No. 813,022. PATENTED FEB. 20, 1906.

A. L. J. QUENEAU.

CHARGING MACHINE.

APPLICATION FILED JAN. 16, 1905.

2 SHEETS—SHEET 1.

Fig. 1.

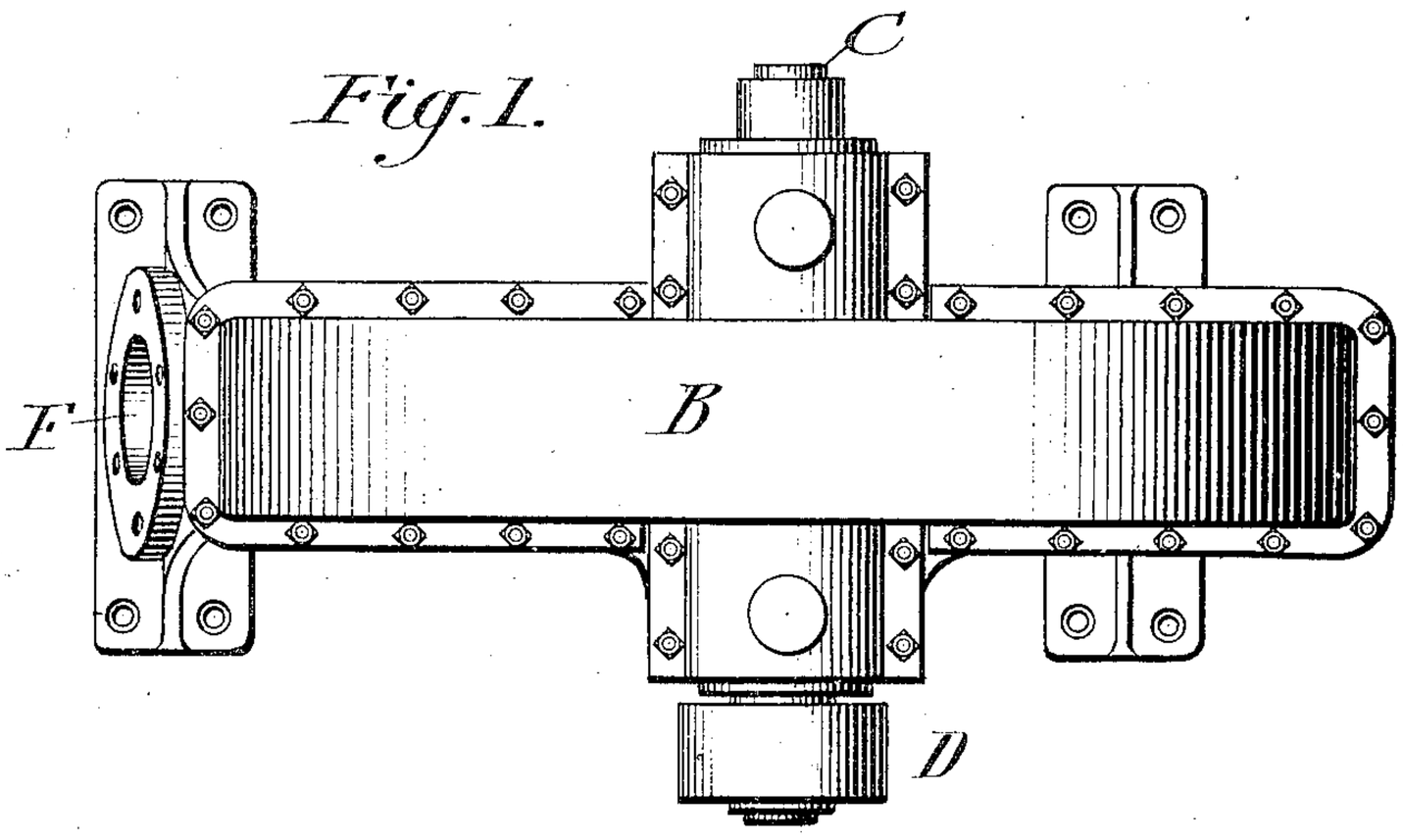
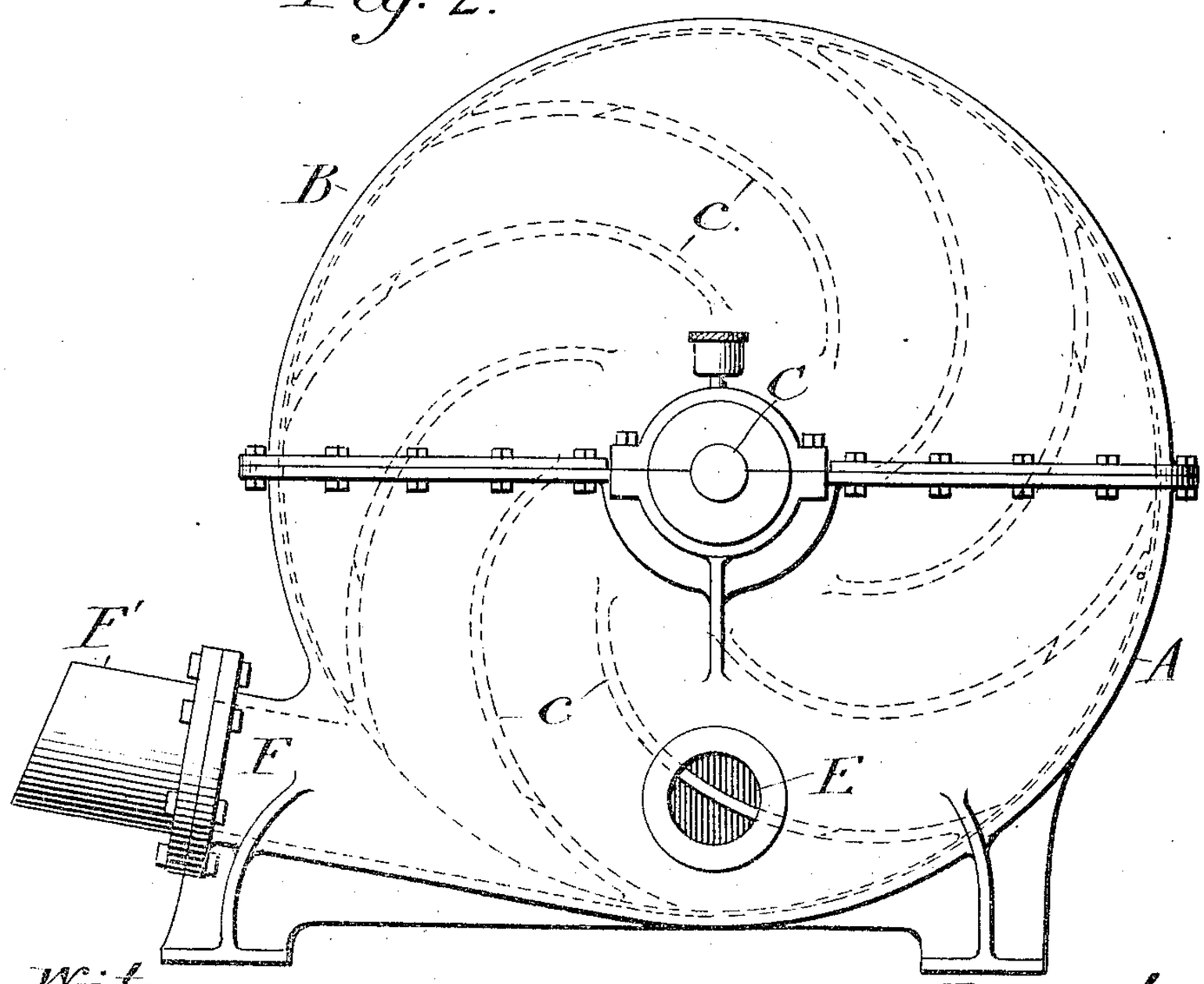



