(No Model.)

F. G. & A. C. SARGENT.

WOOL WASHING MACHINE.

No. 480,283. Patented Aug. 9, 1892.

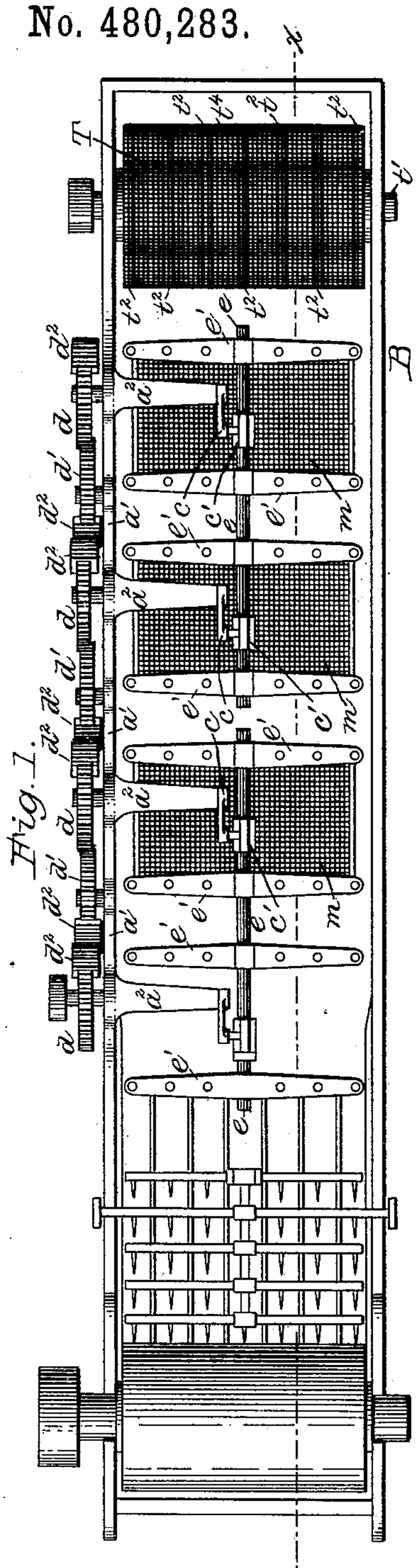

Fig. 1.

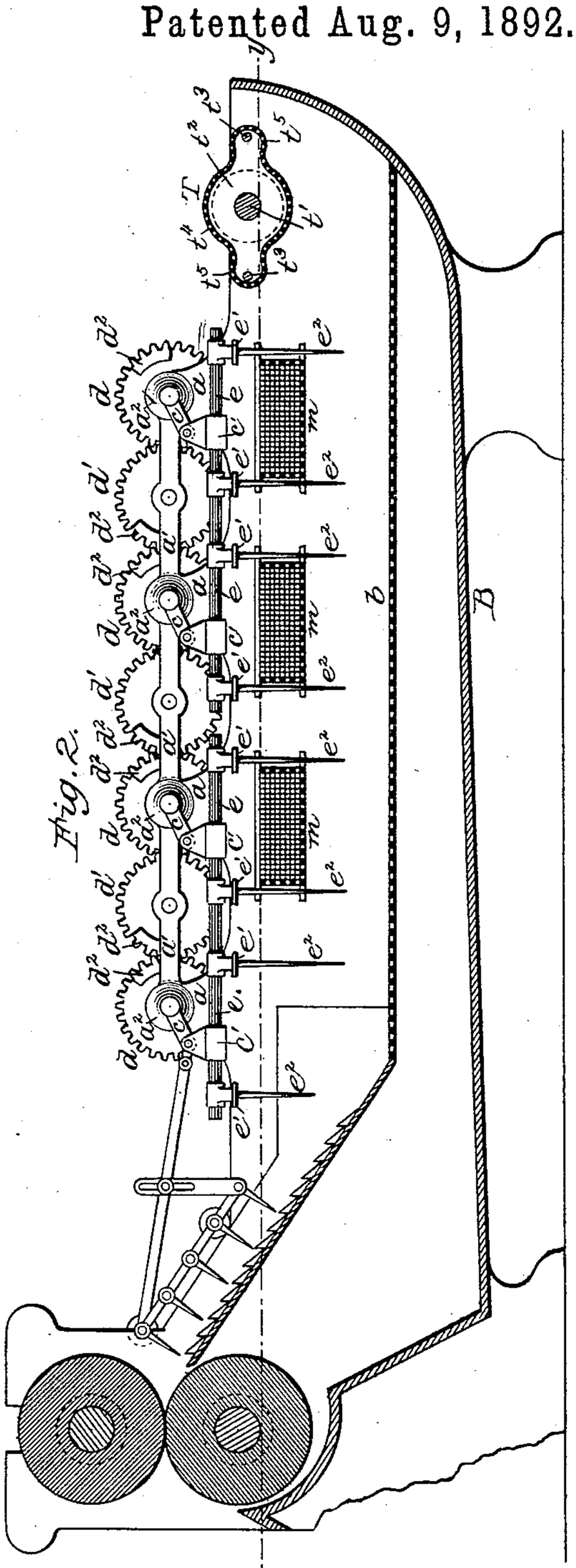

Fig. 2.

