No. 736,875. PATENTED AUG. 18, 1903.

J. RAGOT & H. TOURNEUR.

MIXING APPARATUS FOR SUGAR.

APPLICATION FILED JAN. 20, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 5

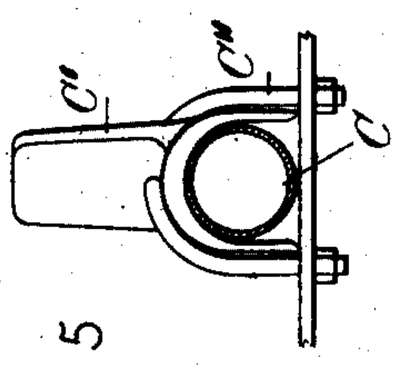

Fig. 1

WITNESSES

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 2

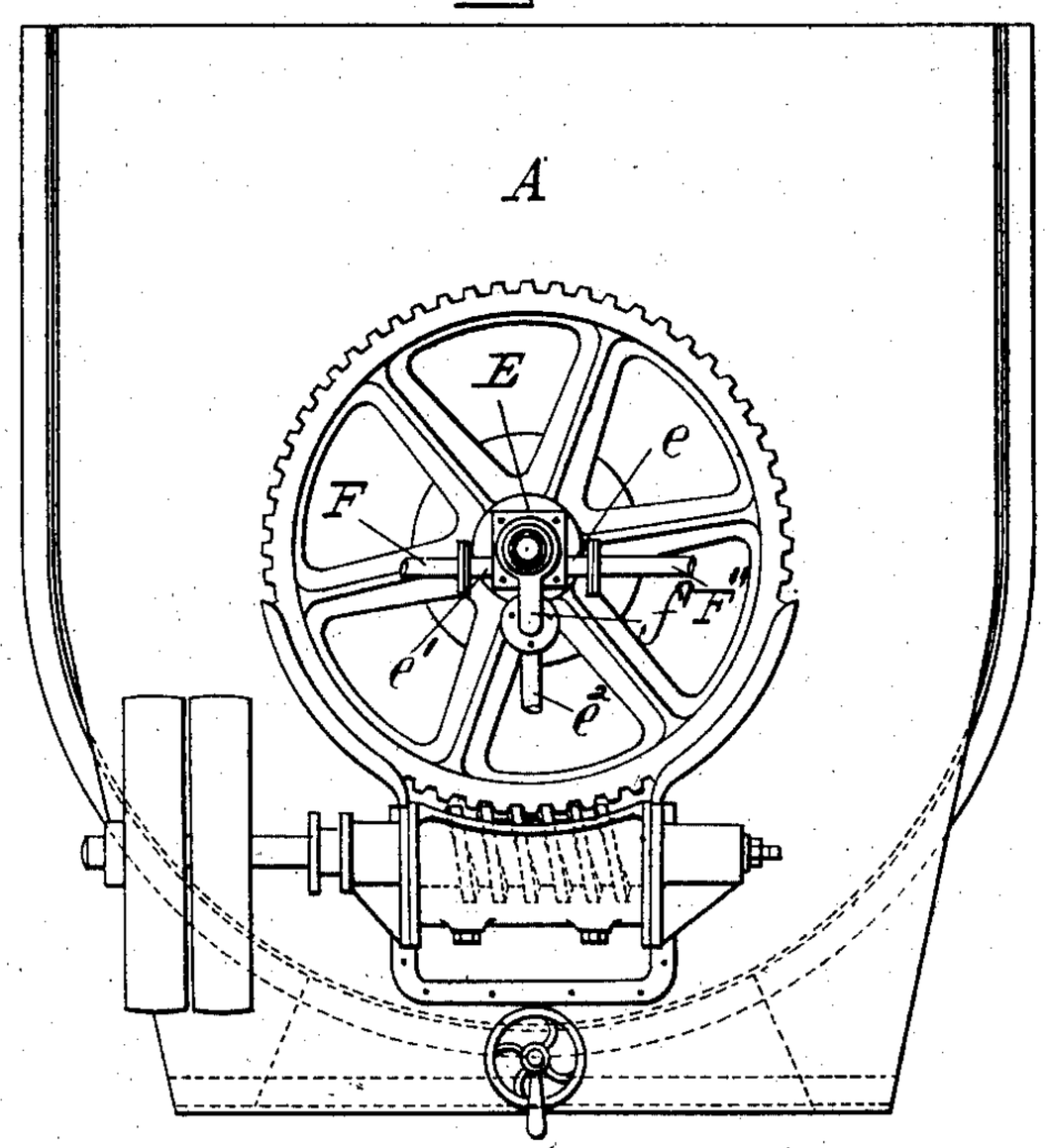


Fig. 3

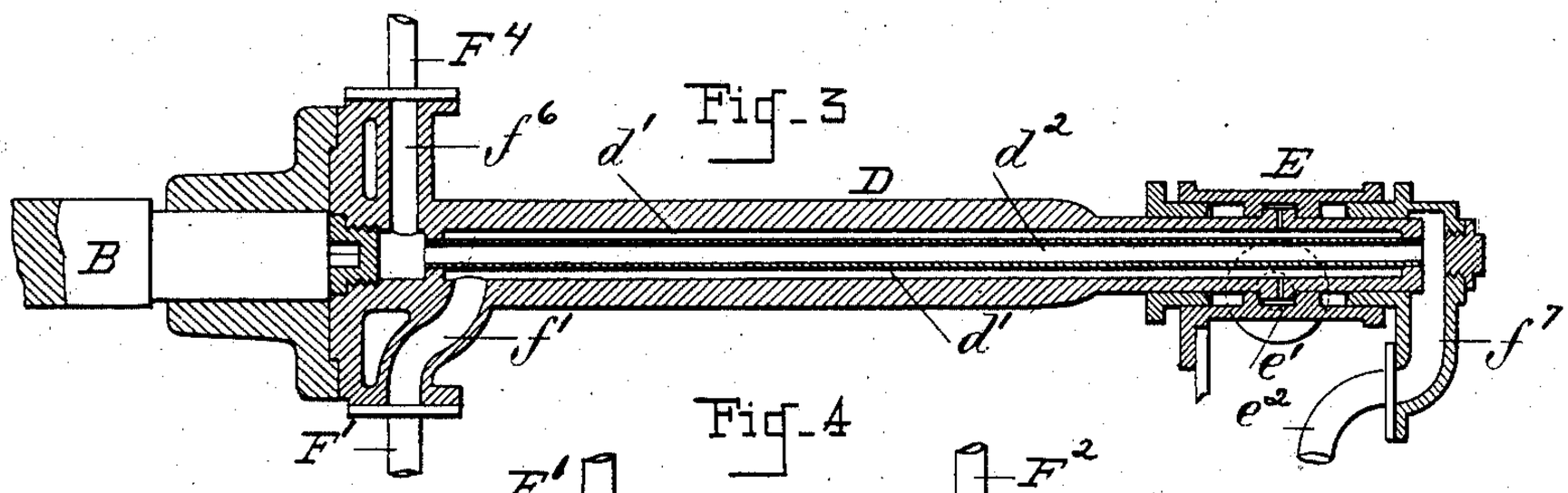
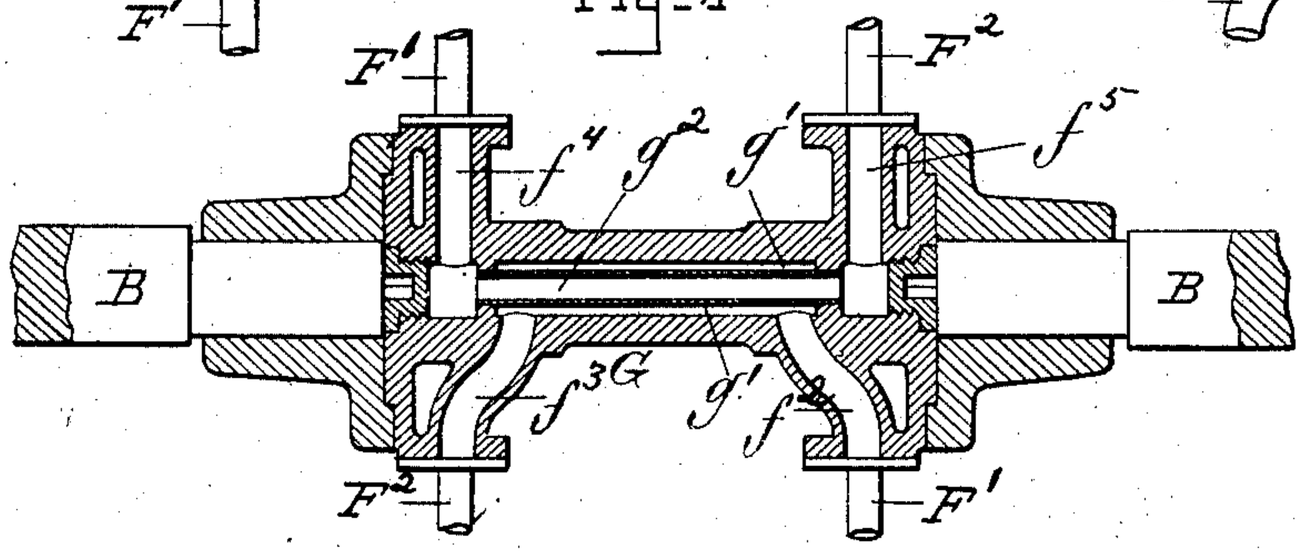