Fig. 2.

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2 SHEETS—SHEET 2.

Fig. 4.

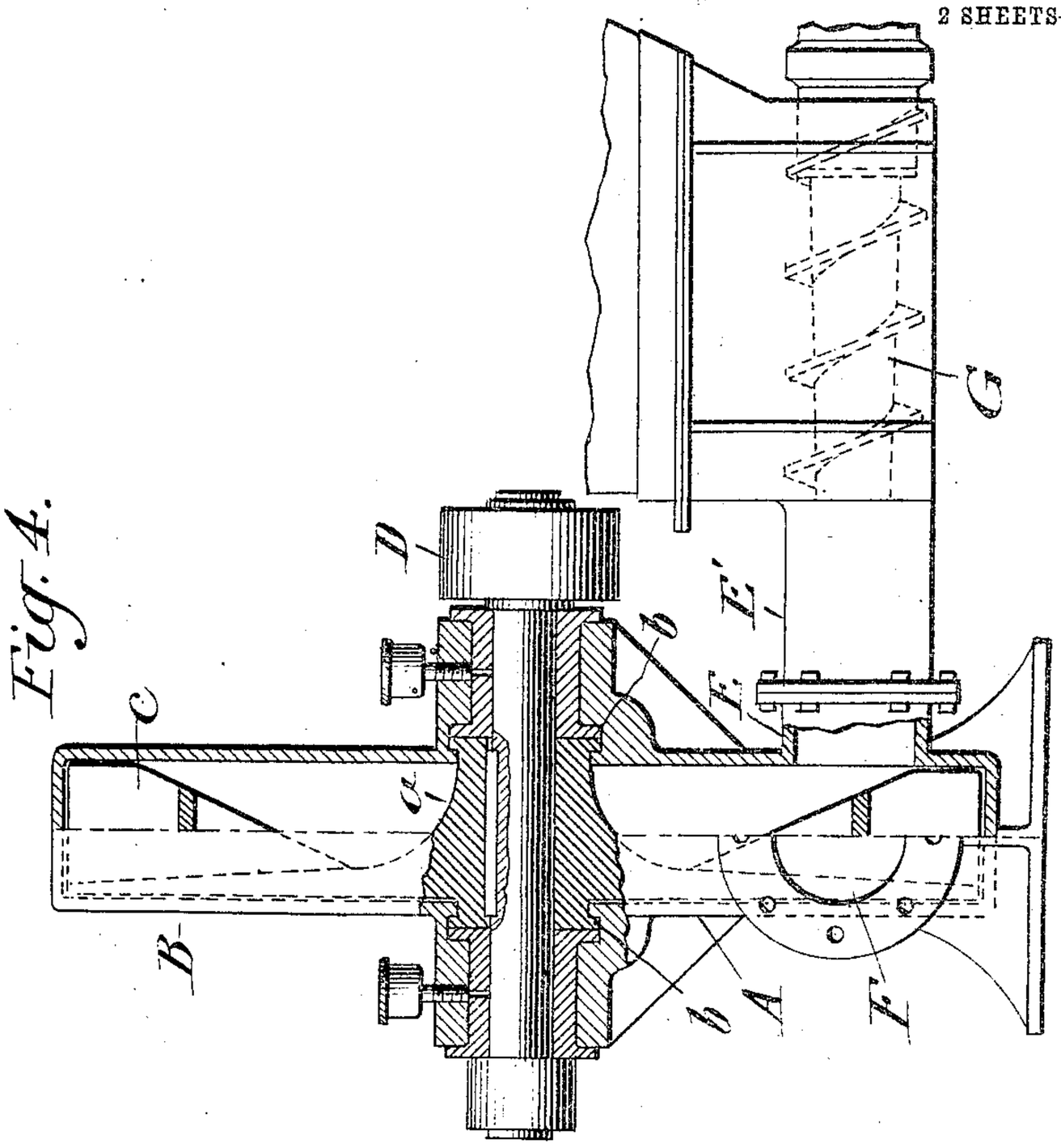
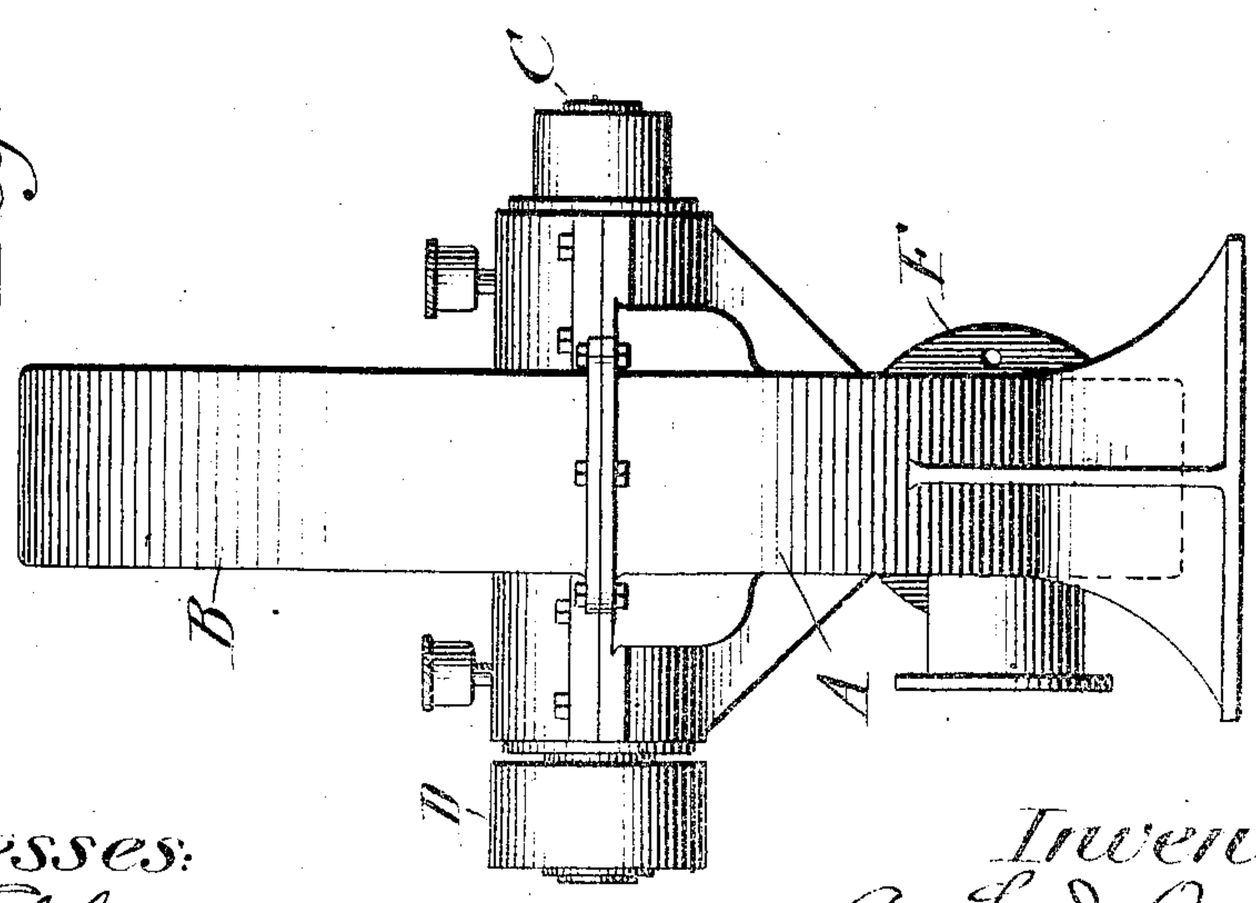



