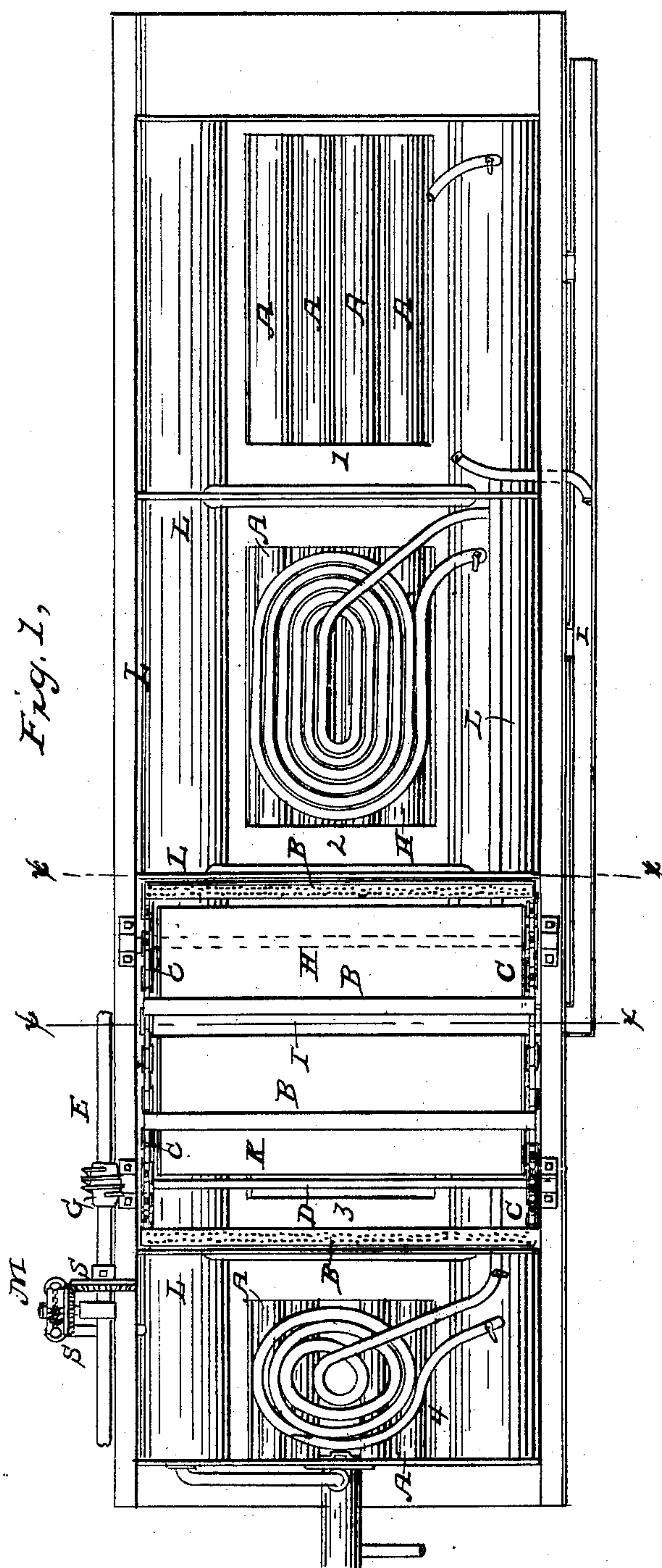


L. A. GOSSIN.

Making Sugar.

No. 11,782.

