

(No Model.)

3 Sheets—Sheet 1.

A. SPIES.
CHURN.

No. 461,933.

Patented Oct. 27, 1891.

Fig. 1.

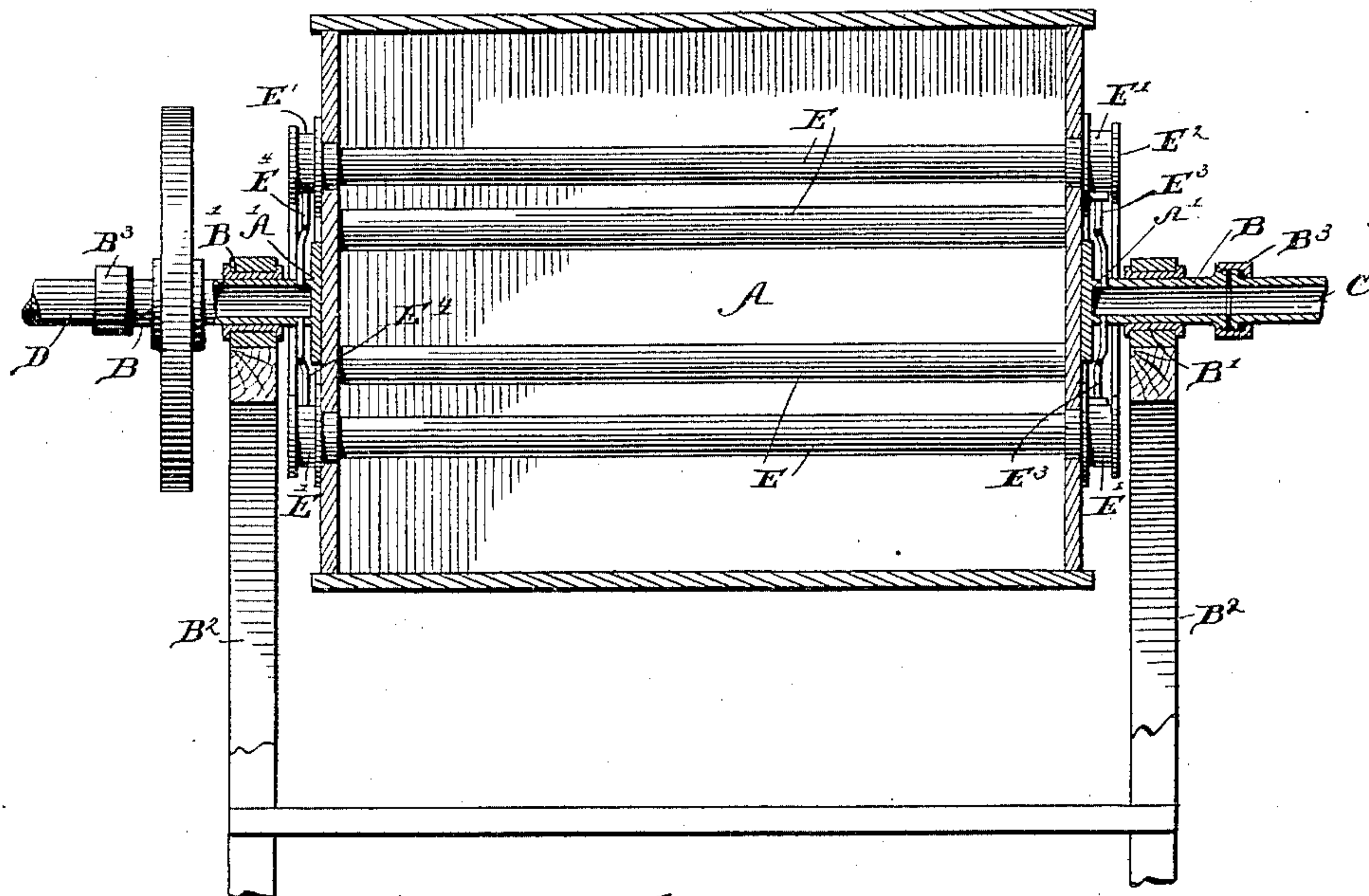
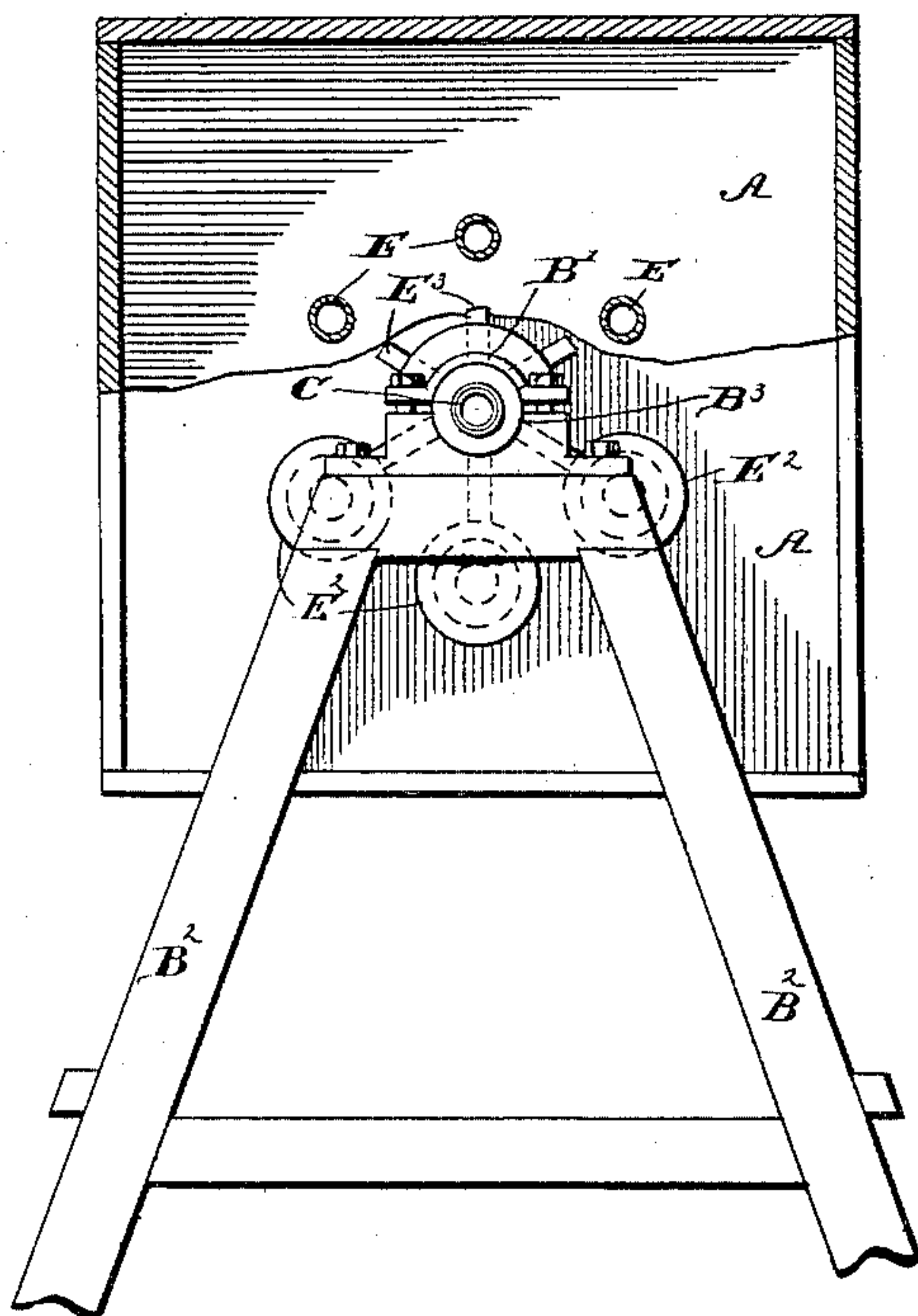


Fig. 2.