Fig. 4



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No. 736,875. Patented August 18, 1903.

UNITED STATES PATENT OFFICE.

JULES RAGOT AND HENRI TOURNEUR, OF PARIS, FRANCE.

MIXING APPARATUS FOR SUGAR.

SPECIFICATION forming part of Letters Patent No. 736,875, dated August 18, 1903.

Application filed January 20, 1903. Serial No. 139,831. (No model.)

To all whom it may concern:

Be it known that we, JULES RAGOT and HENRI TOURNEUR, citizens of the Republic of France, and residents of Paris, France, have invented certain new and useful Improvements in Mixing Apparatus, of which the following is a specification.

The present invention relates to certain improvements in kneading apparatus with exchange of temperatures by movable surfaces, particularly in view of their application to the sugar industry where such apparatus should have quite considerable dimensions. In this case owing to the great length of the horizontal shaft it is required to let the latter rest at two or more points of its length upon one or more bearings, which necessitates forming the coiled pipe in two or more parts, from which it follows that certain difficulties are met when it is desired to insure the continuous circulation of water in these parts. Moreover, the longitudinal pressure exercised by the mass being treated on the coils of the coiled pipe, the number of which increases considerably, produces considerable friction upon the abutment-bearing and adds greatly to the motive power required.

The improvements referred to avoid the inconveniences above noted. These improvements include the particular construction of coiled pipes alternately of inverse threads upon parts separated from a horizontal shaft, said coiled pipes being provided on their surface with stirring arms or paddles oblique to their direction, while two consecutive parts of the horizontal shaft are connected by a particular support-piece fixed so as to serve as a support for these parts upon a corresponding bearing and so as to insure the continuous circulation of the heating or cooling liquid with which this support is provided, whereas the entrance of this liquid occurs at will at the two farthest or nearest ends of two neighboring pieces, thanks to an appropriate pipe system.

In order to facilitate the understanding of the invention, we will describe a structure embodying a coiled pipe consisting of two parts and refer to the annexed drawings as an example.

In the drawings, Figure 1 is a longitudinal elevation, partly in section, of a mixing apparatus on our system; Fig. 2, an end view of same from the side of the operating apparatus and distribution of steam or water. Fig. 3 is a sectional elevation of the distributing-box and the end hollow shaft; Fig. 4, a sectional elevation of the center hollow shaft resting on a bearing. This construction is necessary from the circumstance that the mixing-trough shown is of such a length that it is necessary to use an intermediate bearing for supporting the shaft. The cross-piece on which this bearing rests necessitates having two separate coils with different admissions and exits in order to allow of the passage of the pipes, and the result of this is that it is necessary to have in the middle of the apparatus and of the coils a second hollow shaft. Fig. 5 is a detail view of the mounting on the coil of a paddle for displacing the mass.

The same letters of reference indicate the same parts in the five figures.