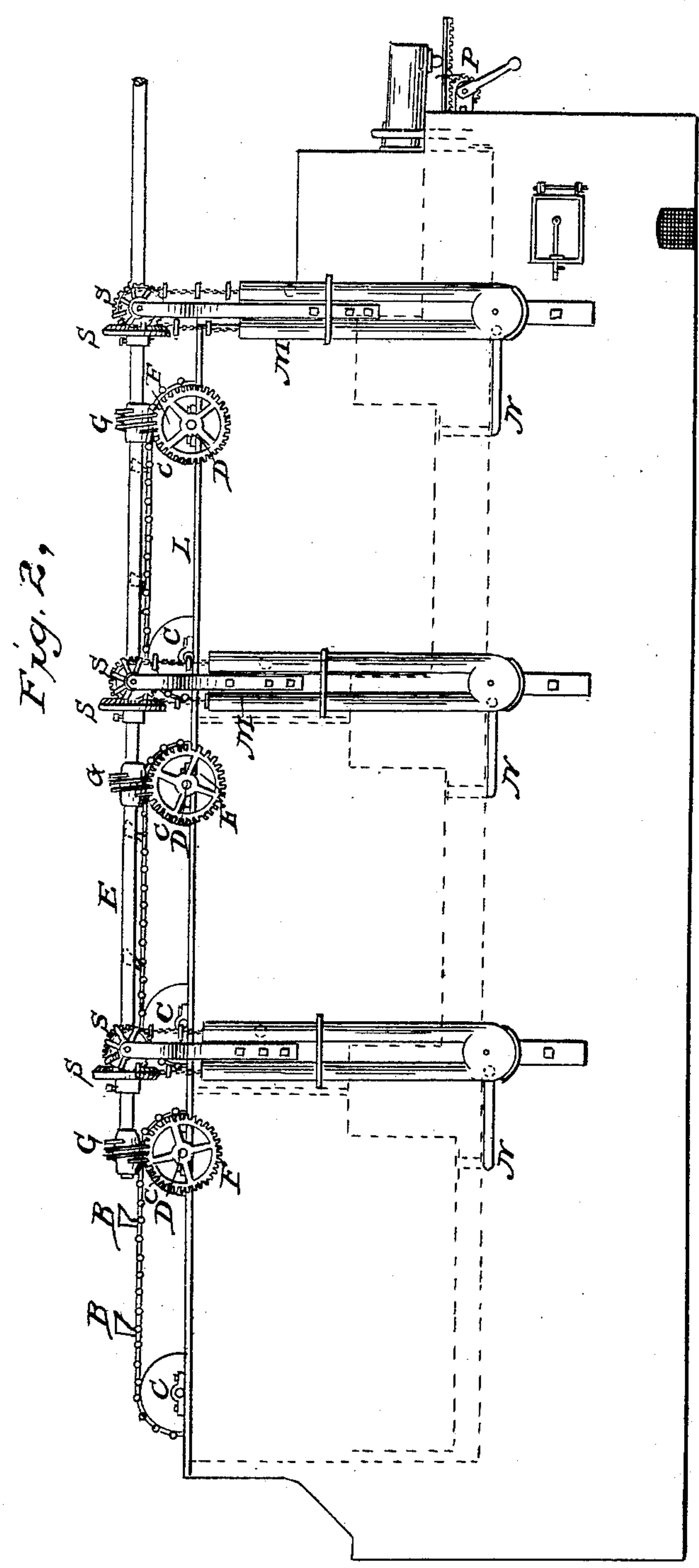
Patented Oct. 10, 1854.



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Making Sugar.

No. 11,782.

Patented Oct. 10, 1854.



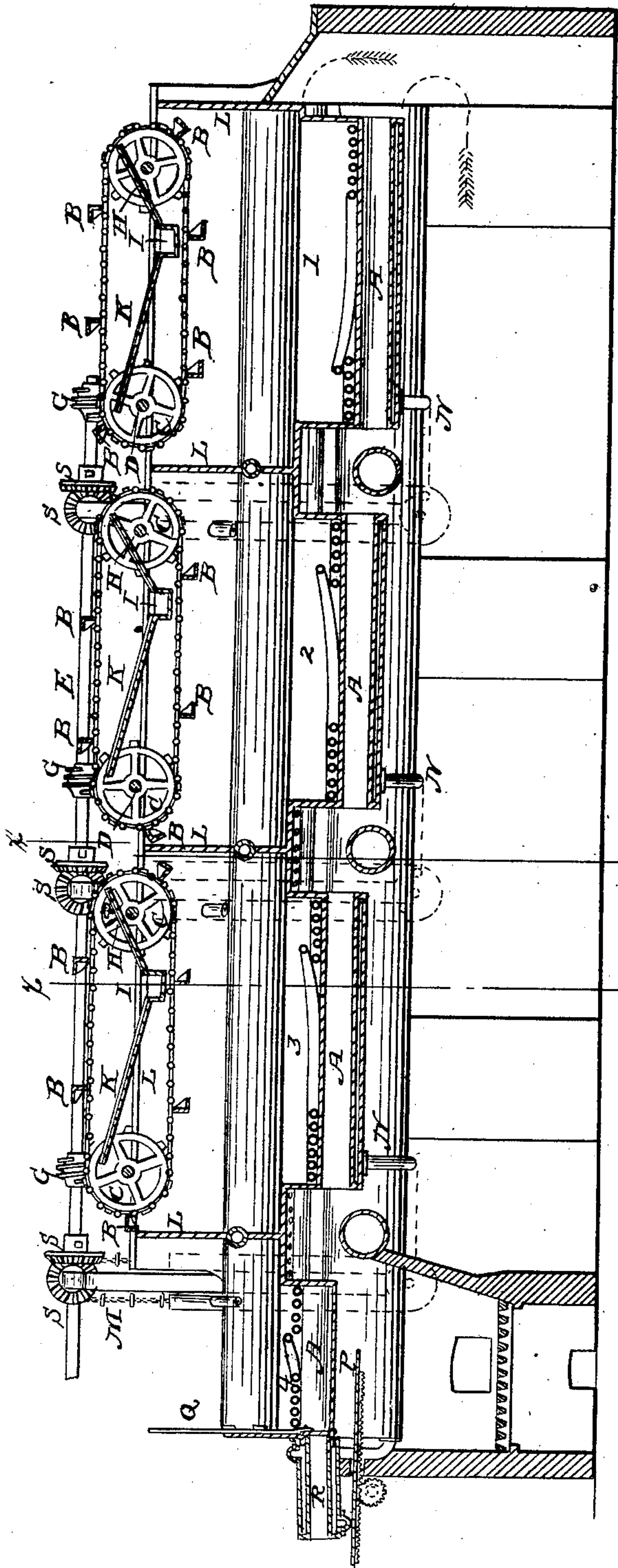
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Making Sugar.