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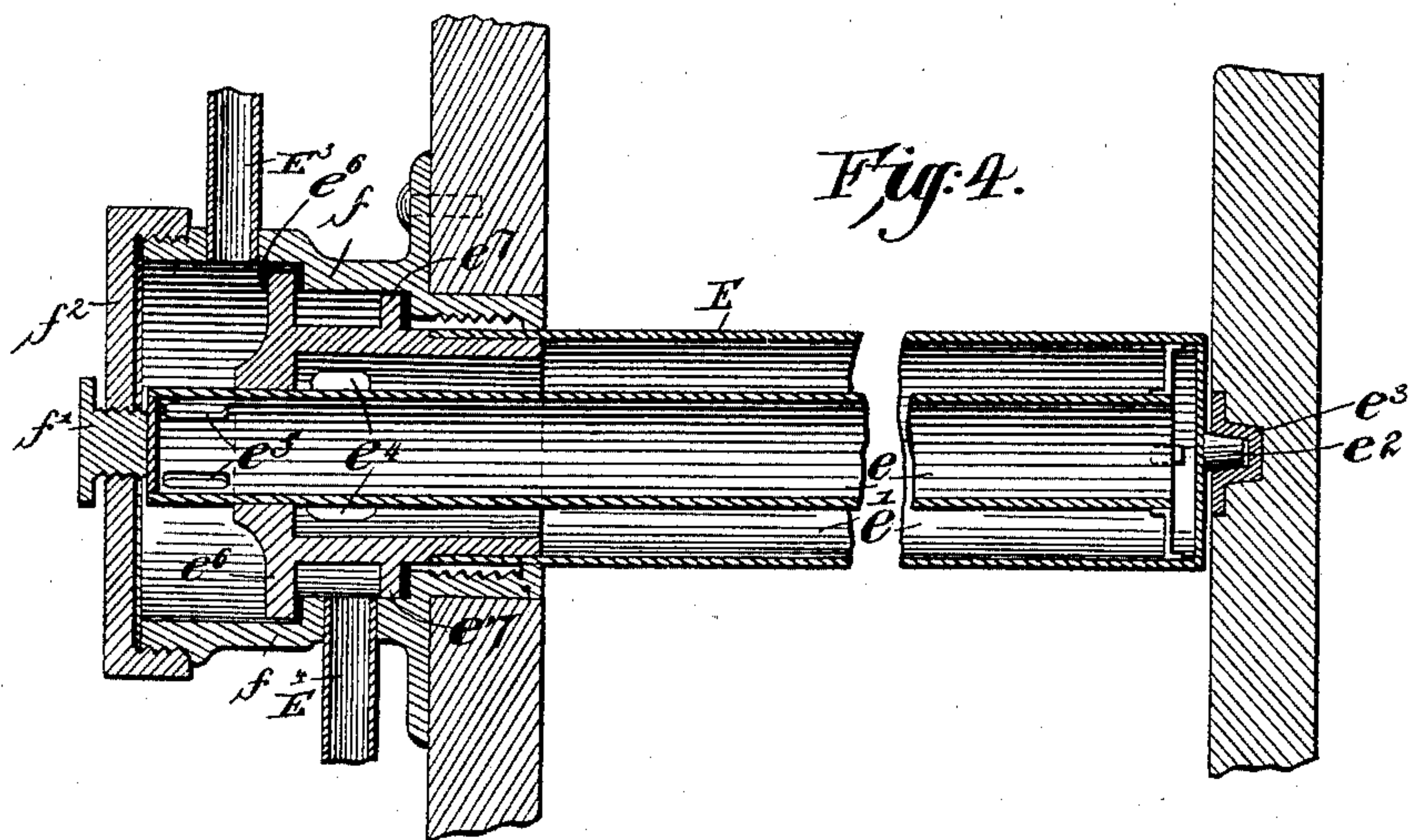
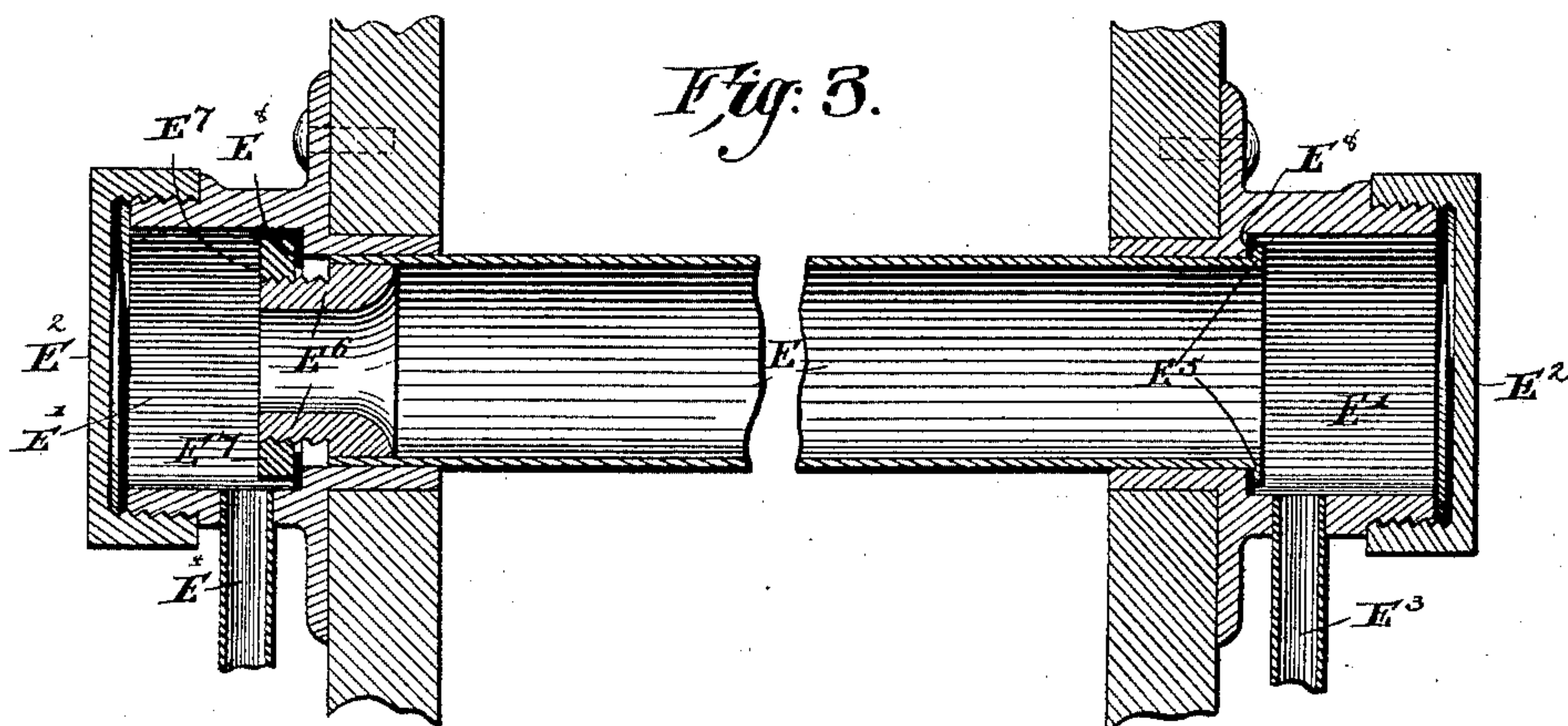