Fig. 3.

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# UNITED STATES PATENT OFFICE.

AUGUSTIN L. J. QUENEAU, OF SOUTH BETHLEHEM, PENNSYLVANIA.

## CHARGING-MACHINE.

No. 813,022. Specification of Letters Patent. Patented Feb. 20, 1906.

Application filed January 16, 1905. Serial No. 241,273.

*To all whom it may concern:*

Be it known that I, AUGUSTIN L. J. QUENEAU, a citizen of the Republic of France, residing at South Bethlehem, county of Northampton, State of Pennsylvania, have invented certain new and useful Improvements in Charging-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to certain new and useful improvements in charging-machines, which improvements are especially applicable to the metallurgy of spelter, but which have also a more general application in the arts—as, for instance, for charging retorts or muffles used for other purposes than the metallurgy of spelter, to the firing of boilers by means of coal-dust, and to the injection of pulverized fuel into rotary cement-furnaces and the like.

The fundamental principle of construction involved in my invention consists in providing means for impelling a practically solid and homogeneous stream of the material to be charged through the outlet-spout of the charging-machine into the retort, muffle, furnace, or the like to be supplied therewith. In practice, I realize this purpose in the preferred form of my invention, by feeding the material from a supply-hopper and by means of a feed-screw into a casing within which revolves a disk having a series of blades, which blades immediately impart to the material admitted an impact-blow sufficient to give it a very considerable momentum and force it through a directing outlet-spout in a substantially cylindrical stream, which retains its shape and form without material deviation for a distance varying from three to ten feet and more, according to the velocity of movement of the impact-blades. I am thus enabled to direct this practically solid and homogeneous stream with great accuracy into retorts, muffles, and the like of small cross-sectional area or into charging-openings of such relatively small area as to ordinarily require the service of highly-skilled operators to properly supply them with the material.

In the accompanying drawings, Figs. 1, 2, and 3 represent, respectively, a top plan view, side elevation, and rear elevation, of a charging-machine embodying my improvements. Fig. 4 represents a front elevation, partly in section.

