N. M. ROSENDAHL.

SCREENING AND DRYING APPARATUS.

APPLICATION FILED JULY 28, 1913.

1,212,264.

Patented Jan. 16, 1917.

4 SHEETS—SHEET 1.

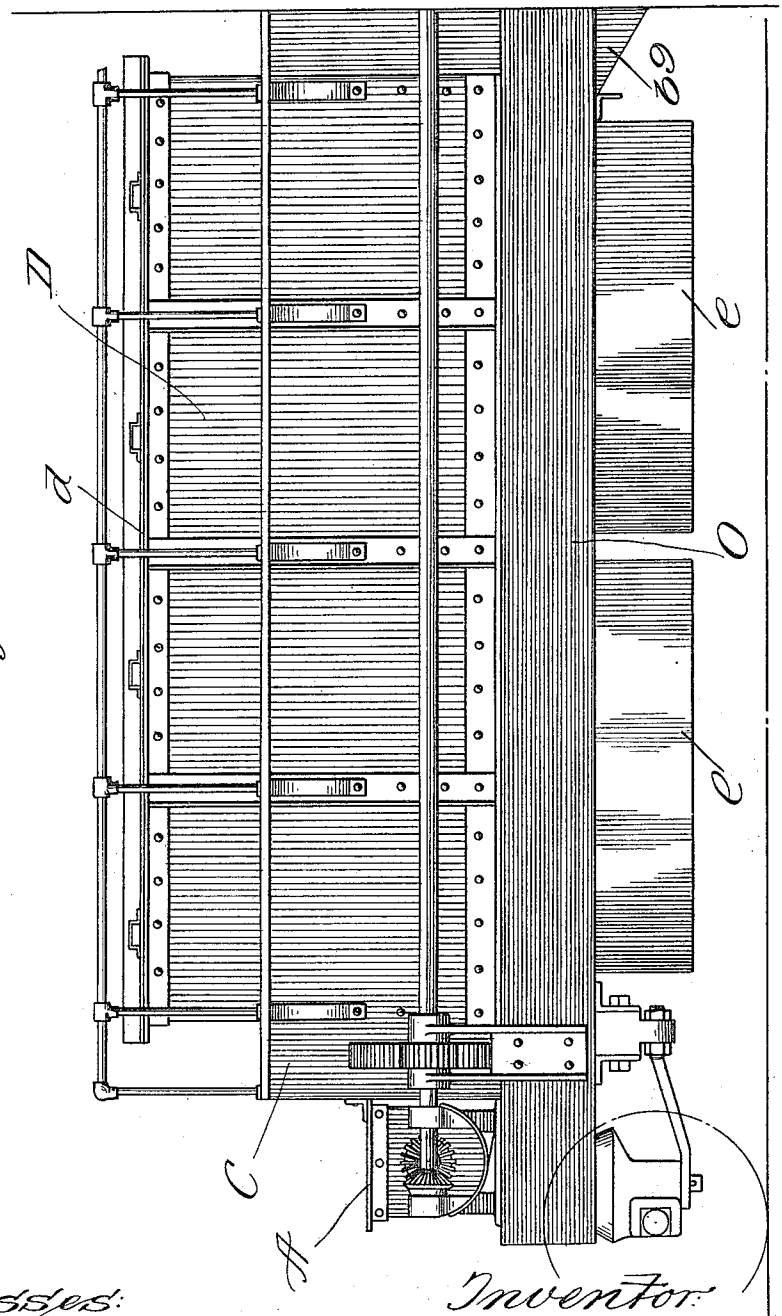


Fig. 1.

Witnesses:
R. E. Ehrens.
R. J. Richardson

Inventor:
Nils M. Rosendahl
By Arthur F. Durand
Atty

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

N. M. ROSENDAHL.

SCREENING AND DRYING APPARATUS.

