and tubular journal 7 a short distance into roll 5.

On the outer end of tubular journal 3, I provide a pulley 12 so that roll 2 may be rotated by means of a belt from a jack shaft.

A conduit 13 extends through a support 14 and tubular journal 3 into roll 2 and to a point adjacent the bottom thereof as may best be seen in dotted lines on Figure 2.

Conduit 13 is connected to a suitable pump suction device so that any water condensed from the steam in roll 2 may be drawn therefrom.

A second pulley 15 is secured to the outer end of tubular journal 6 so that roll 5 may be rotated in a similar way as roll 2.

A tubular shaft 16 is secured to pulley 15 and extends outwardly through a support 17. On the outer end of shaft 16 is secured a gear 18. An exhaust conduit 19 extends through tubular shaft 16 and tubular journal 6 into roll 5 and downwardly to a point adjacent the bottom thereof so that water in roll 5 may be withdrawn therefrom in the same manner as the water which may accumulate in roll 2.

Gear 18 is operatively connected by a chain 20 to a gear 21 (see Figure 3) secured to the end of a shaft 22 which is journaled on the base of frame 1.

Shaft 22 extends longitudinally of frame 1, and has secured to its other end, a spiral gear 23 which is in mesh with a second spiral gear 24 secured to the end of a shaft 25 which is journaled in the base of frame 1, and which extends at right angles to shaft 22 to the opposite side of frame 1.

On the other end of shaft 25 is secured a bevel gear 26 in mesh with a bevel gear 27 which is secured to the lower end of a vertical shaft 28. (See Figure 2.)

On the upper end of shaft 28 which is suitably journaled in frame 1, is a gear 29. Secured to shaft 22 adjacent gear 21 is a bevel gear 30 which is in mesh with a bevel gear 31 which is secured to the lower end of a vertical shaft 32 journaled in frame 1. On the upper end of shaft 32 is secured a gear 33.

Referring to Figures 5 and 6, gear 29 is in mesh with a gear 34 which is rotatably mounted on a vertical shaft 35 which depends from the upper end of frame 1, and which is held against axial displacement by a threaded dowel 36.

Beneath gear 34 and rotatably mounted on shaft 35 is a gear 37 which abuts against a shoulder 38 on shaft 35.

Rotatably mounted on shaft 35 above gear 34 and secured to gear 34 as by screws 39, is a guide roll 40. On the upper end of guide roll 40 and secured thereto as by screws 41, is a gear 42 also rotatably mounted on shaft 35. Superimposed on gear 42 and secured thereto by

screw 41 is a guide disk 42' of a diameter to overlie the teeth on gear 42.

I provide a second depending shaft 43 in spaced parallel relation to shaft 35 and held against axial displacement by a dowel 44.

On the lower end of shaft 43 is rotatably mounted a gear 45 which is held against downward displacement by a collar 46.

Gear 45 is in mesh with gear 37. Integral with gear 45 and above the same is another gear 47 which is in mesh with gear 34. Above gear 7 and rotatably mounted on shaft 43 is a guide roll 48 in spaced relation to guide roll 40. Rotatably and slidably mounted on shaft 35 beneath gear 37 is a pulley or sheave 49.

The lower face of gear 37 and the upper face of pulley 49 carry clutch teeth so that when pulley 49 is moved upwardly into clutching relation with gear 37, it will rotate therewith.

For the purpose of moving pulley 49 into and out of clutching engagement with gear 37, I provide a lever 50 (see Figure 4*a*) having one end pivotally mounted on frame 1 and having a ring 52 at its central point, which ring 52 encircles the hub of pulley 49.

Referring to Figures 2 and 11, the shaft 32 has secured thereto, as by a pin 53, a guide roll 54 upon which is positioned the gear 33 and a guide disk 55, disk 55 and gear 33 being secured to guide roll 54 as by a screw 56.