Referring to the drawings, it will be noted that, as shown, the casing of the machine is made up of a base-casting A and a top casting B, said castings being provided with projecting flanges for bolting them together. Between the two castings is journaled the shaft C, adapted to be revolved by the drive-pulley D and provided with suitable brasses and lubricating devices.

Upon the shaft C is keyed the impeller-disk, consisting, preferably, of a single casting having a hub portion *a* with end flanges *b*, a flat main body portion constituting a circular plate of a diameter corresponding to the internal diameter of the casing, and a series of blades *c* of a curvature indicated in Fig. 2. At their outer ends these blades *c* are of a width corresponding to the width of the casing and then continue of this width to a radial distance corresponding to the lower portion of the feed-inlet E, from which point they decrease in width until they merge into the surface of the disk. It will be apparent, therefore, that any material forced into the casing through the inlet-opening E will receive the full impact-blow of the extreme outer portion of the blade approaching at that particular instant, and dropping in front of the widest and outermost portion of the blade and at right angles thereto will have imparted to it a momentum equivalent to that due to a sharp blow, in consequence whereof the material receiving such impact-blow will be driven out tangentially through the upwardly-inclined outlet-spout F and its auxiliary pipe-section F′.

In practice the material supplied to the charging-machine will be fed from a suitable hopper into the inlet-opening E by means of a feed-screw G delivering into a pipe E′, bolted to the inlet-pipe E, so that the charging-machine will be thus supplied with a forced feed which may be so regulated as to correspond exactly to the conditions of use, and particularly to the speed of revolution desired.

When the material admitted is a mixture of zinciferous material previously mixed with the quantity of pulverized coal necessary for its reduction in the spelter-muffles, the apparatus not only fully performs its charging function, but also serves to effect a

more thorough mixing of the charge during its travel through the machine, the more friable coal being further broken up and the coal particles being brought into more intimate association with the particles of the zinciferous material, thereby coating them quite thoroughly. I regard this function of the apparatus as of particular importance in the metallurgy of spelter and in the metallurgy of similar retort charges for the reason that the usual hand-mixing need not be conducted with as much thoroughness as has heretofore been deemed necessary, and because the mixture, due to the action of the machine, is much more intimate and uniform than can be usually expected from hand operations.

The speed of revolution of the impeller-disk and the speed of revolution of the conveyer-screw are so adjusted with respect to each other as to furnish a resultant stream of material corresponding to the particular requirements of use. In practice I have been enabled to produce a stream of material which, shot through the outlet, travels in a straight path without any material spreading for a distance varying from three to ten feet and more, this charge moving in a practically solid homogeneous column of generally cylindrical form, so that it can be directed into a retort or muffle opening of a correspondingly small diameter.

So far as I am aware it is broadly new to feed retorts, muffles, and the like with a solid stream of the charging material thus continuously and homogeneously projected from a constant source of supply by an impelling-disk or its equivalent, and I desire, therefore, that my broad claims shall have a correspondingly generic interpretation. A device of this character has the great advantage of operating with exact uniformity at all times of the day and night and at all seasons of the year, whereas it is found in practice that the care and attention which the skilled operator gives to hand-charging almost inevitably flags toward the end of the shift, and especially in the late hours of the night, and that his capacity for maintaining his efficiency varies greatly with the seasons and with particular atmospheric conditions. It results frequently that in the ordinary hand-charging procedure numbers of the retorts show that their charges have been fully worked out several hours before their proper time, while others indicate various approximations toward complete exhaustion of their charges. This uneven work, which in the metallurgy of spelter is due to the very trying conditions under which the hand-charging is practiced and the consequent varying energy of such hand-charging, results in a serious diminution in the output of a furnace having a given number of retorts or muffles and a corresponding loss to the operators of the plant. These deficiencies are fully compensated by the use of my invention, which substitutes for irregular, uneven, and varying work a charging operation which is absolutely uniform and unvarying under all conditions of use.

The function of the pipe-section F′ (see Fig. 2) is to give form and direction to the issuing stream of charging material, and in this regard the pipe-section F′ acts in a measure like the barrel of a gun to insure against scattering of the projected particles. In some instances I may, if desired, substitute for the single pipe-section F′ a forked pipe-section, so as to simultaneously charge two or more vessels at one and the same time. It will also be understood that the mechanism for operating the screw conveyer may be automatically regulated, so as to bring the conveyer to rest at predetermined intervals, corresponding to the charge required for any particular retort or muffle.