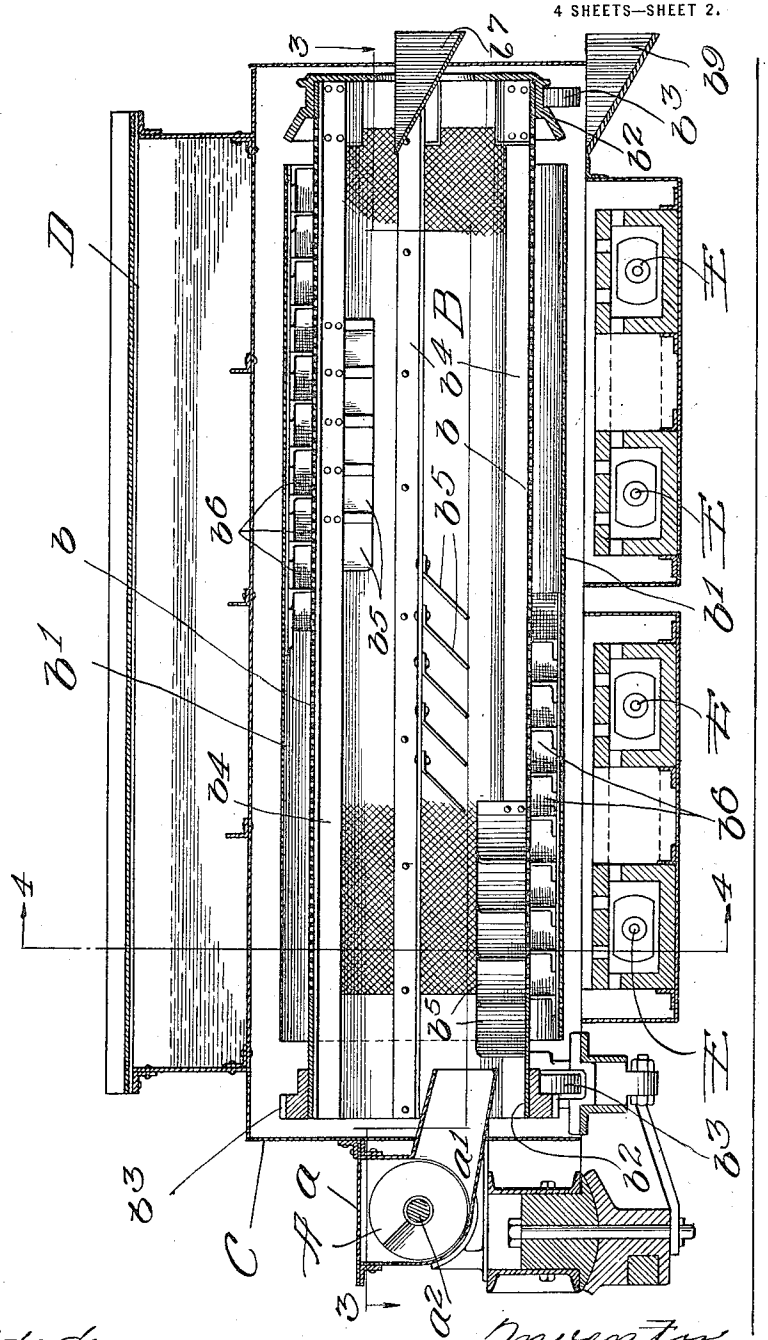
APPLICATION FILED JULY 28, 1913.

1,212,264.

Patented Jan. 16, 1917.

4 SHEETS—SHEET 2.

Fig. 2.



Witnesses:
R. Schoenen
R. J. Richardson

Inventor:
Nils M. Rosendahl
By Arthur F. Durand
Atty

THE NORRIS PETERS CO., PHOTO LITHO., WASHINGTON, D. C.

N. M. ROSENDAHL.

SCREENING AND DRYING APPARATUS.