Fig. 5.

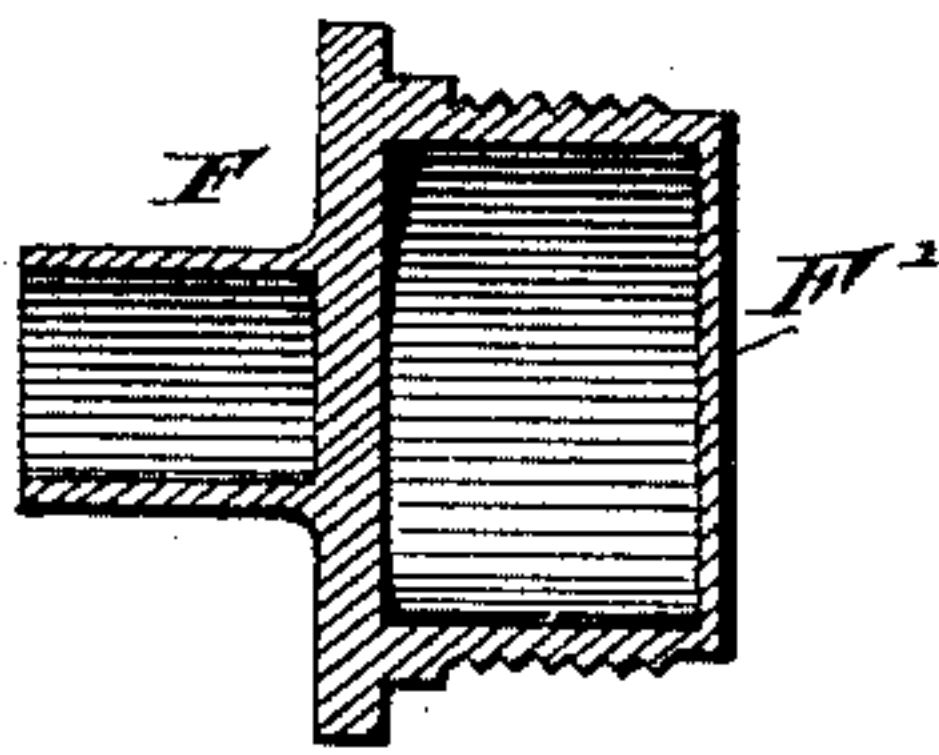
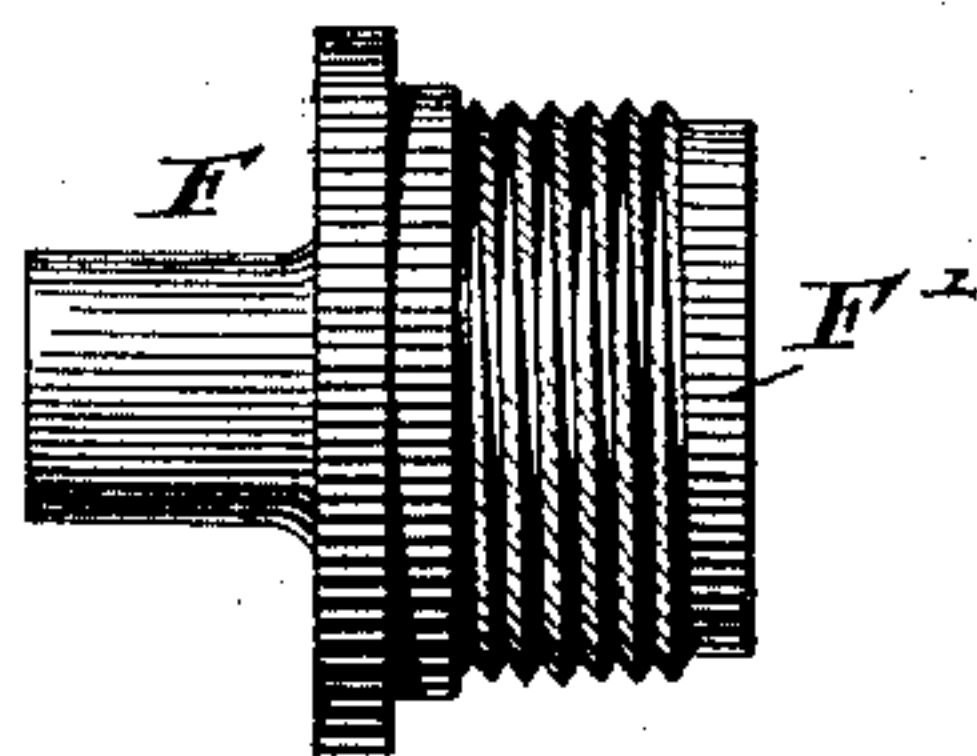


Fig. 6.