No. 11,782.

Patented Oct. 10, 1854.

Fig. 3.

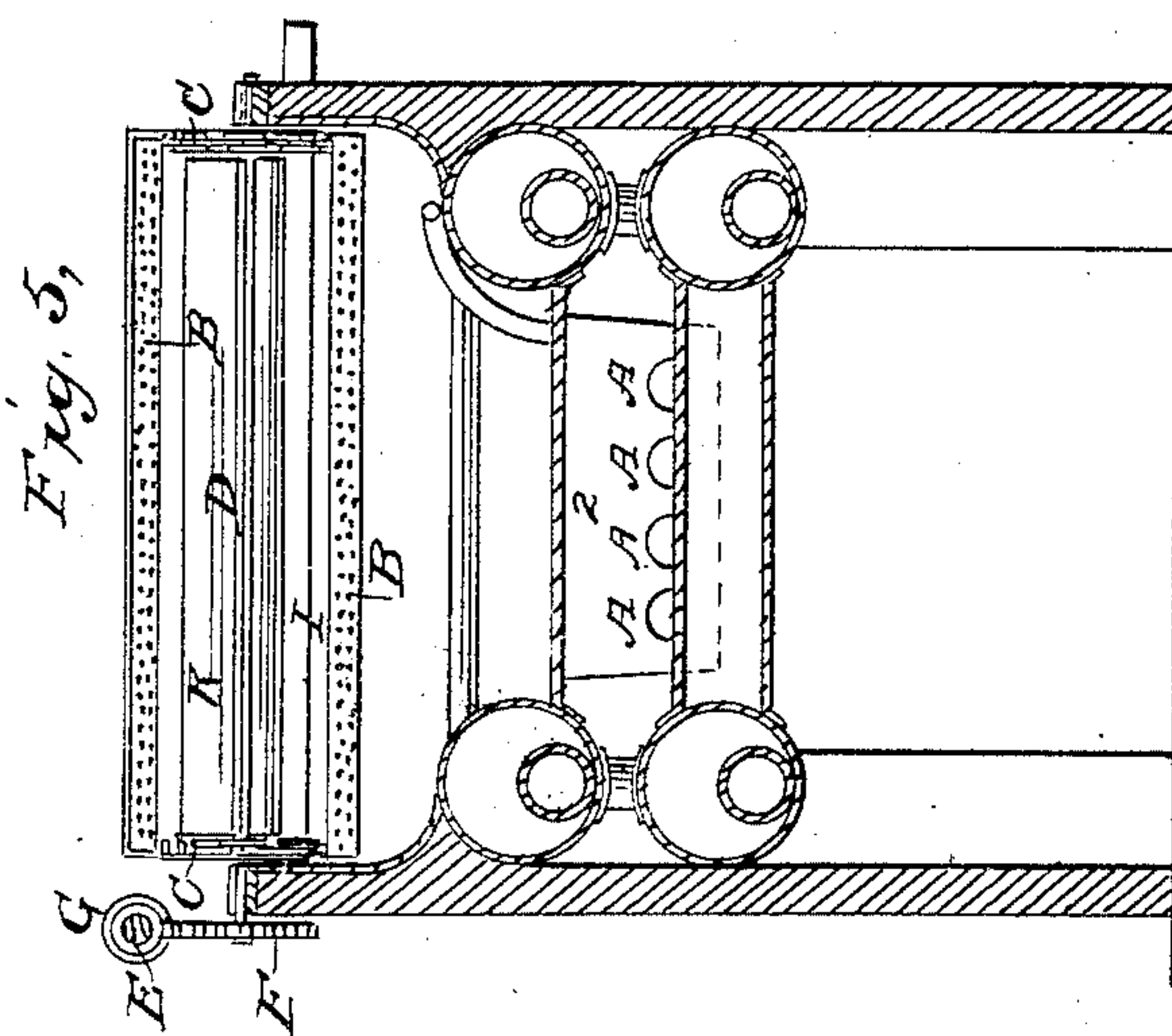