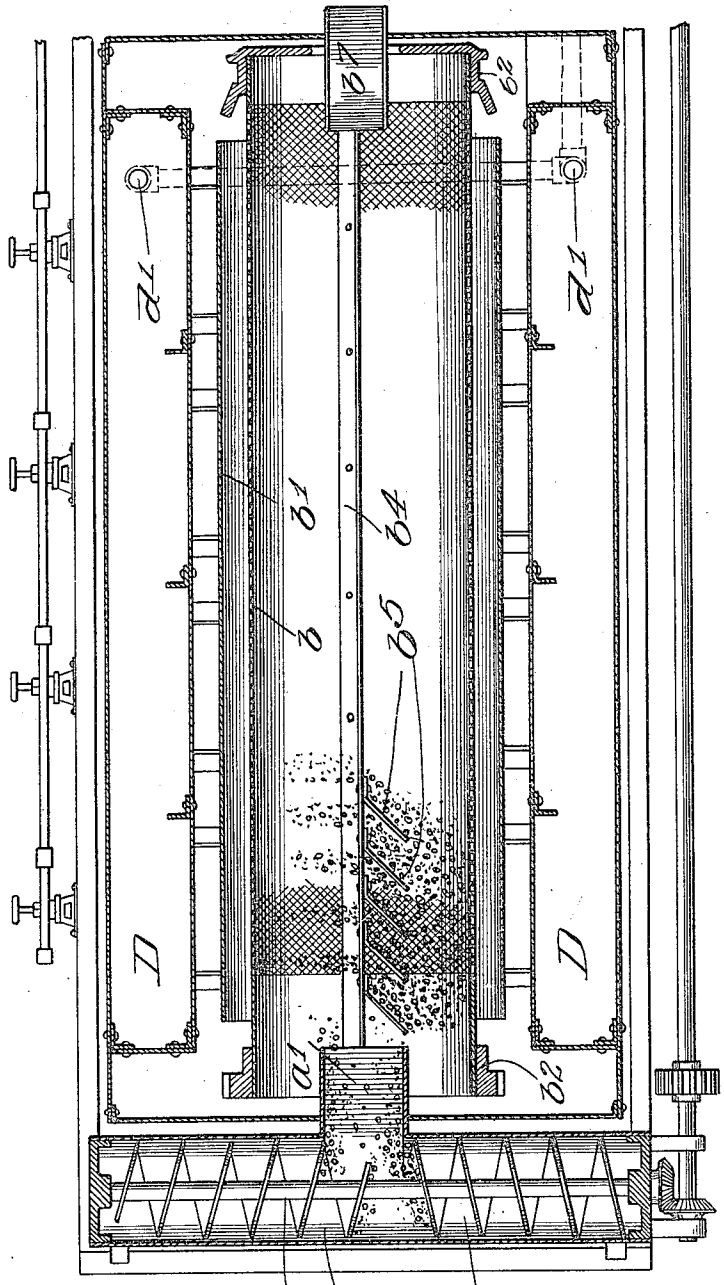
APPLICATION FILED JULY 28, 1913.

1,212,264.

Patented Jan. 16, 1917.

4 SHEETS—SHEET 3.

Fig. 5.



Witnesses:
R. Schneur
R. J. Richardson

Inventor:
Nils M. Rosendahl
By Arthur F. Durand
Atty

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

N. M. ROSENDAHL.

SCREENING AND DRYING APPARATUS.

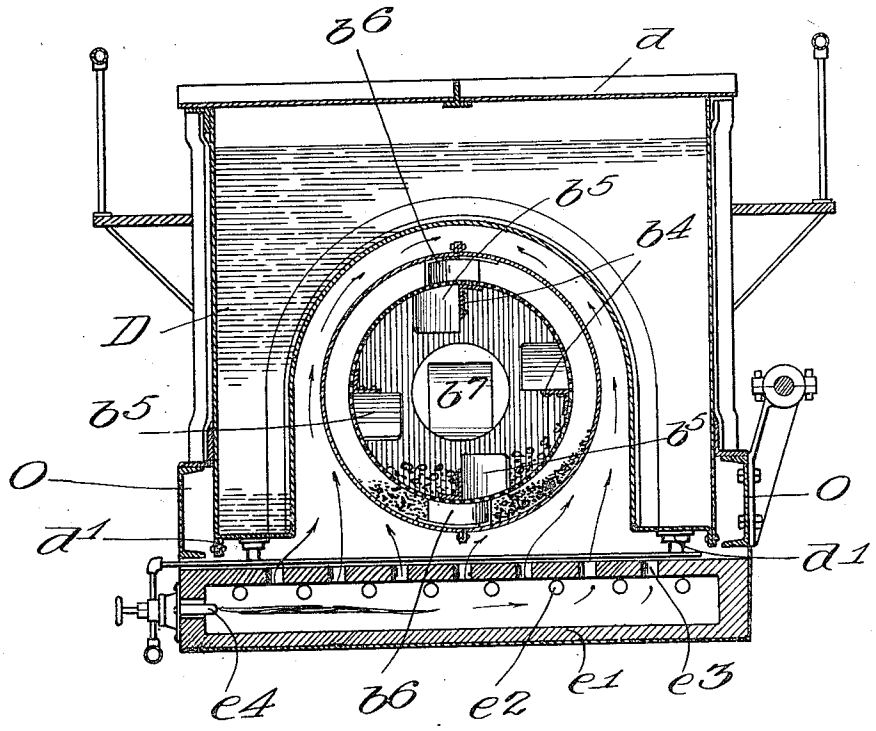
APPLICATION FILED JULY 28, 1913.