Adjacent shaft 32 and in parallel relation thereto is positioned a stub shaft 57 which carries a rotatable guide roll 58 secured against downward displacement by a collar 59 secured to shaft 57 as by a pin 60.

The upper ends of shafts 32 and 57 are secured to frame 1 in the same manner as are shafts 35 and 43 previously described.

The scraper or doctor plate 61 is an endless band L-shaped in cross section, and having the portion which extends horizontally when the scraper is in position formed with gear teeth 62.

For the purpose of holding the scraper 61 in proper relation to the rolls 2 and 5, I provide adjacent roll 2 a guiding support 63, and a similar guiding support 64 is provided adjacent roll 5.

The construction and mode of operation of the guiding supports 63 and 64 being similar, a description of one will serve as a description of the other.

Guiding support 63 comprises a bar 65 which extends approximately the full length of roll 2 and which has the opposite ends of its upper edge pivotally mounted on frame 1.

At each end of guiding bar 63, there is provided an upwardly and outwardly extending arm 66 having a threaded aperture therethrough.

Adjacent arms 66 and in spaced relation thereto, are provided brackets 67 having a recess 68 in the outer face of its upper end.

A screw 69 is threaded through the threaded aperture in arms 66 and its other end is seated in the aperture 68 in bracket 67 so that the combination of the arm 66, bracket 67 and screw 69 gives the same effect as what is commonly known as a builder screw, and the movement of the screw 69 through the aperture in arms 66 will cause the arms 66 to be moved towards and from the brackets 67 with the result that the guiding support 63 will be caused to move about its pivots to move the lower end thereof towards and from the roll 2.

For the purpose of providing a convenient means for manipulating screw 69, I provide on the outer end thereof a hand wheel 70.

On the inner face of guiding support 63 is provided a slotted carrying bar 71 held in position as by screws 72.

Bar 71 being slotted, it may be moved vertically with respect to guiding support 63 when screws 72 are loosened and may be secured in any desired relative position within the limits of movement permitted by the slot therein.

The lower end of bar 71 is offset and has a slot 73 at the upper end of the offset portion.

The arrangement parts is such that the horizontal portion of the scraper 61 carrying the teeth 62 may be received in the slot 73 and the depending portion of the scraper 61 will then be positioned between the lower end of guiding support 63 and the offset portion of the bar 71.

The slot 73 is of a proper size and the space between the offset portion of bar 71 and guiding support 63 is sufficient to permit the longitudinal movement of scraper 61 when the same is in position.

For the purpose of keeping the proper frictional contact between scraper 61 and roll 2, I provide in the lower end of guiding support 63 a plurality, in this case shown as eleven, of thumb screws 74 preferably carrying on its inner end a ball 75 in contact with the scraper 61.

The manipulation of thumb screws 74 will permit scraper 61 to be moved towards roll 2 until it is under the proper tension, balls 75 relieving friction on scraper 61 when the same is moved longitudinally of guiding support 63.

For an aid in guiding the scraper 61 in its movement, I provide on frame 1 two sets of guiding rolls 76 and 77.

The construction of the guide rolls 76 and 77 being similar, a description of one will be a description of the other.

Guiding roll 76 comprises an assembly in which is provided opposed parallel stub shafts 78 and 79 secured in position in frame 1 by dowels or set screws 80 and 81.

On the lower end of stub shaft 78 is provided a rotatable guiding roll 82 held against downward displacement by a collar 83 pinned to shaft 78.

On the lower end of stub shaft 79 is provided a guiding roll 84 held against downward displacement by a collar 85 keyed to shaft 79.

Guiding roll 84 has adjacent its upper end an annular groove 86 adapted to receive the horizontal portion of scraper 61. Guiding rolls 82 and 84 are spaced apart a sufficient distance to permit the passage therebetween of the depending portion of scraper 61.

