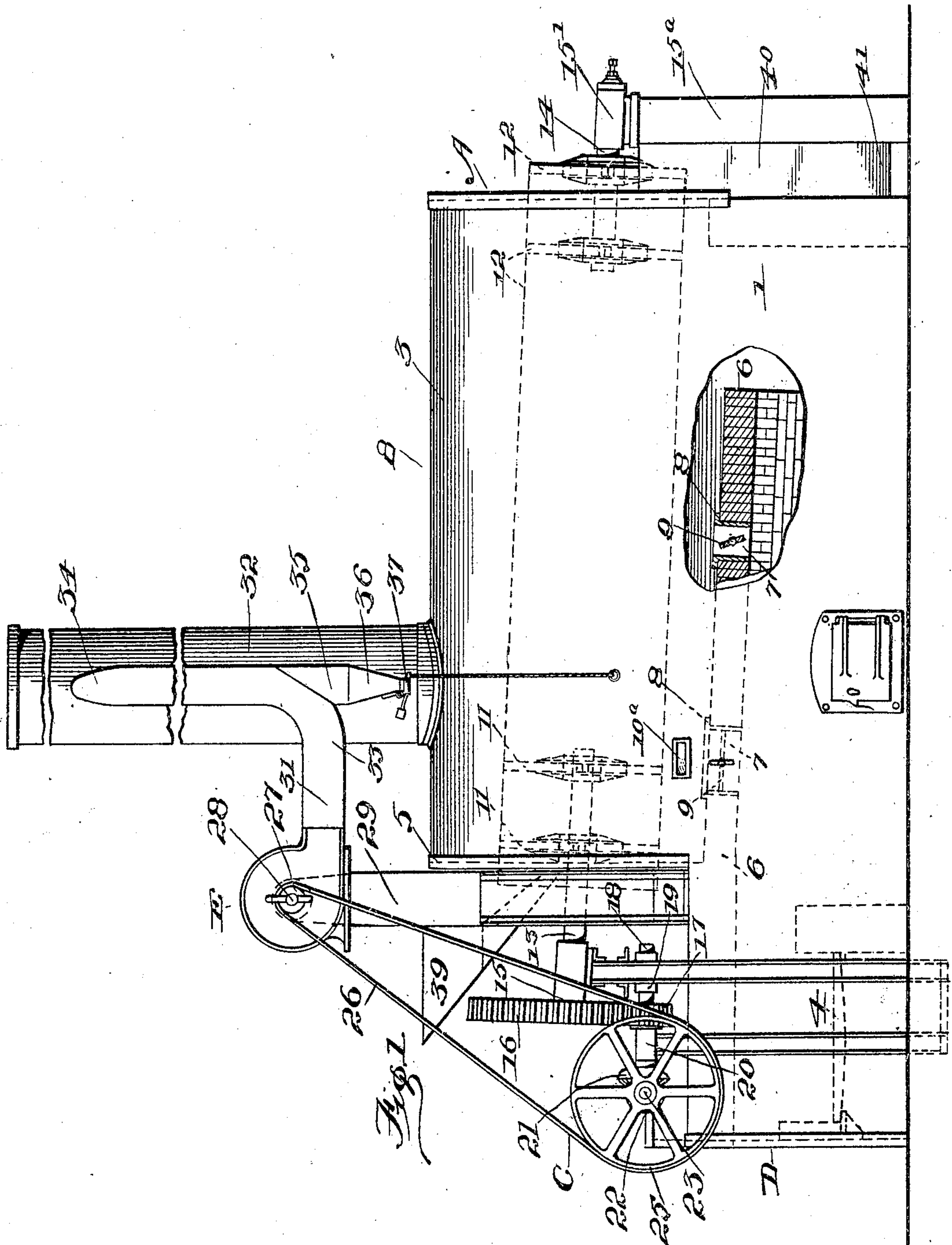


951,977.

F. R. WILLSON, JR.  
 ROTARY DRIER.  
 APPLICATION FILED SEPT. 19, 1903.

Patented Mar. 15, 1910.

2 SHEETS—SHEET 1.



WITNESSES  
*P. W. Willson, Jr.*  
 Edwin P. Rea.