1,212,264.

Patented Jan. 16, 1917.

4 SHEETS—SHEET 4.

Fig. 4.



Witnesses:
R. E. Schneider
R. J. Richardson

Inventor:
Nils M. Rosendahl
By Arthur F. Durand
Atty

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

NILS M. ROSENDAHL, OF CHICAGO, ILLINOIS, ASSIGNOR TO FREDERICK C. AUSTIN, OF CHICAGO, ILLINOIS.

SCREENING AND DRYING APPARATUS.

1,212,264. Specification of Letters Patent. Patented Jan. 16, 1917.

Original application filed January 22, 1913, Serial No. 743,430. Divided and this application filed July 28, 1913. Serial No. 781,460.

To all whom it may concern:

Be it known that I, NILS M. ROSENDAHL, a citizen of the United States of America, and resident of Chicago, Cook county, Illinois, have invented a certain new and useful Improvement in Screening and Drying Apparatus, of which the following is a specification.

This is a division of my application No. 743,430, filed January 22, 1913, for improvement in machine for making asphaltic or other mixtures. In said prior application, I have made claims for the various features and combinations which relate to the handling and mixing of asphalt or other similar materials. In this divisional application I have claimed the rotary drier or screening apparatus which, although it forms a part of the said machine for making asphalt or other similar mixtures, may be used alone or in conjunction with other machines.

Generally stated, the object of my invention is to provide a novel and highly efficient machine for treating materials, such as gravel and sand and other similar materials which are used, for example, in the construction of paving.

More specifically considered, my invention contemplates an improved screening apparatus for separating the relatively coarse and fine portions of sand, crushed rock, gravel and other similar materials preparatory to mixing the same with asphalt or for other purposes.

It is also an object to provide certain details and features of construction and combinations tending to increase the general efficiency of a rotary drier for this particular purpose, thereby to insure a more satisfactory street machine for use in laying pavements, and to increase the efficiency of a screening apparatus of that particular character in which a rotary screen is employed for separating the relatively fine and coarse portions of the sand, gravel or other materials.

To the foregoing and other useful ends, my invention consists in matters hereinafter set forth and claimed.

In the accompanying drawings Figure 1 is a side elevation of a screening apparatus embodying the principles of my invention, showing the same employed as the rotary drier of an asphalt mixing machine, being necessary in the preparation of asphaltic mixtures for paving, etc., to grade the sand or gravel or crushed rock, and to heat the same, my improved screening apparatus being especially adapted for heating the materials while the screening or grading operation is taking place. Fig. 2, is a vertical longitudinal section through the structure shown in Fig. 1. Fig. 3, is a horizontal section on line 3—3 in Fig. 2. Fig. 4, is a cross section on line 4—4 in Fig. 2.

