

(No Model.)

J. M. DUNCAN.
SALT WASHING APPARATUS.

No. 247,026.

Patented Sept. 13, 1881.

FIG-1-

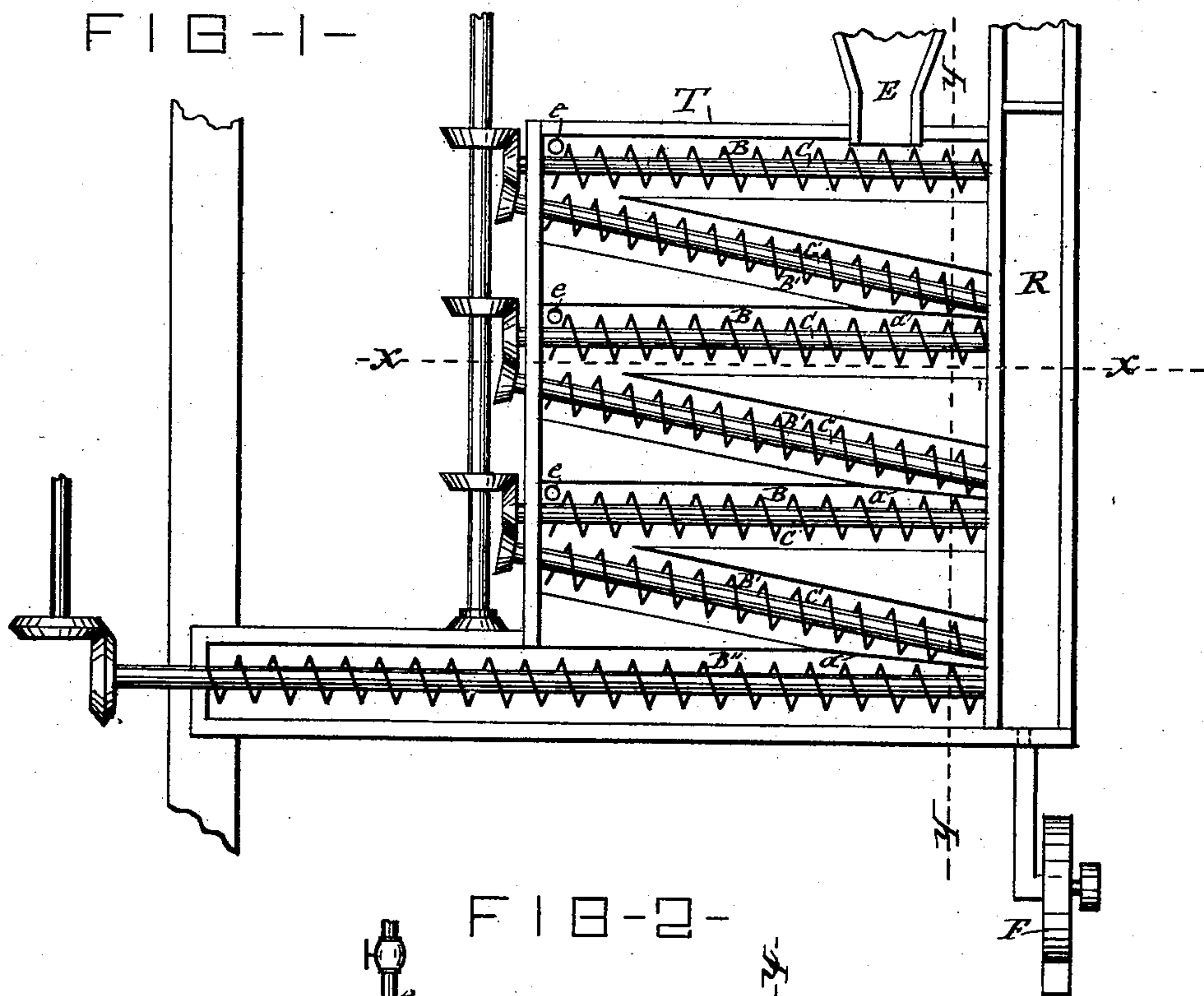


FIG-2-

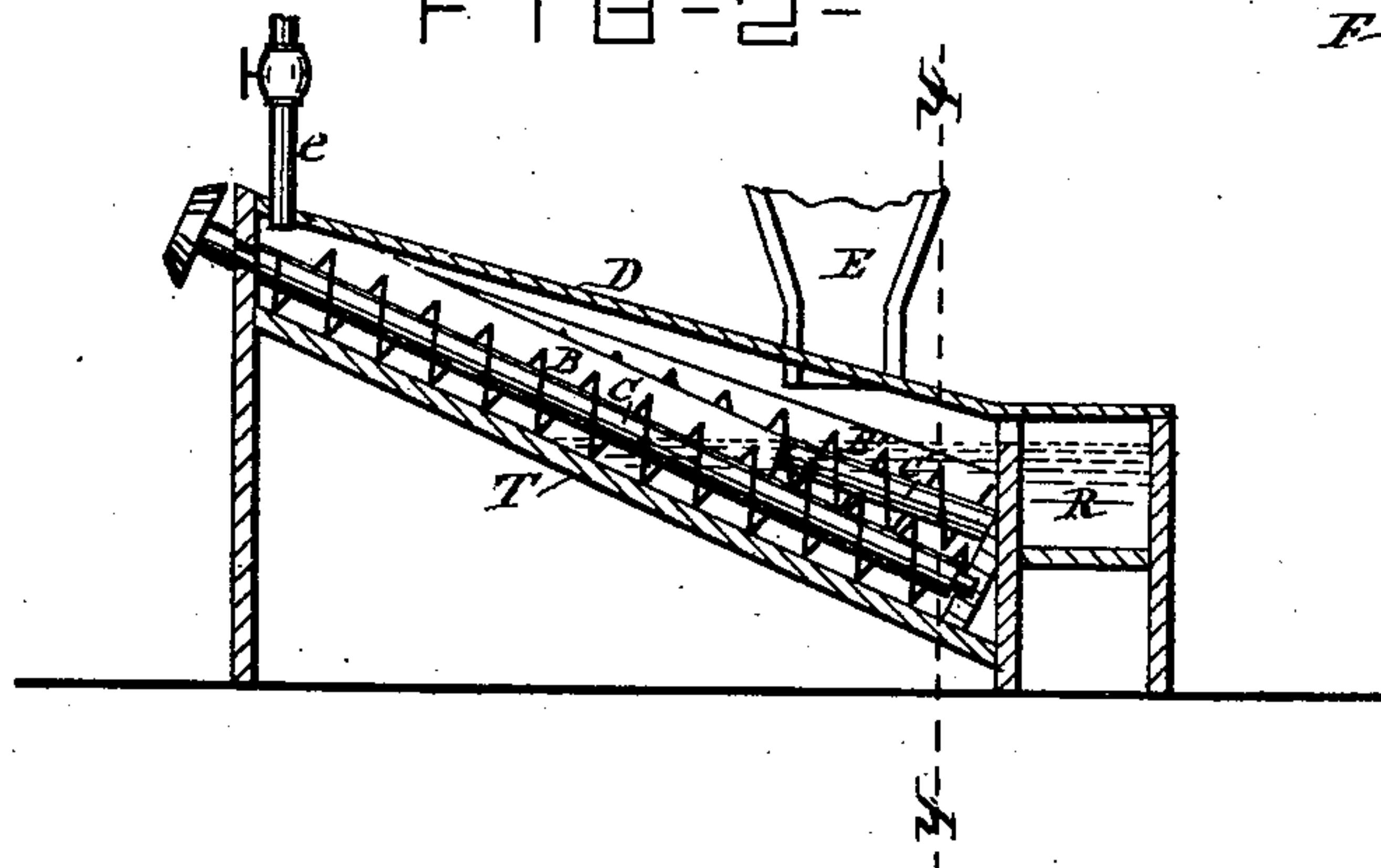
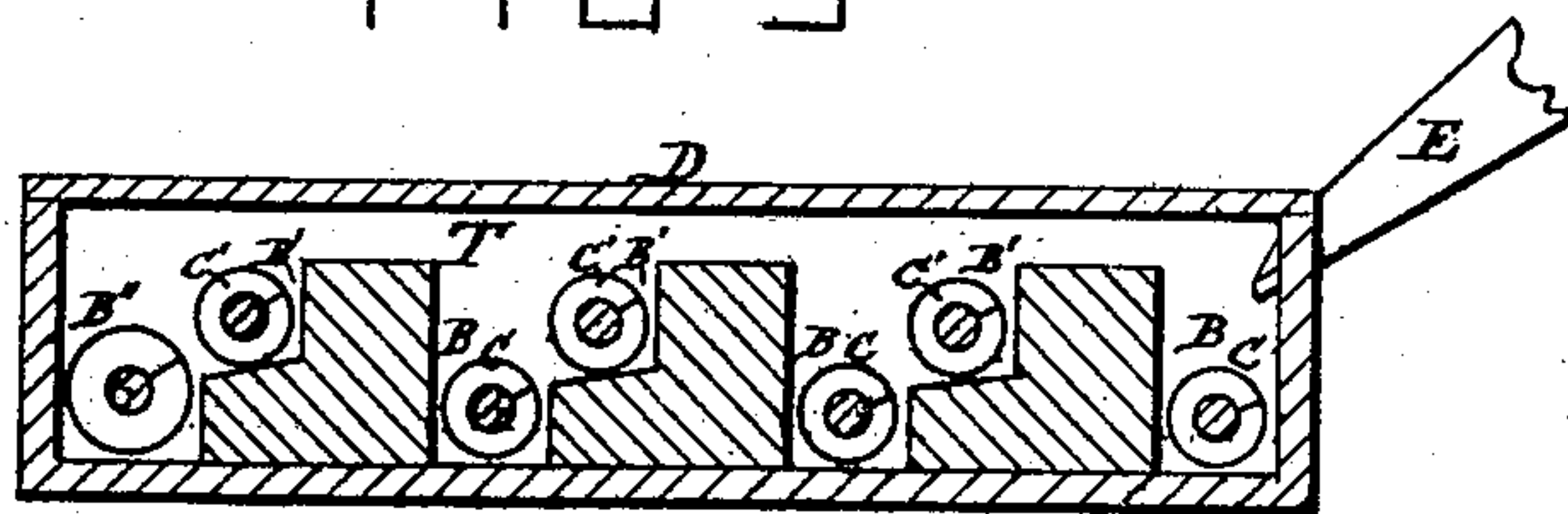