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UNITED STATES PATENT OFFICE

FREDERICK G. SARGENT AND ALLAN C. SARGENT, OF GRANITEVILLE, MASSACHUSETTS.

WOOL-WASHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 480,283, dated August 9, 1892.

Application filed January 17, 1887. Serial No. 224,647. (No model.)

To all whom it may concern:

Be it known that we, FREDERICK G. SARGENT and ALLAN C. SARGENT, of Graniteville, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Wool-Washing Machines, of which the following is a specification.

Our improvement relates to machines for washing wool and similar fibers; and it consists in certain new and useful constructions and combinations of the several parts of the same, substantially as hereinafter described and claimed.

In the drawings, Figure 1 is a top plan view of a wool-washing machine constructed with our improvements. Fig. 2 is a section of the same on the dotted line $x\ x$ of Fig. 1.

B is the bowl of the machine, which is constructed in the usual manner with a perforated platform b above the bottom of the bowl to allow the impurities washed from the wool to drop through the same and be deposited beneath it.

T is the tumbler which carries the wool into the machine and downward beneath the level of the washing fluid, which is indicated by the dotted line Y Y on Fig. 2. Heretofore this fluted tumbler has been constructed of a solid substance impervious to the fluid, similar to a solid feeding-roller, except that it was fluted on two sides, with flutes or projections in the form shown in outline in Fig. 2. It therefore performed merely the function of carrying the wool by its flutings or projections into the liquid to soak it before reaching the forks. We construct it of a shaft t', on which is placed a series of heads t^2, two at each end and others along the shaft at suitable intervals between them, having the same shape on their edges as the outline or surface of the completed tumbler in cross-section. Rods $t^3\ t^3$ may be passed through the outermost edges of these heads from end to end of the tumbler to give them greater stability. Upon these heads is stretched the wire screen t^4, so as to form an outer perforated fluted surface or coating for the tumbler which will allow the fluid to pass or rush through the projecting parts of the same as these projecting parts of it traverse through the washing fluid, thereby creating currents of the fluid through them against the wool which is in contact with the flutings of the tumbler and washing its impurities through the latter and into the tumbler, thereby performing a cleansing operation upon the wool greatly superior to any accomplished with a solid tumbler. Each of the flutings t^5 of the tumbler as it passes through the fluid also has the fluid flowing continuously through it as it passes around through the latter in a direction to come more efficiently in contact with the wool, which is pushed forward ahead of the other fluting as it follows around after the first one instead of the first one pushing aside the fluid and preventing its coming directly against this wool from that quarter, as it would if the flutings were impervious to the fluid. The wire screen surface entirely surrounds the tumbler in the contour in cross-section shown in Fig. 2. The perforations through the flutings of the tumbler also assist in preventing the fiber from slipping off of the rounded surfaces of these flutings as they carry it down into the washing fluid.

Another advantage of having the flutings of the tumbler perforated and connected by spaces within the tumbler reaching across from one side to the other is that the tumbler in its revolution does not have to lift any surplus fluid which may be inside of it in order to discharge the same through the openings at which it entered, thereby continually throwing the tumbler out of balance and requiring a much greater amount of power to drive the machine. The flutings of the tumbler as they advance through the fluid raise and compress the latter ahead of them, which causes it to flow into and through the perforations on that side of the fluting. The same movement relieves and reduces the pressure of the fluid on the rear faces of the flutings, providing a way of easy escape for the fluid which has been forced in at the other side and relieving the tumbler from the lifting of the excess of fluid in it as it rotates. This effect could not occur unless the flutings were perforated on both sides where they project beyond the main body of the tumbler nor unless an unobstructed flow of fluid were allowed from one side to the other within the tumbler.

Upon one side of the bowl of the machine is fixed a series of brackets a a, which are tied together by horizontal bars a'. Each of the brackets a supports a tubular sleeve a^2, extending horizontally and transversely over the bowl to about its central portion.

In each of the sleeves a^2 is fitted a horizontal shaft carrying the crank c upon its inner end over the center of the bowl and the gear-wheel d at its opposite end outside of the bowl. The crank-pin of each crank c is fitted to turn in a projecting part of the sleeve c', and through this sleeve passes the rod or bar e, which carries the rake-heads e', the bar e being rigidly secured in the sleeve c'. One bar e is used for each pair of cranks c c, thus allowing the lengths of the crank of each pair to be varied and such movement to be given to the rake-heads and their downwardly-projecting teeth as may be deemed desirable. The rake-teeth e^2 project downwardly from the rake-heads, being firmly secured at their upper ends, as shown.