As thus illustrated, the means for preparing the materials, preliminary to mixing the same together, are as follows: The feeding device A comprises a hopper a provided with a discharge spout a^1, projecting within the machine, said hopper extending transversely of the machine at the end thereof. A transverse and horizontally disposed shaft a^2 is arranged in the said hopper, and is provided with right and left screws which feed the materials to the center of the hopper, and then into the said spout. From the said spout the materials are delivered to a rotary drum comprising inner and outer shells b and b^1, the inner shell being perforated to serve as a screen, and having imperforate end portions b^2 which rest upon wheels or rollers b^3, which latter are suitably mounted within the body C of the machine. The said inner shell b is provided with longitudinal angle-iron ribs b^4 having feed blades b^5, whereby the materials are gradually fed forward within the drum, it being observed that these blades are arranged obliquely relative to the said ribs. The two shells are spaced a distance apart, the outer shell being imperforate throughout the length thereof, and the said space between the two shells being provided with feed blades b^6, whereby the sand and other fine particles which pass through the perforations of the inner shell are gradually fed forward. A stationary spout b^7 receives the relatively coarse materials, such as crushed rock or stone, from the delivery end of the drum, the said inner shell being provided with lifting blades for this purpose, said blades carrying the materials upward and dropping them into said spout. Another spout b^9 receives the sand and relatively fine materials from the end of the outer shell. The tank D overlies the rotary drum, and extends at each side thereof, serving as a sort of housing therefor, space

being provided between the drum and the inner surface of said tank. The top of the tank is provided with covers or doors d which, when opened, permit of the introduction of asphalt or other similar materials into the tank. The end of the tank is provided with pipe connections d^1 at the bottom thereof, which connections are joined to the feed pipe d^2 by which the hot asphalt is delivered to the other end of the machine, as will hereinafter more fully appear.

A plurality of burners E, of any suitable character, are disposed in the receptacles e below the rotary drum, whereby the contents of the said drums are heated while the relatively coarse materials are being separated from the relatively fine materials. At the same time the heat and products of combustion circulate around and above the rotary drum in contact with the inner surface of the tank D, whereby the contents of said tank is heated in the required manner. These burners, as shown, are each constructed from a hollow tile e^1 extending transversely of the machine, said tile having its side walls provided with openings e^2 for the escape of the heat and products of combustion, and its top wall provided with openings e^3 for the same purpose. A gas or oil burner e^4 is provided at the end of each tile, for producing the heat, it being understood that each tile is preferably constructed from terra cotta, vitreous material, or other suitable heat resisting substance. Steam is conveyed to these burners by pipes e^5, laid across the tops of the tiles E, whereby the steam is superheated before entering the burners to force the oil or other fuel therefrom. In this way the materials are properly separated from each other, and at the same time thoroughly heated while progressing to the other end of the machine.

From the foregoing, it will be seen that my invention relates more particularly to screening and drying apparatus for use in a portable paving-plant. The apparatus performs a screening function, of course, but the primary object is obviously to dry the materials before they reach the place where they are to be combined with the hot asphalt. In a portable paving-plant, it is desirable and necessary, of course, that the different instrumentalities be of a character to take up as little room as possible, and that they be combined in a manner to reduce the entire plant to as small a structure as possible, it being understood that these portable paving-plants are hauled along the streets and moved from place to place during the progress of paving the streets. The screening and drying apparatus shown and described is particularly adapted for use in a portable paving-plant, and is designed and constructed with special reference to its use in conjunction with the other instrumentalities which are necessary in a plant of this kind. Any suitable heating means can be employed for heating the materials in the rotary drum of the drier, but the exterior of the said drum is essentially of a character to withstand fire for heating the said materials in the desired manner. Consequently, the said drum, including the longitudinal rows of blades b^5 and b^6, becomes very hot, and the back-and-forth sliding movements of the materials over the said blades, and on the longitudinal angle-iron ribs b^4, as well as on the inner surfaces of the two cylinders, serves very quickly to dry the materials and raise them to a high temperature, whereby, when these materials are ready to be combined with asphalt, they are perfectly dry and so hot that they will not cool the asphalt during the mixing operation. The outer cylinder b^1 is open at both ends, so that the hot gases may enter and come into direct contace with the materials, thus assisting in the drying operation.

What I claim as my invention is:

1. In a portable paving-plant having a machine for treating the materials, a rotary drum provided with inner and outer walls, said walls spaced apart, the inner wall being longer than the outer wall and adapted to serve as a screen, the outer wall being imperforate, means for feeding materials to one end of said drum, within the said screen, rings on the ends of said screen, supporting rolls engaging said rings, and gearing applied to one end of said screen to rotate the drum, and devices at the other end of said drum for separately receiving the relatively coarse and fine materials therefrom, said screen having interior feed blades for causing the materials to move forward, and feed blades disposed between the said inner and outer walls to move the relatively fine materials forward, serving also to support the outer wall.

