L. R. JACKSON.

DRIER.

APPLICATION FILED MAR. 30, 1916.

1,220,130.

Patented Mar. 20, 1917.

2 SHEETS—SHEET 1.

Fig. 1.

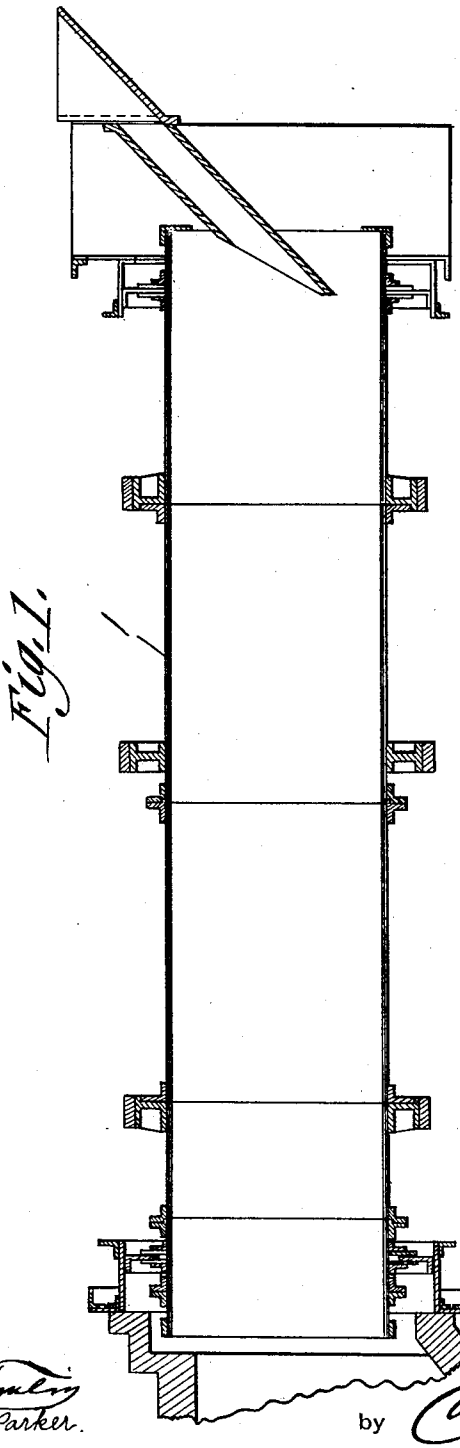
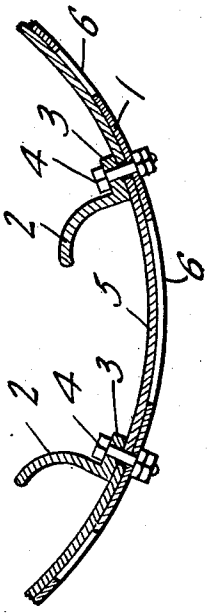


Fig. 2.