FIG-3-



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UNITED STATES PATENT OFFICE.

JOSEPH M. DUNCAN, OF GEDDES, NEW YORK.

SALT-WASHING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 247,026, dated September 13, 1881.

Application filed June 27, 1881. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH M. DUNCAN, of Geddes, in the county of Onondaga, in the State of New York, have invented new and
5 useful Improvements in Salt-Washing Apparatus, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to improved means of
10 removing the scum and supernatant impurities which are generally brought to the surface of the brine or washing-liquid during the process of washing salt, and is more particularly designed as an improvement on the apparatus
15 patented to John H. Duncan, January 25, 1881, in which a blower is employed to blow the scum from the surface of the brine or washing-liquid during the process of washing the salt, and the salt and brine are carried from the upper
20 end of the ascending canals to the lower end of the succeeding canal simply by the gravity of the substance under treatment, and the several canals are all on the same plane. This arrangement has failed to perfectly accomplish
25 the desired result for the following reasons, viz: It is exceedingly difficult to distribute the blast over the surface of the substance under treatment and to direct the scum toward its required place of deposit, requiring numerous blast-pipes
30 arranged in various positions, and, notwithstanding a careful arrangement of said pipes, more or less of the scum will get out of the range of the blast and requires manual labor to sweep or draw it off, and after it is removed
35 from the vat it requires further attention to properly dispose of it. The gradual and gentle flow of the salt and brine from the head of one canal to the foot of the succeeding canal fails to agitate the salt sufficiently to wash it
40 thoroughly.