In an apparatus constructed in accordance with our invention the mixing-trough is either open or closed and is of any suitable form, but preferably semicylindrical. It may either have a double casing or not, as is required, and contains a serpentine arrangement of pipes C, which rotates around a central shaft B and is provided at its periphery with paddles or beaters C′, held by suitable collars C″. In this coil steam or a more or less cold fluid may be caused to circulate, according to the object which it is desired to attain. The central shaft B is terminated by a hollow shaft D, on which a steam or water distributing box E, is fitted, according as it is desired to heat or cool the substance to be mixed. This box places the ends of the coils in communication through the hollow shaft D with the admission and discharge pipes F F″ and F′ for steam or water. If the mixing apparatus be long, it is necessary to provide a support for the shaft in the center of the trough, and in this case the coils are separate, one being preferably right-handed, while the other is left-handed, and the shaft in the bracket is hollow, so as to provide a free passage for the cooling or heating fluid in the coils. Part G is prepared so as to serve to connect the two separate parts of shaft B and serves to let the whole rest on the central bearing. Moreover,

Fig. 4 illustrates the interior arrangement of this part, which arrangement is close to the hollow shaft D, the object of this arrangement being to insure, on the one hand, the continuous circulation of the liquid in the two separated parts of the coiled pipe, and, on the other hand, its direct flow from one end to the other of the apparatus by means of a central pipe g^2, of an annular pipe g', and of the pipe system F' F^2 F^3 F^2 F^4.

The steam or cooling fluid, as the case may be, traverses the apparatus in the following way: It enters by one pipe, e', if the fluid employed be steam, or by another pipe, e, if water or other cooling liquid be employed. These two pipes are arranged in a distributing-box E, Figs. 1, 2, and 3, to which the steam or water is led by pipes F F''. From the said box E the fluid passes into an annular space d', formed in the end hollow shaft D, Fig. 3, and connecting with a pipe f', from which branches the coil supply-pipe F'. This latter pipe conducts the fluid in the direction shown by the arrow 1 to the intermediate hollow shaft G, Figs. 1 and 4, into which it enters by junction f^2. The fluid employed then passes through the annular space g' in the middle shaft in order to finally emerge by a pipe f^3, with which is connected the second coil supply-pipe F^2. After having passed through F^2 in the direction of arrow 2 the fluid then enters the further coil C, and it must be here pointed out that it is advisable thus to bring the fluid employed first into the coil farthest away from the distributing-box, because if the fluid first traversed the nearer coil C it would reach the farther coil C' after having lost most of its particular properties. After having circulated in the farther coil C the fluid escapes by a pipe F^3, in which it travels in the direction of arrow 3 in order to reach the pipe f^4 of the intermediate hollow shaft G. It then passes along the central passage g^2 of the said shaft in order to finally escape by a junction f^5, from which the supply-pipe F^2 of the coil nearest to the distributing-box is branched. After having traversed this pipe in the direction of arrow 4 the fluid penetrates into the first or right-hand coil C, in which it circulates and escapes at the end adjacent to the distributing-box, by which it originally entered. For this object the discharge-pipe F^4 conveys the fluid in the direction of arrow 5 to the end hollow shaft D, into which it enters by a junction-pipe f^6. The fluid having traversed the central passage d^2 of this shaft finally arrives at a pipe f^7, carried by the distributing-box E, and is removed by an exhaust-pipe e^2, branching from the last-named pipe.

We declare that what we claim is—

The herein-described improvements in kneading apparatus with exchange of temperatures by movable surfaces, comprising the combination with a horizontal shaft B made of separated parts supporting coiled pipes C of inverse threads with stirring arms C' oblique to their direction, of a support-piece G connecting two neighboring parts of shaft B and serving to support the whole on a corresponding bearing, and of a particular pipe system F', F^2, F^3, F^2, F^4 insuring on the one hand the entrance of the liquid at the two farthest or nearest ends of two coiled-pipe neighboring parts, and on the other hand the continuous circulating of the liquid in these parts by means of the canals f^2, g', f^3, f^4, g^2, f^5 with which piece G is provided, substantially as described.

In testimony whereof we have hereunto set our hands in presence of two witnesses.

JULES RAGOT.
HENRI TOURNEUR.

Witnesses:
JULES FAYOLLET,
EDWARD P. MACLEAN.