When the scraper 61 is in position in the guiding supports 63 and 64, and the guiding assemblies 76 and 77, it will also referring to Figure 5, be positioned with teeth 62 in mesh with gear 42, and with the depending portion of the scraper 61 positioned between guiding rolls 40 and 48 so that when gear 42 is rotated, the scraper will be moved longitudinally of roll 2. Disk 42' prevents the teeth 62 on scraper 61 from moving vertically out of engagement with gear 42.

For the purpose of assisting in making the movement of scraper bar 61 uniform, it is, when in position in the assembly disclosed in Figure 11, positioned with the teeth 62 in mesh with gear 33, and with the depending portion of scraper 61 positioned between guide rolls 54 and 58 so that when gear 33 is rotated through the rotation of shaft 32, the longitudinal movement

of scraper 61 with respect to roll 5 will be effected.

Disk 56 prevents the teeth 62 on scraper 61 from moving vertically out of engagement with gear 33.

The relation of the different gearing herein described is such that when rotary motion is transmitted to shaft 22 through gear 18, chain 20 and gear 21, gears 33 and 42 will be rotated at a uniform speed with gear 33 moving one side of scraper 61 in one direction and gear 42 moving the opposite side of scraper 61 in the opposite direction so that scraper 61 will be moved continuously from one roll to the other at a uniform rate of speed.

Referring to Figures 7 and 8, I provide on frame 1 adjacent one end of guiding support 63 a grinding assembly 87 which comprises a slotted bracket 88 held in position as by screws 89, the slots permitting vertical adjustment of bracket 88 with respect to frame 1.

The horizontal portion of the bracket 88 is also slotted and carries on its upper face, a plate 90 having an offset arm 91.

The plate 90 is secured to bracket 88 as by bolts 92, the slots in bracket 88 permitting the plate 90 to be adjusted towards and from the scraper 61.

The plate 90 has secured thereto a bearing 93 through which extends a shaft 94. Shaft 94 carries pinned collars 95 and 96 abutting against the opposite ends of bearing 93 to hold shaft 94 against axial displacement.

On the inner end of shaft 94, is secured in the usual manner, a grinding wheel 97.

On the opposite end of shaft 94 is secured a worm gear 98 in mesh with a worm 99 carried on a shaft 100 which is journaled in the end of the offset arm 91 of plate 90.

On the lower end of shaft 100 and beneath arm 91 is secured a sheave or pulley 101.

A belt 102 connects pulley 49 and pulley 101 for simultaneous movement.

When it is desired to sharpen scraper 61, bracket 88 is adjusted to bring grinding wheel 97 into the proper degree of contact with the scraping edge of scraper 61. Clutch lever 50 is then manipulated to bring pulley 49 into clutching relation with gear 38. The rotary movement of gear 34 will then, through gears 47, 45, 37 and pulleys 49 and 101, be transmitted to worm 99 and worm gear 98, to cause the rotation of shaft 94 and grinding wheel 97.

The speed of rotation of gear 34 being preferably comparatively slow, the gears 47, 45 and 37 are provided so that the worm 99 will be rotated at a considerably higher speed than is gear 34.

Inasmuch as grinding compound which might adhere to scraper 61 might be injurious to the material being scraped from the rolls 2 and 5, I prefer to provide on frame 1 a wiper as 103 here shown as being of a type wherein a wiping pad 104 is held by a spring arm 105 against scraper 61.

The position of wiper 103 is such that it will wipe scraper 61 after the same has left the grinding wheel 97 and before it comes into contact with the roll 5.

For the purpose of feeding the material to be dried to the rolls 2 and 5, I provide on frame 1 a trough 106 which extends longitudinally of rolls 2 and 5, and which is positioned above and between them.

Trough 106 is indicated in full lines on Figure 2 and in dotted lines on Figure 1.

The trough 106 is provided in its bottom with a plurality of apertures 107 so that material placed therein will drop downwardly on to rolls 2 and 5, which are caused to rotate in opposite directions, and the directions indicated by the arrows on Figure 4.