It will be noted that the feed-screw G (see Fig. 4) terminates, as indicated in dotted lines in said figure, well in advance of the discharge-mouth of the inlet into the casing, thereby leaving an intervening portion of the inlet, which portion is constantly filled with the material to be fed into the casing, whether the feed-screw is in operation or not. This is a feature of very considerable importance in the practical carrying out of the invention, for the reason that the casing is thus sealed at all times against the admission of air with the material to be charged. Consequently the stream of material issuing from the casing through the tangential discharge-spout is substantially solid and maintains this formation without spreading on its way into the retorts. I am thus enabled to project into the retorts a continuous and homogeneous stream of the charging material of almost the cross-sectional area of the retorts themselves, and therefore to pack the retorts full from their extreme inner ends to their outer mouths. If any substantial body of air were present in the projected stream, such air would tend to expand immediately upon leaving the discharge-spout and would correspondingly scatter the material on the way to the retorts, and, furthermore, the effort of a stream containing any substantial body of air to enter a retort of diameter but little larger than the stream would be opposed by the air already in the retort to such a degree as to prevent successful charging where the material is in a comminuted condition. Where, as in my machine, the stream of material projected into the retort is substantially deprived of air by reason of the sealing of the inlet, the air within the retort is found to oppose no substantial resistance to the entrance of the material, and the charging operation proceeds with corresponding accuracy and completeness.

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

1. A charging-machine, comprising an inclosing casing, a rotary shaft, a series of impact-blades, an inlet for feeding the material to be charged into the path of movement of the outer ends of the blades, feeding mechanism arranged in the inlet and terminating in advance of its discharge-mouth, thereby serving as a seal against the admission of air with the charging material, and a tangential outlet; substantially as described.

2. A charging-machine, comprising an inclosing casing, a rotary shaft, a series of impact-blades, a tangential outlet, and an inlet adjacent to the outer ends of the blades, said inlet entering the side of the casing transversely to the plane of revolution of the blades and immediately in advance of the outlet; substantially as described.

3. A charging-machine, comprising an inclosing casing, a rotary shaft, a series of impact-blades, an inlet entering the side of the casing transversely to the path of movement of the blades, and a tangential outlet, said tangential outlet having a tubular continuation forming a directing-spout; substantially as described.

4. A charging-machine, comprising an inclosing casing, a rotary shaft, an impeller-disk provided on its face with a series of impact-blades, an inlet entering the side of the casing transversely to the path of movement of the blades, and a tangential outlet; substantially as described.

5. A charging-machine, comprising an inclosing casing, a rotary shaft, a series of impact-blades, an inlet for feeding the material to be charged into the path of movement of the outer ends of the blades, a tangential outlet, and a forced feed for the inlet, said forced feed terminating in advance of the discharge-mouth of the inlet, thereby leaving an intervening portion which serves as a seal against the admission of air with the charging material; substantially as described.

6. A charging-machine, comprising an inclosing casing, a rotary shaft, a series of impact-blades whose outer ends are curved in the form of involutes, an inlet for feeding the material to be charged into the path of movement of said outer ends, and a tangential outlet; substantially as described.

7. A charging-machine, comprising an inclosing casing, a rotary shaft, an impeller-disk provided on its face with a series of curved blades of substantially the width of the casing at their outer ends and decreasing in width inwardly, an inlet adjacent to the outer ends of the blades, and a tangential outlet; substantially as described.

8. A charging-machine, comprising an inclosing casing, a rotary shaft, an impeller-disk provided on its face with a series of curved blades of substantially the width of the casing at their outer ends and decreasing in width inwardly, an inlet adjacent to the outer ends of the blades, a forced feed for said inlet, and a tangential outlet; substantially as described.

9. A charging-machine, comprising an inclosing casing, a rotary shaft, an impeller-disk provided on its face with a series of curved blades of substantially the width of the casing at their outer ends and decreasing in width inwardly, an inlet adjacent to the outer ends of the blades, a forced feed for said inlet, and a tangential outlet, said tangential outlet having a continuation forming a direction-spout; substantially as described.

10. A charging-machine, comprising an inclosing casing, a rotary shaft, a series of impact-blades, an inlet for feeding the material through the side of the casing into the path of movement of the outer ends of the blades, and a feed conveyer separated from the discharge-mouth of the inlet by an intervening sealing-space; substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

AUGUSTIN L. J. QUENEAU.

Witnesses:
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S. P. WETHERILL, Jr.