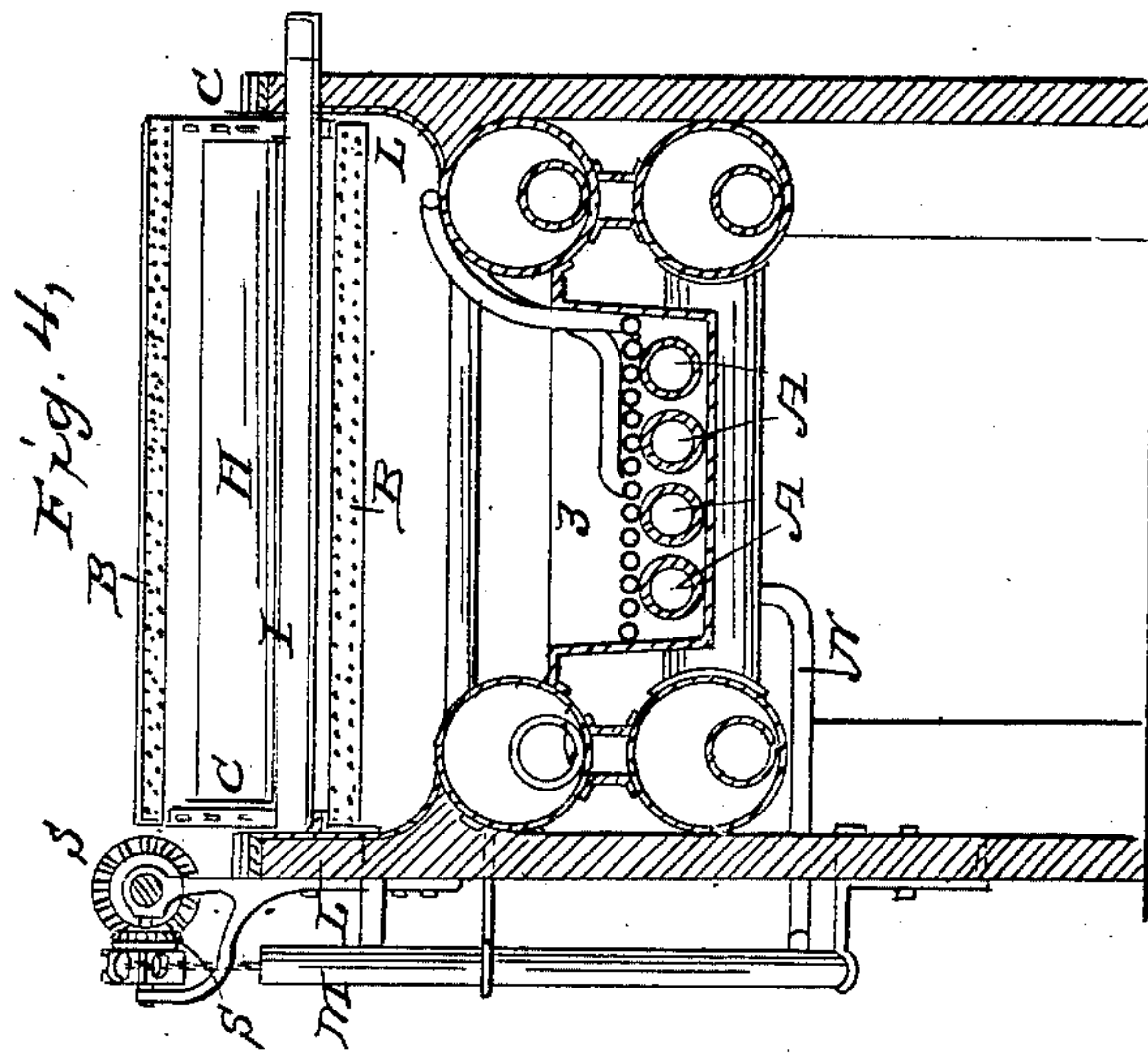


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Making Sugar.