The material to be dried will adhere to rolls 2 and 5 and will be carried downwardly and upwardly to the scraper 61 which will scrape the dried material from the rolls. On each side of frame 1, I provide a trough 108 which is positioned to catch the material which is scraped from the rolls 2 and 5.

The material collected in troughs 108 may be carried away in any desired way.

It will be understood that the type of heated roll and the method of heating the same may be varied as may the means employed for driving the rolls and the mechanism for moving the belt and driving the grinder.

It will also be understood that various changes may be made in different parts of the apparatus here shown without departing from the spirit of my invention, for although I have shown and described a specific structure and form and arrangement of parts as an exemplification of an embodiment of my invention, I do not desire to restrict myself to the exact size, shape or arrangement of parts, as various changes may be made within the scope of the appended claims.

I claim:

1. An atmospheric roll drier comprising a roll, means for rotating the roll, an endless scraper engaging the roll, and including an angle edge having rack teeth, a driven gear engaged with the rack teeth for moving the scraper longitudinally of the roll, and means for sharpening the scraper during such movement.

2. An atmospheric roll drier comprising a roll, means for rotating the roll, an endless scraper engaging the roll, and including an angle edge having rack teeth, a driven gear engageable with the rack teeth for continuously moving the scraper longitudinally of the roll, and means for sharpening the scraper during such movement.

3. An atmospheric roll drier comprising a pair of rolls, means for rotating the rolls, an endless scraper engaging both of the rolls, and including an angle edge, guide members receiving the angle edge, and means engaged with the angle edge of the scraper for continuously moving the scraper longitudinally of the rolls in opposite directions.

4. An atmospheric roll drier comprising a pair of rolls, means for rotating the rolls, an endless scraper engaging both of the rolls and including an angle edge, guide members receiving the angle edge, means engaged with the angle edge of the scraper for moving the scraper longitudinally of the rolls in opposite directions, and means for sharpening the scraper during such movement.

5. An atmospheric roll drier comprising a pair of rolls, means for rotating the rolls, an endless scraper engaging both of the rolls and including an angle edge, guide rollers having annular grooves therein receiving the angle edges, means engaged with the angle edges for continuously moving the scraper longitudinally of the rolls in opposite directions, and means for sharpening the scraper during such movement.

6. An atmospheric roll drier comprising a roll, means for rotating the roll, an endless scraper engaging the roll, a guiding support for the scraper, means for securing the guiding support in a selected one of a plurality of positions with

respect to the roll, and means for moving the scraper longitudinally of the roll.

7. An atmospheric roll drier comprising a roll, means for rotating the roll, an endless scraper engaging the roll and including rack teeth, and a driven gear engaged with the teeth for positively moving the scraper longitudinally of the roll.

8. An atmospheric roll drier comprising a roll, means for rotating the roll, an endless scraper engaging the roll and including rack teeth, a driven gear engaged with the teeth for positively moving the scraper longitudinally of the roll, and means for sharpening the scraper during such movement.

9. An atmospheric roll drier comprising a pair of rollers, means for rotating the rollers, an endless scraper engaging both of the rollers and including an angle edge, guide means for the scraper receiving the angle edge, and means for moving the scraper longitudinally of the rollers.

10. An atmospheric roll drier comprising a pair of rollers, means for rotating the rollers, an endless scraper engaging both of the rollers and including an angle edge, guide means for the scraper receiving the angle edge, means for moving the scraper longitudinally of the rollers, and means for sharpening the scraper during such movement.

11. An atmospheric roll drier comprising a pair of rollers, means for rotating the rollers, an endless scraper engaging both of the rollers and including an angle edge, guide means for the scraper receiving the angle edge, said scraper being provided with rack teeth, and a driven gear engaged with the teeth for moving the scraper longitudinally of the rollers.

SAMUEL WOOD.