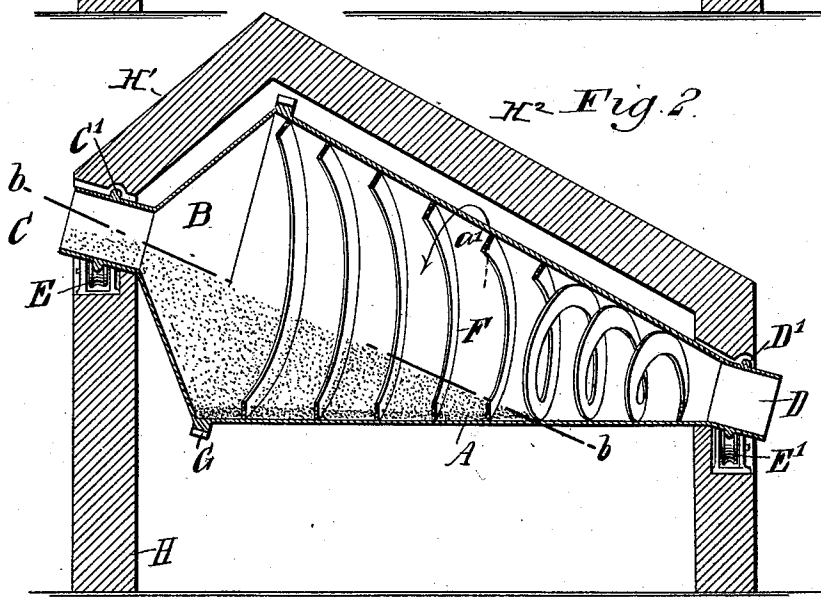
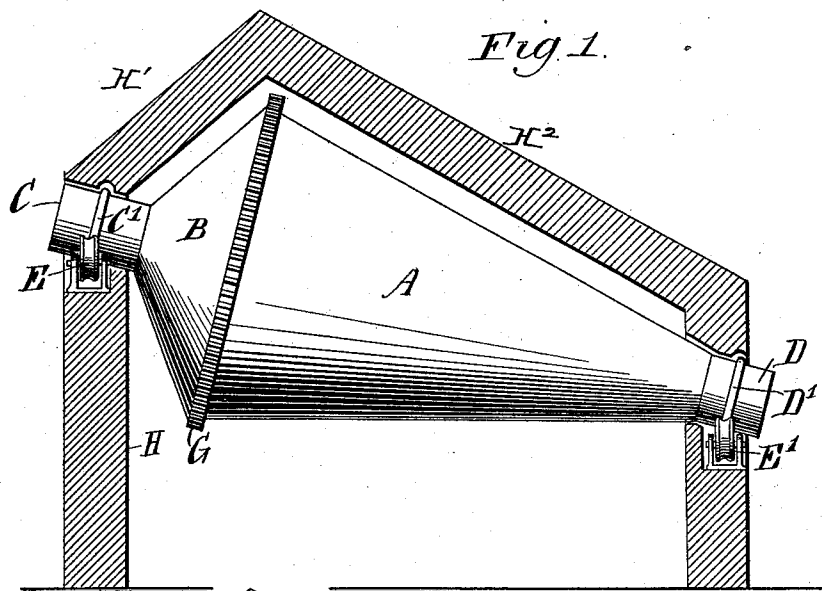


(No Model.)

A. S. COOPER.
MIXING AND HEATING APPARATUS.

No. 578,628.

Patented Mar. 9, 1897.



WITNESSES:
Paul J. Foster
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UNITED STATES PATENT OFFICE.

AUGUSTUS STEIGER COOPER, OF SANTA BARBARA, CALIFORNIA.

MIXING AND HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 578,628, dated March 9, 1897.

Application filed March 27, 1896. Serial No. 585,083. (No model.)

To all whom it may concern:

Be it known that I, AUGUSTUS STEIGER COOPER, of Santa Barbara, in the county of Santa Barbara and State of California, have invented a new and Improved Mixing and Heating Apparatus, of which the following is a full, clear, and exact description.

The invention relates to that class of apparatus for mixing and heating in which the material is introduced into a revoluble drum provided with an interior spiral blade and axis of the drum having such inclination that the material will tend toward one end and in which apparatus the drum is rotated first in one direction to force the material toward the end of the drum which is highest elevated and afterward rotated in the opposite direction to permit the discharge of the material at the lowest end of the drum.