In order to employ as small an amount of power as possible in moving the rake-teeth and to prevent jerking and twisting upon the working parts, we place all the cranks c c, which sustain and carry throughout their revolution the entire weight of the rakes and intermediate parts connecting the same with the cranks, in the same direction, substantially, on both rake-heads, and we interpose between the gears d d connecting-gears d' d' and provide all of the gears d and d' with weighted portions d^2 in such position as to counterbalance the weight of the cranks and their attached parts throughout the entire chain of gears. The intermediate gears d' are mounted upon horizontal studs fixed in the bars a', projecting outward therefrom the proper distance. By thus having an entire chain of gears d and d', the latter being intermediate and connecting the former together, weighted, as described, on the side which will counterbalance the cranks, we obtain an advantage by bringing the strain of the counter-weights in operating against the cranks and their load upon a larger number of bearing studs or shafts than if the counter-weighting was entirely upon one or more of the gear-wheels d, because the strain of part of the counter-weighting falls upon the studs upon which the intermediate gears d' are mounted, and we are also enabled to make smaller gears d, because to render the weighting of one or both of these which carry a fork practically efficient without using excessive weighting of the gears the latter must be made of quite large diameter to counterbalance the forks, which is avoided by the weighting of the chain of gears, including the intermediate ones, as described, thus rendering the machine more accessible and less liable to get out of order.

Besides the above advantages the employment of the chain of driving-gears, with every other one attached to the crank-shafts, and these, as well as the intermediate ones, weighted, enables us to make all the gears small enough to place them outside of one side of the bowl, and reach and look over them conveniently to attend to the machinery, clean out the bowl, or to inspect and test the washing operation going on in the bowl, while if only the gears attached to the crank-shaft were weighted they would have to be made much larger to give the necessary counterbalancing effect to the cranks and their loads with the same degree of weighting, which would seriously interfere with the necessary attention to the machine from that side of the bowl. It will be observed that in order to obtain these effects we are obliged to arrange the weighting upon the intermediate gears in a particular and novel location with relation to the weighting and cranks on the crank-shafts. That is owing to the fact that the intermediate gears run in the opposite direction from those on the crank-shafts and they must be weighted on the opposite side of their axes from the latter to balance the cranks and their loads in the same direction at all parts of the revolution of the gear-wheels.

Another advantage of arranging and weighting the gears on the side of the bowl in this manner is that the operator is enabled to reach over the weighted gears and have access to the bowl from that side, which would not be feasible if only a portion of the gears were weighted, as the gears would be so large as to materially interfere with access to the bowl, or if any other than our special arrangement of weighting were to be used.

Between and to the rake-teeth e^2 e^2 nearest to the feed-in end of the machine we attach woven-wire baskets m, having flat perforated bottoms and ends and sides, the upper edges of which reach above the level of the washing fluid at all times, even when the other parts of the basket are submerged. These baskets are so attached as to leave the lower ends of the rake-teeth projecting for some distance below them, but also so that their bottoms will be submerged to some distance in the washing fluid when the rake-teeth descend into it. These baskets therefore serve to press the wool which is caught between the rake-teeth down into the liquid, thereby thoroughly submerging and soaking it, while causing currents of the liquid to flow upward through the fiber and through their bottoms as the baskets descend, thus more effectively cleansing the fiber. The sides and ends of the woven-wire baskets m prevent the wool from getting upon the upper side of their bottom portions and loading the same, thereby greatly increasing the amount of power required to drive the machine, while at the same time they permit the washing fluid to pass so freely through them as to cause very little obstruction to the passage of the rakes through the fluid. The projecting parts of the rake-teeth below the perforated basket m serve to carry forward the wool toward the

squeeze-rolls and carrier end of the machine, while the baskets are acting to submerge and cleanse it. It will be seen that this arrangement of the parts creates more rapid and effective currents through the fiber than would be caused by the arrangement of rake-teeth alone while carrying it forward through the bowl, substantially as heretofore. Either one or two of these baskets may be employed, with intervals between them; but the side of the basket in advance when moving through the washing fluid also materially assists in cleansing the wool pushed ahead of it by creating currents through the fiber and this side of the basket.

What we claim as new and of our invention is—

1. The combination, with the bowl B, of the tumbler T, formed with longitudinal flutings t^5 t^5, such flutings being perforated and provided with cavities extending across through the body of the flutings from one fluting to another, whereby the fluid may flow through the same from one side to the other, substantially as described.

2. In combination with two rake-heads e', provided with teeth e^2, projecting downward into the liquid, the perforated basket m, connected thereto and passing below the surface of the washing fluid therewith at each movement of the rake-head, substantially as described.

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Witnesses:
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