Witnesses

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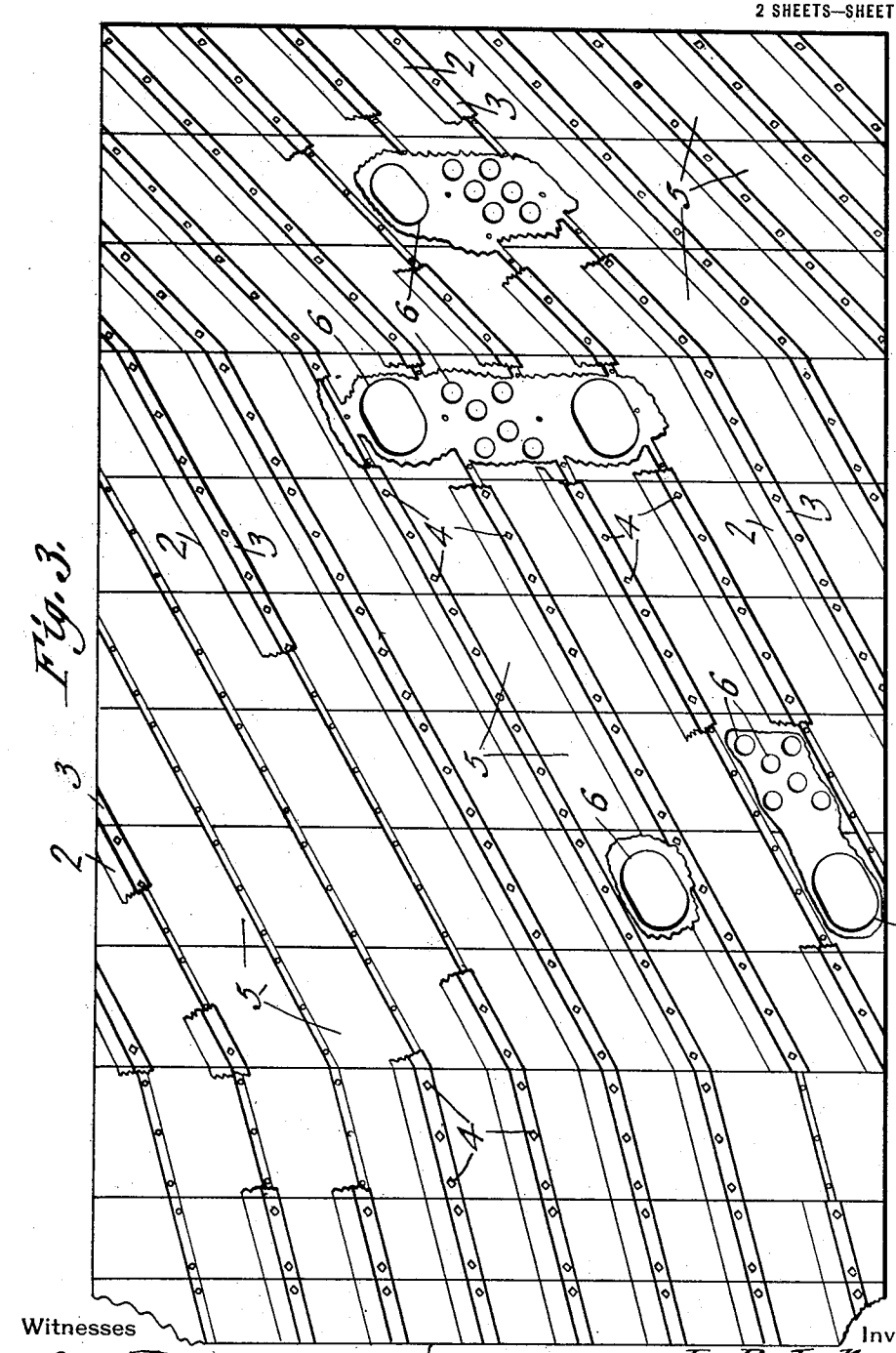


Fig. 3.

Witnesses

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UNITED STATES PATENT OFFICE.

LEWIS RHODES JACKSON, OF MACON, GEORGIA, ASSIGNOR TO J. S. SCHOFIELD'S SONS COMPANY, OF MACON, GEORGIA.

DRIER.

1,220,130. Specification of Letters Patent. Patented Mar. 20, 1917.

Application filed March 30, 1916. Serial No. 87,770.

To all whom it may concern:

Be it known that I, LEWIS RHODES JACKSON, a citizen of the United States, residing at Macon, in the county of Bibb and State of Georgia, have invented a new and useful Drier, of which the following is a specification.

The present invention appertains to rotary driers or drying cylinders, and aims to provide novel and improved, yet simple and inexpensive means for protecting the shell of the drier.

Ordinary rotary drier cylinders not having their shells protected are expensive in upkeep, since the abrasion incident to the material handled, together with the fumes from the fuel passing through the drier, quickly wear the shells away. To repair the damage to a shell worn out by abrasion and corrosion, it is necessary to cut the shell to pieces, and rebuild the worn out parts. Sometimes an entirely new shell must replace the worn out one. This involves expensive repair work, aside from the consideration that considerable time is necessary for repairs, so that the drier plant must be shut down. The wearing away of the shell is even more pronounced with certain materials of an abrasive nature and having considerable moisture. Holes soon wear through the steel shell of the cylinder, requiring lengthy shut downs of the drier plant for renewing the shell or repairing the same. Sometimes, in repairing a worn out shell, sheet liner strips are placed within the shell between the flights, and are riveted, bolted or otherwise fastened to the shell. It is usually necessary to renew the flights or spirals at the same time, hence repairing the shell requires the riveting or bolting of both liner strips and flights. The worn out parts are carried out and the new parts brought in through the end of the shell, which is an inconvenient method, due to the construction of the drier. The foregoing and other objections involve considerable time, trouble and expense, and are overcome by the present invention.

It is the object of the present invention to provide a lining for the shell composed of liner plates which can be readily removed and replaced when worn, in connection with the sectional flights, the liner plates protecting the shell from wear incident to the abrasion of the material, and the fumes, so that the shell will last for a considerably long period of time.

The invention also includes simple and effective means for attaching the flight sections and liner plates within the shell, and simple means for indicating when any of the liner plates are worn through, in order that they can be replaced quickly.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention.

The invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a longitudinal section of the drier cylinder and accompanying parts, the interior of the cylinder being left plain for sake of clearness.

Fig. 2 is an enlarged sectional detail on a transverse line of the cylinder.