The object of the invention is to provide superior means for performing this work. To this end I employ a closed furnace in which a rotary drum is mounted, the drum being formed of two oppositely-projecting cones with coextensive bases and sides of unequal angles, the longer of which cones forms the body of the drum and is arranged so that the line of its lowermost edge will be approximately horizontal and the shorter of which cones is arranged so that the line of its lowermost edge will be almost at right angles to the lowermost edge of the longer cone. The spiral blade is located within the longer cone, and when the drum is turned in one direction the blade will force the material toward one end of the drum and when turned in the opposite direction will force the material toward the second end of the drum. The disposition of the shorter cone is such that it alone performs the work of giving the material operated upon a tendency to gravitate toward one end of the drum because the lower edge of the long cone is horizontal.

The invention will be fully described hereinafter, and defined in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in both the figures.

Figure 1 is a sectional view of the furnace with the drum in elevation, and Fig. 2 is a

similar view of the furnace with the drum shown in longitudinal section.

The furnace H has vertical walls and a roof, the latter being composed of two slanting portions H' and H² and the roof conforming to the shape of the drum, as will be hereinafter more apparent.

Formed in the vertical walls of the casing H are two oppositely-arranged openings, one of which carries supporting-rollers E for the hollow trunnion C of the drum, such trunnion having an annular rib C' running in the grooved peripheries of the rollers E, and the second of which opening has carrying-rollers E', receiving the annular rib D' of the hollow trunnion D. By these means the drum is revolvably mounted. The trunnion C is higher than the trunnion D, and the relative position of the openings in which the trunnions are respectively carried is such as makes the longer cone A of the drum horizontal at its lowermost edge. The shorter cone B of the drum is joined at its base to the base of the cone A. The bases of the cones are thus coextensive and the lower edge of the cone B will have a steep declivity whereby to form a wall, throwing the material within the drum into such a position that its upper surface will lie in the line b b. A cog-rim G runs around the largest portion of the drum and serves to transmit rotary movement thereto.

Within the cone A of the drum is the spiral blade F, which runs from the base of the cone to its apex and which, as other blades of its class, feeds the material within the drum toward either end, according to the direction in which the drum is turned; but it will be seen that the cone B and its peculiar disposition render it impossible for the blade F to advance the material farther toward the trunnion C than it is shown in Fig. 2, because the steep wall of the section B necessarily throws the material back.

It will be seen that the uppermost lines of the cones A and B run, respectively, parallel with the portions H² and H' of the roof of the furnace H, so that each section of the roof will be directly adjacent to the respective sections of the drum and more effectually apply the heat thereto.

In the operation of the invention the ma-

terial is fed to the drum through the hollow
trunnion C. Fire having been started in the
furnace, the drum is turned in the direction
of the arrow *a*, causing the spiral blade F to
5 force the material leftward or toward the
trunnion C. This leftward movement of the
material continues until the material assumes
the position shown in Fig. 2. After this pe-
10 riod in the operation the lower edge of the
section B constantly repels the material to-
ward the trunnion D, while the blade F con-
currently forces it back. A thorough agita-
tion of the material is thus produced, because
the blade F and cones B counteract on the
15 material the operation of each other. When
the operation on the material is complete
within the drum, the drum is turned re-
versely to the arrow *a'* and the material is
immediately ejected through the hollow trun-
20 nion D.

Having thus described my invention, I
claim as new and desire to secure by Letters
Patent—

1. A mixing apparatus having a rotary drum
25 formed of two intercommunicating and con-
nected cones having coextensive bases and

sides of unequal lengths and angles, the bases
being placed together, the longer of the cones
having its lowermost side line approximately
horizontal and the shorter of the cones hav- 30
ing its lowermost side line inclined upward
from the lowermost side line of the longer
cone, and a spiral blade within the longer
cone, substantially as described.

2. A mixing apparatus having a rotary drum 35
formed of two intercommunicating and con-
nected cones with coextensive bases and sides
of unequal lengths and angles, the bases be-
ing placed together, the longer of the cones
having its lowermost side line approximately 40
horizontal and the shorter of the cones hav-
ing its lowermost side line inclined upward
from the lowermost side line of the longer
cone, the drum being mounted on an inclined
axis whereby this disposition of side lines is 45
attained and a spiral blade in the longer cone,
substantially as described.

AUGUSTUS STEIGER COOPER.

Witnesses:

JOHN LININGTON MOYER,
JOHN KENNEDY HARRINGTON.