It is these defects which my invention is designed to overcome; and to that end my invention consists, first, in applying to the top of the tank a cover with an air-inlet at the top edge
45 of the tank and an exhaust-fan communicating with the space underneath the cover, by which arrangement the scum is drawn from all directions toward the exhaust-fan, which receives said scum and blows it to its required place of
50 deposit; and, second, in diminishing the angle

of inclination of the descending canals of the vat or tank and giving said canals an abrupt fall at their intersection with the foot of the ascending canals, and placing in the descending canals of reduced inclination, as aforesaid, 55 a spiral conveyer for propelling the substance under treatment, thereby thoroughly stirring said substance not only during its passage through the descending canals, but also in its entrance to the foot of the ascending canals. 60

In the annexed drawings, Figure 1 is a plan view of my improved salt-washing apparatus, with the cover removed to illustrate its internal arrangement. Fig. 2 is a transverse section on line *x x*, and Fig. 3 is a vertical section on 65 line *y y*.

Similar letters of reference indicate corresponding parts.

T represents a large tank, generally constructed of wood, and of rectangular form. The 70 bottom of this tank is formed into a series of ascending canals, B B, extending across the tank, and intervening descending canals B' B', communicating respectively with the upper end of one and the lower end of the succeeding 75 ascending canal, thereby producing a continuous zigzag or sinuous canal through the tank T, which canal terminates in a conveyer, B², arranged to carry away the washed salt. The angle of inclination of the descending canals is 80 less than that of the ascending canals, both being on the same level at their upper ends, and having a fall, *a*, from the foot of the descending canal B' to the foot of the ascending canal B. 85

In each of the canals B and B' is arranged longitudinally a spiral conveyer, C C', the conveyer of the ascending canal being geared to propel the contents of said canal to the summit thereof, and the conveyer of the descend- 90 ing canal being geared to convey toward the foot of the latter.

The salt to be washed is introduced in the vat by a chute, E, at the foot of the first ascending canal, and the water or washing-liquid is 95 admitted at the summit of the canals by conduits *e*. The rotation of the conveyers C C' carries the salt up the first ascending canal, thence down the succeeding descending canal to the foot of the next ascending canal, from 100

whence it is again taken up and down by the succeeding canals until it reaches the conveyer B², which removes it from the tank. Simultaneously with the aforesaid traverse of the salt, water or brine is admitted thereto by the conduits *c* in sufficient quantity to submerge the salt. The propulsion of the salt through the water by the conveyer C C' thoroughly agitates or stirs the salt, and thereby causes the same to become thoroughly washed by the time it reaches the conveyer B². The impurities which are washed out of the salt rise to the surface of the water or brine in the form of scum.

The described washing process being accelerated by the employment of the conveyer C' in the descending canal B', of reduced inclination, and by the abrupt fall *a* at the foot of said canal, which augments the agitation of the salt, as hereinbefore set forth, the scum and supernatant impurities pass from the vat, through an overflow, into a trough, R, running along the lower side of the tank. The top of the tank T and trough R is closed by a cover, D, which admits air along the top edge of the tank, preferably only at the side opposite the overflow which communicates with the trough R.

F represents an exhaust-fan, which is connected with either the trough R or the adjacent side of the tank, above or near the water-line thereof, and is arranged to draw therefrom the scum and supernatant impurities.

Heretofore the ascending and descending canals were made at the same angle of inclination and in the same plane, and the salt which was propelled up the ascending canal by a

spiral conveyer was allowed to be washed down the descending canal without the aid of a spiral conveyer. The consequence was, that the work of washing the salt could not be effectually accomplished without a greatly-enlarged tank and considerable loss of time and extra labor, which difficulties have not even been entirely obviated by the application of an air-blast over the surface of the washing-liquid, as has recently been attempted.

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

1. The improved salt-washing apparatus consisting of the washing-tank T, provided with the cover D and air-inlets at the top edge of the tank, and the exhaust-fan F, communicating with the space underneath the cover at or near the water-line of the tank, substantially as and for the purpose shown and set forth.

2. In combination with the ascending canals B B, the descending canals B' B', of a reduced angle of inclination, and having at their foot or lower end the abrupt fall *a*, and provided with the spiral conveyer C', substantially as described and shown, for the purpose set forth.

In testimony whereof I have hereunto signed my name and affixed my seal in the presence of two attesting witnesses, at Syracuse, in the county of Onondaga, in the State of New York, this 31st day of May, 1881.

JOSEPH M. DUNCAN. [L. S.]

Witnesses:

C. H. DUELL,

WM. C. RAYMOND.