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No. 11,782.

Patented Oct. 10, 1854.





# UNITED STATES PATENT OFFICE.

LOUIS A. GOSSIN, OF THIBODEAUX, LOUISIANA.

IMPROVEMENT IN THE CONSTRUCTION OF SUGAR-MAKING APPARATUS.

Specification forming part of Letters Patent No. 11,782, dated October 10, 1854.

*To all whom it may concern:*

Be it known that I, LOUIS ALEXANDER GOSSIN, of Thibodeaux, in the parish of Lafourche and State of Louisiana, have invented a new and useful Improvement in Apparatus for the Manufacture of Sugar, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, in which—

Figure 1 represents a top view of a machine embodying my improvements; Fig. 2, a side elevation showing the arrangement of the pumps; Fig. 3, a longitudinal section of the same; Fig. 4, a transverse section through the line *x x* of Fig. 1, and Fig. 5 a similar section through the line *z z* of Fig. 1.

The manufacture of brown sugar from the saccharine juice expressed from the cane comprises three principal operations—namely, defecation, evaporation, and concentration.

My invention consists of an improved apparatus for skimming and evaporating, and among the properties and advantages of this apparatus the following may be enumerated: First, it is cheaper than any heretofore constructed, and capable of evaporating an equal quantity of juice; second, it will at a single operation convert the cane-juice into brown sugar of the best quality; third, it is not only more speedy in its operation, but requires much less labor to attend it than the older apparatus; fourth, by the thorough automatic skimming which takes place the filtering of the juice is dispensed with, and yet the quality of the sugar is even better than that which has been filtered and evaporated by means of the older apparatus; fifth, by combining steam with open-fire heating of the evaporating-pans mineral coal may, with a great saving of expense, be used as fuel instead of wood, which has heretofore been deemed indispensable.

The apparatus, as represented in the drawings, consists of two pairs of cylindrical steam-boilers placed at a short distance apart with a series of evaporating-pans placed between them and extending their entire length. The furnace is placed beneath the pan at the front end of the boilers, and the flame and smoke after passing beneath the pans and boilers return through flues in the boilers to the front, where they pass off into the chimney. By this arrangement the same fire heats the boilers and the evaporating-pans, instead of having a separate fire for the steam-boilers according

to the usual plan in sugar apparatus. The steam-boilers are connected by vertical and horizontal pipes, so as to maintain a free circulation of steam and water between them. The horizontal connecting-pipes are placed at suitable intervals to admit the evaporating-pans between them. The pan immediately over the furnace where the heat is most intense is for the purpose of concentrating the sirup to the proper degree for crystallization after its water has been to a great extent driven off in the previous pans. As the juice is reduced in bulk during the process of evaporation it follows that the pan in which the evaporation begins should be larger than those which succeed, which receive the juice in a partially evaporated state and reduced in bulk.

In order that the pans may not be unnecessarily large and expensive, they are made to diminish gradually from the end of the series where the raw juice enters to the opposite end where the concentrated sirup is drawn off. The lower part of each pan is fitted with a series of horizontal flues, *A*, to increase the evaporating-surface. The bottom of each successive pan, counting from the furnace, is lower than that which precedes it, and the pan is of correspondingly-increased capacity, as the tops of all are upon the same level. The flues of each succeeding pan are also lower than those of the preceding pan, and these gradations in the level of the flues, it is obvious, will greatly facilitate the entrance of the flame into them. Each pan is fitted with a coil of pipe placed on the flues, in which steam is kept circulating, which has the effect of materially hastening the evaporation. The pipe of the coil in each pan communicates at one end with the steam-space in the boiler, and at the other end connects with an exhaust-pipe to conduct the waste steam into the atmosphere or into a condenser to utilize the heat or save the water.