2. In a portable paving-plant having a machine for treating the materials, a rotary drum provided with inner and outer walls, said walls spaced apart, the inner wall being adapted to serve as a screen, the outer wall being imperforate, means for feeding materials to one end of said drum, within the said screen, devices at the other end of said drum for separately receiving the relatively coarse and fine materials therefrom, said drum being disposed horizontally, and said inner wall having imperforate end portions, means whereby said entire drum is supported by said end portions, and a plurality of parallel series of blades for supporting the outer wall on the inner wall, serving to propel the materials in the required direction.

3. In a portable paving-plant having a machine for preliminarily treating the materials, a drum mounted to rotate about a horizontal disposed axis, having internal lon-

gitudinal rows of feed blades, said blades being disposed at angles oblique to the length of each row, with space between adjacent rows, thereby to feed the materials from one end to the other of said drum, a cylinder inside of said rows of blades, means to deliver the materials to one end of said drum, mechanism encircling said means to rotate said drum, and means to support said drum at the ends thereof.

4. In a portable paving-plant having a machine for preliminarily treating the materials, a drum mounted to rotate about a horizontally disposed axis, having internal longitudinal rows of feed blades, said blades being disposed at angles oblique to the length of each row, with space between adjacent rows, thereby to feed the materials from one end to the other of said drum, means to deliver the materials to one end of said drum, mechanism to rotate said drum, means to support said drum at the ends thereof, said drum comprising concentrically arranged cylinders, and each cylinder having said rows of blades secured to the inner surface thereof, one cylinder feeding to the other, and the outer wall being imperforate and of metal to withstand fire to heat the materials.

5. In a portable paving-plant having a machine for preliminarily treating the materials, a drum mounted to rotate about a horizontally disposed axis, having internal longitudinal rows of feed blades, said blades being disposed at angles oblique to the length of each row, with space between adjacent rows, thereby to feed the materials from one end to the other of said drum, a cylinder inside of said rows of blades, means to deliver the materials to one end of said drum, mechanism to rotate said drum, and means to support said drum at the ends thereof, said drum having an outer imperforate metal wall adapted to withstand fire to heat the materials.

6. In a portable paving-plant having a machine for treating the materials, a rotary drum provided with inner and outer walls, said walls spaced apart, the inner wall being larger than the outer wall and adapted to serve as a screen, the outer wall being imperforate, means for feeding materials to one end of said drum, within the said screen, rings on the ends of said screen, supporting rolls engaging said rings, gearing applied to one end of said screen to rotate the drum, and devices at the other end of said drum for separately receiving the relatively coarse and fine materials therefrom, said screen having interior feed blades for causing the materials to move forward, and feed blades disposed between the said inner and outer walls to move the relatively fine materials forward, serving also to support the outer wall, said inner wall having means to elevate the coarse materials into position to fall into one of said devices, which devices are arranged one above the other with the end portion of the drum overhanging the lower device and containing the upper device.

7. In a portable paving-plant having a machine for treating the materials, a rotary drum provided with inner and outer walls, said walls spaced apart, the inner wall being adapted to serve as a screen, the outer wall being imperforate, means for feeding materials to one end of said drum, within the said screen, devices at the other end of said drum for separately receiving the relatively coarse and fine materials therefrom, said drum being disposed horizontally, and said inner wall having imperforate end portions, means whereby said entire drum is supported by said end portions, and a plurality of parallel series of blades for supporting the outer wall on the inner wall, serving to propel the materials in the required direction, said inner wall having means to elevate the coarse materials into position to fall into one of said devices, which devices are arranged one above the other with the end portion of the drum overhanging the lower device and containing the upper device.