INVENTOR  
*Freeman R. Willson, Jr.*  
 by *A. H. Bliss*  
 Attorney

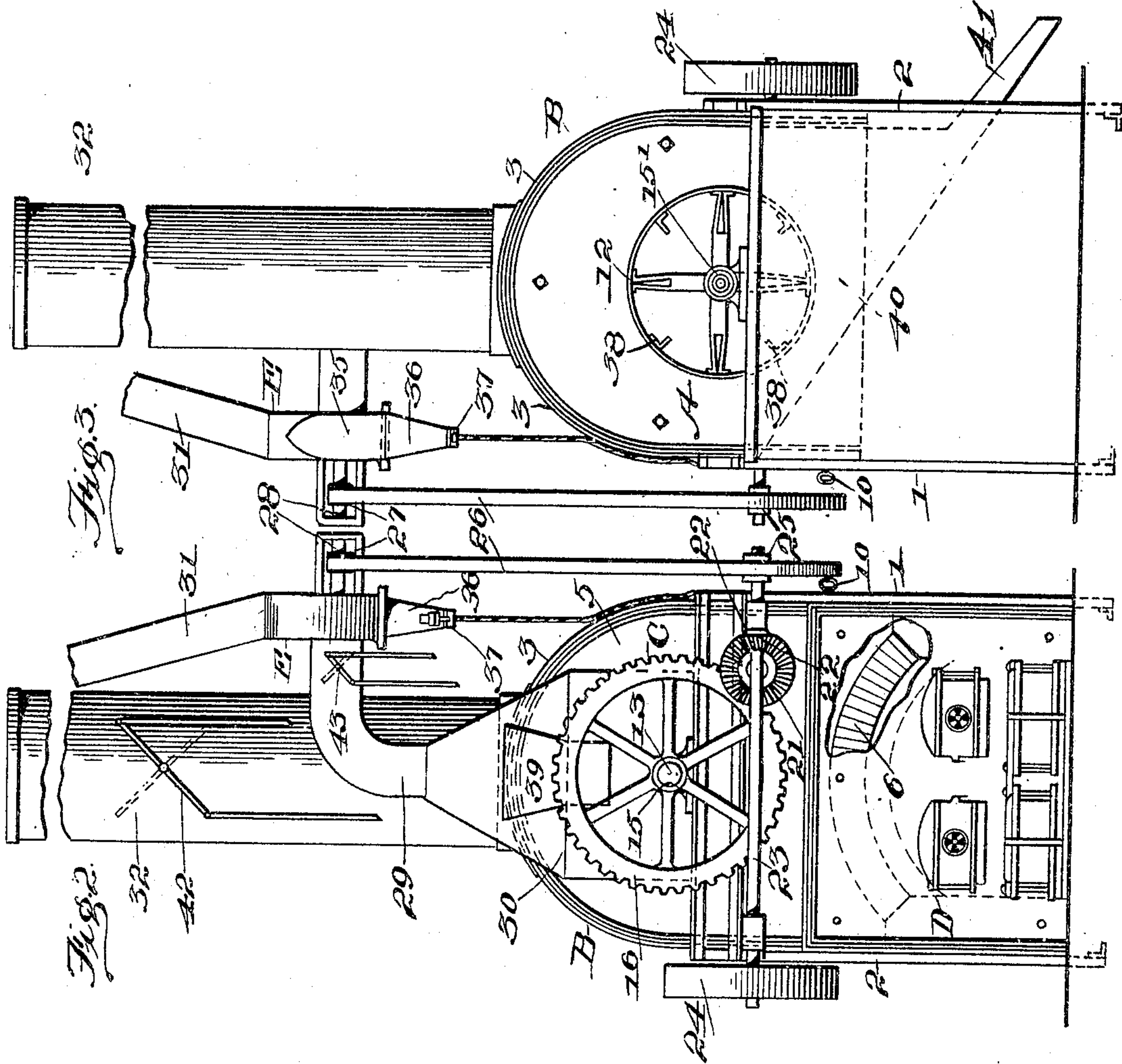
F. R. WILLSON, JR.  
ROTARY DRIER.

APPLICATION FILED SEPT. 19, 1903.

Patented Mar. 15, 1910.

951,977.

2 SHEETS—SHEET 2.



WITNESSES  
*R. M. Teskey*  
Edwin P. Rea.

INVENTOR  
*Freeman R. Willson, Jr.*  
by *A. H. Bliss*  
Attorney



# UNITED STATES PATENT OFFICE.

FREEMAN R. WILLSON, JR., OF WORTHINGTON, OHIO, ASSIGNOR TO JEFFREY MANUFACTURING COMPANY, OF COLUMBUS, OHIO, A CORPORATION OF OHIO.

## ROTARY DRIER.

951,977.

Specification of Letters Patent.

Patented Mar. 15, 1910.

Application filed September 19, 1903. Serial No. 173,840.

*To all whom it may concern:*

Be it known that I, FREEMAN R. WILLSON, Jr., a citizen of the United States, residing at Worthington, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Rotary Driers, of which the following is a specification, reference being had therein to the accompanying drawing.

10 This invention relates to improvements in rotary driers.

It has for its object to provide a drier of very simple construction in which the heated products of combustion from the furnace do not come into contact with the material to be dried.

Another object is to provide means whereby the said heated products of combustion may be distributed at will over the drying cylinder.

Figure 1 is a side elevation of a drier embodying my invention. Fig. 2 is an end elevation of the same looking from the left in Fig. 1. Fig. 3 is an end elevation looking from other end of the mechanism.

25 In the drawings, A represents the drying cylinder, B the housing or casing incasing said cylinder, C the driving mechanism for the cylinder, D the furnace, and E the suction. The housing B is preferably of brick having the vertical side walls 1 and 2 surmounted by the arched top wall 3. The furnace is arranged at the front end of said housing. It may be constructed in any well known manner, but I prefer to have the entire grate surface 4 outside of the front end wall 5 of the housing which incases the cylinder A.