Above each of the pans for evaporating the juice before it is reduced to the consistency of sirup an automatic skimmer is arranged, which consists of a series of perforated scoops, *B*, mounted on endless chains which encircle pulleys *C*. These skimmers are kept slowly revolving by gearing on the axle *D*, which carries one pair of the pulleys *C* to a driving-shaft, *E*, by means of a worm-wheel, *F*, on the axle *D*, which takes into and is driven by



an endless screw, G, on the shaft E. The scoops, while moving on the lower side of the pulleys, penetrate the froth produced by the ebullition of the sirup, and separate from it those impurities which always rise with the froth. When the scoops have ascended to near the top of the pulleys, they discharge the impurities which they contain upon an inclined apron, H, which conducts them to a trough, I, by which they are carried into some suitable receptacle. The sirup lifted with the scum drains out of the scoops through the numerous perforations made in them before the scum is discharged upon the apron H. In case the scum raised by the scoops should not all be discharged before they pass the trough, then what remains will be caught by a second apron, K, inclined to the trough from the opposite direction. In this way, when the impurities are once raised from the sirup they are not in danger of being again returned. The sirup is prevented from overflowing the sides of the pans when it foams by surrounding the same with a high rim, L. The raw sirup is introduced into the largest pan 1, and after it has remained there until concentrated, so as to require a considerably-increased degree of heat to make it boil, it is then, by means of an endless-chain pump, M, or other suitable means, withdrawn through a pipe, N, at the bottom of the pan, conducted through the pump M, and discharged into the next pan, 2.

The pump is of large size, that the transfer may be made quickly, in order to prevent the juice adhering to the sides of the pan from being burned before the latter can be refilled with fresh juice. In like manner the contents of the second pan, when they have reached the proper stage of concentration, are discharged into the third, and those of the third are discharged into the fourth or last pan, in which the juice is concentrated into sirup suitable for crystallizing. As the heat in the latter pan must be comparatively high in order to evaporate the water from the sirup, several precautions against burning the sirup are necessary. Thus, for example, when the charge is to be withdrawn a damper, P, is pushed into the furnace to shield the bottom of the pan from the intense heat of the fire. The gate Q is then raised and the concentrated sirup is suffered to flow through the pipe R into a suitable receptacle.

In order that the pipe R may not be heated so much as to discolor the sirup that adheres to its sides, the water for feeding the boiler is caused to run around this pipe on its passage to the boiler. The heat thus abstracted from the pipe is conducted by the water into the boiler, and is thus saved.

The chain-pumps are of the usual construction, and their form need not be particularly described. They derive motion from the shaft E, with which they are connected by bevel-wheels S. By this arrangement of pumps the only manual labor necessary in transferring

the juice from one pan to another is to open the cocks and put the pumps in gear with the driving machinery.

One of the bevel-wheels that communicates motion from the driving-shaft E to the pump should be arranged to slide upon the shaft on a feather, and fitted with a shifting-lever to move the wheels into gear when the pumps are to be worked, and out again when it is required to stop the pumps.

The steam for working the engine, which gives motion to the pumps and skimmers, is supplied by the same boilers which supply the coils of pipes within the pans.

In the manufacture of brown sugar, I do not propose to boil the juice *in vacuo*; but in refining sugar, which requires vacuum-pans to be used, I propose to cause the vapor of each pan to descend through a supplementary coil of pipe, circulating among the juice in the lower part of the pan, and after the vapor has imparted its surplus heat to the liquid to allow it to pass into a worm or through tubes in the next pan behind, and in case it still retains considerable heat I propose to pass it through still another coil of tube in a pan still farther back, and which is boiling at a still lower temperature. In this way much of the heat heretofore wasted will be utilized.

It is obvious that several of the devices I have described may be modified in structure and arrangement to adapt them to different situations or circumstances.

Having thus described my improved apparatus for evaporating cane-juice, what I claim therein as new, and desire to secure by Letters Patent, is—

1. The arrangement of the boilers for generating steam, the pans for evaporating the juice, and the furnace, as herein set forth, whereby a single furnace is made to supply the heat for both the generation of steam and the boiling of sugar through the contact of the naked flame with the bottom of the pans.

2. The combination of the skimmer herein described, consisting of a series of scoops, B, inclined aprons H and K, and conduit I, operating as herein described, with the evaporating-pan, substantially as specified.

3. I do not claim to be the inventor of a water-jacket, or of its application to any other purpose than the pipes of sugar-pans. All I do claim in reference to it is the combination, with the discharge-tube, of the sugar-sirup pan, of a jacket communicating at either side with and forming a part of the feed-pipe of the steam-boiler, whereby a stream of water is kept constantly flowing through the jacket to protect the sirup adhering to the sides of the pipe from being discolored by burning, as described.

In testimony whereof I have hereunto subscribed my name.

LOUIS A. GOSSIN.

Witnesses:

P. H. WATSON,  
PETER HANNAY.