8. In a portable paving-plant having a machine for treating the materials, a rotary drum provided with inner and outer walls, said walls spaced apart, the inner wall being larger than the outer wall and adapted to serve as a screen, the outer wall being imperforate, means for feeding materials to one end of said drum, within the said screen, rings on the ends of said screen, supporting rolls engaging said rings, gearing applied to one end of said screen to rotate the drum, devices at the other end of said drum for separately receiving the relatively coarse and fine materials therefrom, said screen having interior feed blades for causing the materials to move forward, and feed blades disposed between the said inner and outer walls to move the relatively fine materials forward, serving also to support the outer wall, said outer wall being a cylinder which is open at opposite ends thereof and shorter than said screen, and angle-irons secured to said screen to support the blades therein and form ribs to carry the materials upward a distance.

9. In a portable paving-plant having a machine for treating the materials, a rotary drum provided with inner and outer walls, said walls spaced apart, the inner wall being adapted to serve as a screen, the outer wall being imperforate, means for feeding materials to one end of said drum, within the said screen, devices at the other end of said drum for separately receiving the relatively coarse and fine materials therefrom, said drum be-

ing disposed horizontally, and said inner wall having imperforate end portions, means whereby said entire drum is supported by said end portions, a plurality of parallel series of blades for supporting the outer wall on the inner wall, serving to propel the materials in the required direction, said outer wall being a cylinder which is open at opposite ends thereof and shorter than said screen, and angle-irons secured to said screen to support the blades therein and form ribs to carry the materials upward a distance.

10. In a portable paving-plant having a machine for treating the materials, a rotary drum provided with inner and outer walls, said walls spaced apart, the inner wall being larger than the outer wall and adapted to serve as a screen, the outer wall being imperforate, means for feeding materials to one end of said drum, within the said screen, rings on the ends of said screen, supporting rolls engaging said rings, gearing applied to one end of said screen to rotate the drum, devices at the other end of said drum for separately receiving the relatively coarse and fine materials therefrom, said screen having interior feed blades for causing the materials to move forward, and feed blades disposed between the said inner and outer walls to move the relatively fine materials forward, serving also to support the outer wall, means forming ribs in said screen to carry the materials upward a distance, and means secured to the ends of said ribs to deliver the coarse materials to one of said devices.

11. In a portable paving-plant having a machine for treating the materials, a rotary drum provided with inner and outer walls, said walls spaced apart, the inner wall being adapted to serve as a screen, the outer wall being imperforate, means for feeding materials to one end of said drum, within the said screen, devices at the other end of said drum for separately receiving the relatively coarse and fine materials therefrom, said drum being disposed horizontally, and said inner wall having imperforate end portions, means whereby said entire drum is supported by said end portions, a plurality of parallel series of blades for supporting the outer wall on the inner wall, serving to propel the materials in the required direction, means forming ribs in said screen to carry the materials upward a distance, and means secured to the ends of said ribs to deliver the coarse materials to one of said devices.

12. In a portable paving-plant having a machine for treating the materials, a rotary drum provided with inner and outer walls, said walls spaced apart, the inner wall being larger than the outer wall and adapted to serve as a screen, the outer wall being imperforate, means for feeding materials to one end of said drum, within the said screen, rings on the ends of said screen, supporting rolls engaging said rings, gearing applied to one end of said screen to rotate the drum, and devices at the other end of said drum for separately receiving the relatively coarse and fine materials therefrom, said screen having interior feed blades for causing the materials to move forward, and feed blades disposed between the said inner and outer walls to move the relatively fine materials forward, serving also to support the outer wall, said drum having an imperforate outer surface to withstand fire to heat the materials.

13. In a portable paving-plant having a machine for treating the materials, a rotary drum provided with inner and outer walls, said walls spaced apart, the inner wall being adapted to serve as a screen, the outer wall being imperforate, means for feeding materials to one end of said drum, within the said screen, devices at the other end of said drum for separately receiving the relatively coarse and fine materials therefrom, said drum being disposed horizontally, and said inner wall having imperforate end portions, means whereby said entire drum is supported by said end portions, and a plurality of parallel series of blades for supporting the outer wall on the inner wall, serving to propel the materials in the required direction, said drum having an imperforate outer surface to withstand fire to heat the materials.

Signed by me at Chicago, Illinois, this 24th day of July 1913.

NILS M. ROSENDAHL.

Witnesses:
R. J. RICHARDSON,
R. E. SEHNEM.

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