6 is an arch or fire wall preferably of brick, arranged above the grate surface and extending back into the chamber within the housing for a considerable distance and adapted to conduct the heated products from the grate to the end of the cylinder. 7 and 8 are openings in the said arch 6 arranged underneath the cylinder A. They are preferably provided with metal ducts or port holes 8 in which are mounted the valves or dampers 9. The latter are provided with operating handles 10 extending through the housing so that the dampers may be adjusted from the exterior of the drier. Peep holes 10<sup>a</sup> are arranged along the same side of the housing as the handles 10 to enable the operator to determine how to regulate

the said valves or dampers. The drying cylinder or drum A is preferably formed of steel plates.

11—11 and 12—12 are spiders arranged respectively at opposite ends of said cylinder or drum and adapted to support the shell and provide suitable supporting surfaces for the short or stub shafts 13 and 14 at the opposite ends of the cylinder, respectively. It will be seen that by arranging the spiders at some little distance apart, as shown in the drawings, a wide supporting surface is provided for said short shafts and that this is accomplished without using up much of the interior space within the cylinder. This arrangement of the spiders also provides that the strains on the opposite ends of the cylinder will be distributed over a broad area so that the cylinder shell will not be subjected at the points of support to excessive bending or shearing strains.

15 is a bearing for the shaft 13 arranged on the framework at the front end of the drier. The short shaft 14 at the other end of the cylinder is mounted in the thrust bearing 15' supported by the standard 15<sup>a</sup>. Preferably, the bearing 15' is secured in planes below those in which the bearing 15 is secured so that the cylinder A inclines to the horizontal to facilitate in the passage of the material to be dried from its receiving point to its delivery point.

16 is a spur gear rigidly secured to the shaft 13 and adapted to mesh with the driving pinion 17 rigidly secured on the countershaft 18 supported in bearings 19 and 20 on the said framework. The bevel wheel 21 rigidly secured to the said shaft 20 meshes with the bevel pinion 22 rigidly secured on the transversely mounted shaft 23.

24 and 25 are driving pulleys rigidly secured to the shaft 23. The former may be belted to any suitable source of power and the latter is connected by the belt 26 to the pulley 27 on the fan shaft 28. The suction fan E may be secured in place above the drier in any suitable manner.

29 is an exhaust pipe or duct leading to the fan which communicates with the cylinder A at its front end. Preferably, this exhaust duct 29 is expanded at its intake end so as to inclose the front end of the said cylinder. The exhaust duct or pipe 31 leading from the fan communicates with the smoke stack 32 which is secured in place on



the housing B and communicates with the chamber therein. Preferably, this exhaust duct 31 is bent upwardly as at 33 and communicates with the said smoke stack at a point 34 considerably above the top of the drier casing.

35 is a dust collector arranged at the lower end of the vertical leg of the exhaust pipe 31. This dust collector has a cone-shaped hopper 36 provided with an escape valve 37 to permit the withdrawal of the dust therefrom.

38 are lifting plates arranged longitudinally of the cylinder and on the inside thereof.

39 is a feed hopper arranged at the front end of the drying cylinder, and 40 is a receiving hopper arranged at the delivery end thereof and having the outlet spout 41.

The smoke stack 32 is preferably provided with a damper or cut-off valve 42 and the exhaust duct 29 with the damper or valve 43, the former of which serves to control the furnace draft and the latter the vapor suction through the cylinder. These valves are within convenient control of the operator.

With a drier of my improved construction there is no possibility of the gases, fumes and smoke from the furnace coming in contact with the materials to be dried and discoloring or otherwise affecting them. Therefore, cheaper grades of fuel may be used. The provision of means for regulating the distribution of the hot gases or products of combustion over the cylinder surface is of great importance. By this arrangement, the operator is able to regulate the distribution of the heat according to the material to be drier.

The dust collector arranged in the air exhaust system provides the operator with a

simple means for determining the amount of material being carried off in the form of dust and thereby enables him to regulate the valve 43 so as to provide against loss of material or inefficiency of the drier in this particular. Furthermore, by connecting the exhaust duct from the fan to the smoke stack, the blast from the former serves the purpose of a forced blast for the latter.

What I claim is:

1. In a drier, the combination of the heating chamber, the smokestack communicating with said chamber, a rotary cylinder extending through said chamber, an exhaust duct leading from the receiving end of said cylinder and communicating with the smoke-stack, a fan in said exhaust duct, and a dust collector in said exhaust duct between said fan and said smoke-stack.

2. In a drier, the combination with the drying chamber, the exhaust duct communicating therewith, the fan in said duct, the dust collector arranged in connection with said exhaust duct, and a regulating valve in said duct for controlling the suction effect of the fan, substantially as set forth.

3. In a drier, the combination with the drying chamber, the exhaust duct communicating therewith, the exhausting means in said duct, the means arranged in connection with the said exhaust duct for indicating the passage of dust therethrough, and a regulating valve in said duct for controlling the suction effect of the exhausting means, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

FREEMAN R. WILLSON, JR.

Witnesses:

JOE T. WEBSTER,  
GEO. H. ANDERSON.