Fig. 3 is a diagrammatical view of the interior of the cylinder, showing the cylinder divided longitudinally and laid out flat, portions being broken away.

Fig. 1 illustrates the construction of the shell 1 of the drier cylinder, but since the construction of the shell and means for mounting the same are old and well known, they need not be described in detail, no claim being made to the construction of the shell itself or the means for mounting the shell for rotary movement. The material is run into one end of the shell, and as the shell is rotated, the flights 2 therein cause the material to be worked to and out of the other end of the shell, the shell being heated internally, for drying the material passing through the shell. The flights in agitating the material, and the material rubbing against the shell, ordinarily causes considerable abrasion, whereby the shell is worn out quickly, assisted by the fumes within the shell.

The flights 2 extend spirally within the shell, and are provided with flanges 3 attached by bolts 4 or other securing elements to the shell. These flights are composed of short sections disposed end to end, and the bolts are arranged in spiral series. Spiral

series of liner plates 5 of suitable metal fit against the interior of the shell and provide a lining therefor, and said liner plates are of parallelogram or rhomboidal contour, and are curved to fit the inner cylindrical surface of the shell. The liner plates are disposed end to end with their ends abutting, and with their edges contacting with or adjacent the bolts 4, said bolts being disposed between the edges of the liner plates to hold said plates in place. The flanges 3 of the flights 2 overlap the edges of the liner plates, and when the bolts are tightened, the flights are not only secured rigidly to the shell, but the edges of the liner plates are clamped between the flights and shell, to hold the liner plates in place. Although the flights are illustrated as being of spiral form, they can be disposed longitudinally, in which event the shapes of the liner plates will be changed accordingly. The sections of the flights are coextensive with the liner plates, and the ends of the flight sections and liner plates are flush. The flights close the seams between the liner plates, and if found necessary, these seams can be provided with any suitable packing, to prevent the fumes from passing through the seams to attack the shell. The same bolts are used for holding both the flight sections and liner plates in place, and the flight flanges 3 in overlapping the edges of the liner plates, conceal the seams therebetween.

By using this lining, the shell 1 can be provided with suitable openings 6 exposing the various liner plates. This is of importance, since whenever a liner plate wears out, the material will drop through the respective hole or holes, giving a very effective signal to the operator that new liner plates are needed. Some of these holes are sufficiently large to enable the liner plates and flight sections to be passed therethrough, when making repairs, to avoid the necessity of removing and introducing the parts through the end of the shell.

The liner plates protect the shell from wear, as well as preventing the fumes from attacking the shell. The material in dropping through the worn out plates and holes 6 will notify the operator of the necessity for the renewal of the liner plates, and the drier plant is then shut down and allowed to cool. The flights are unbolted and removed, and the liner plates also removed, uncovering the large holes 6, through which all worn out parts can be passed quickly, and new liner plates and flights brought in. The new liners and flights are then placed properly, and the bolts inserted and tightened, for clamping the parts in place. The shell is of skeleton form, and its lining is of sectional construction. Indeed, the outside shell can be cut away with the exception of strip-like portions to close the joints between the liner plates.

The hot gases from a suitable furnace pass through the shell, in the same direction or in a direction opposite to the direction in which the material passes through the shell, and the flights serve to shower the material through these gases, bringing the material into intimate contact with the gases, whereby to thoroughly dry the material by the time it reaches the discharge end of the cylinder.

Having thus described the invention, what is claimed as new is:

1. A drier cylinder embodying a shell, and a lining for the shell comprising removable sections, the shell having openings covered by and exposing said sections and permitting material to drop therethrough from the shell when the lining sections wear out.

2. A drier cylinder embodying a shell, and a lining for the shell comprising removable sections, the shell having openings exposing said sections, and some of said openings being sufficiently large for the passage of said sections therethrough.

3. A drier cylinder embodying a shell, flights therein composed of sections, a lining for the shell comprising liner plates, means for securing the flights and liner plates to the shell, the shell having openings exposing the liner plates through which the material can drop when said plates are worn out, some of said openings being sufficiently large for the passage of the liner plates and flight sections therethrough.

4. A drier cylinder embodying a shell, liner plates lining the inside thereof, flights overlapping the edges of said plates, and means for detachably connecting the flights to the shell, the flights being composed of sections coextensive in length with the liner plates.

5. A drier cylinder embodying a shell, series of liner plates lining the inside thereof and disposed end to end, flights overlapping the edges of said plates, and series of bolts connecting the flights and shell and disposed between the edges of the liner plates, the flights being composed of sections coextensive in length with the liner plates.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

LEWIS RHODES JACKSON.

Witnesses:
A. D. Schofield, Jr.,
Wm. P. Fleming, Jr.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."