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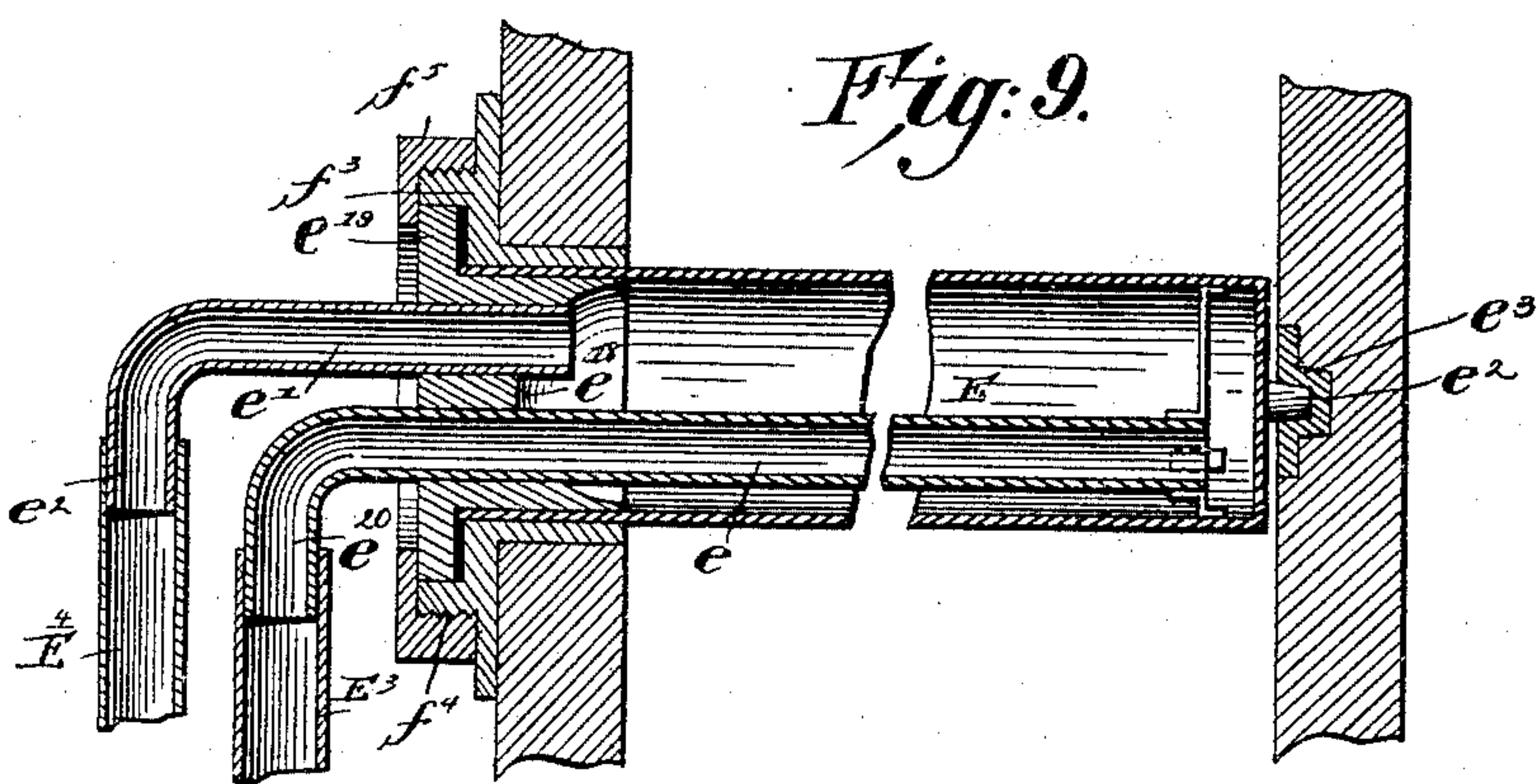
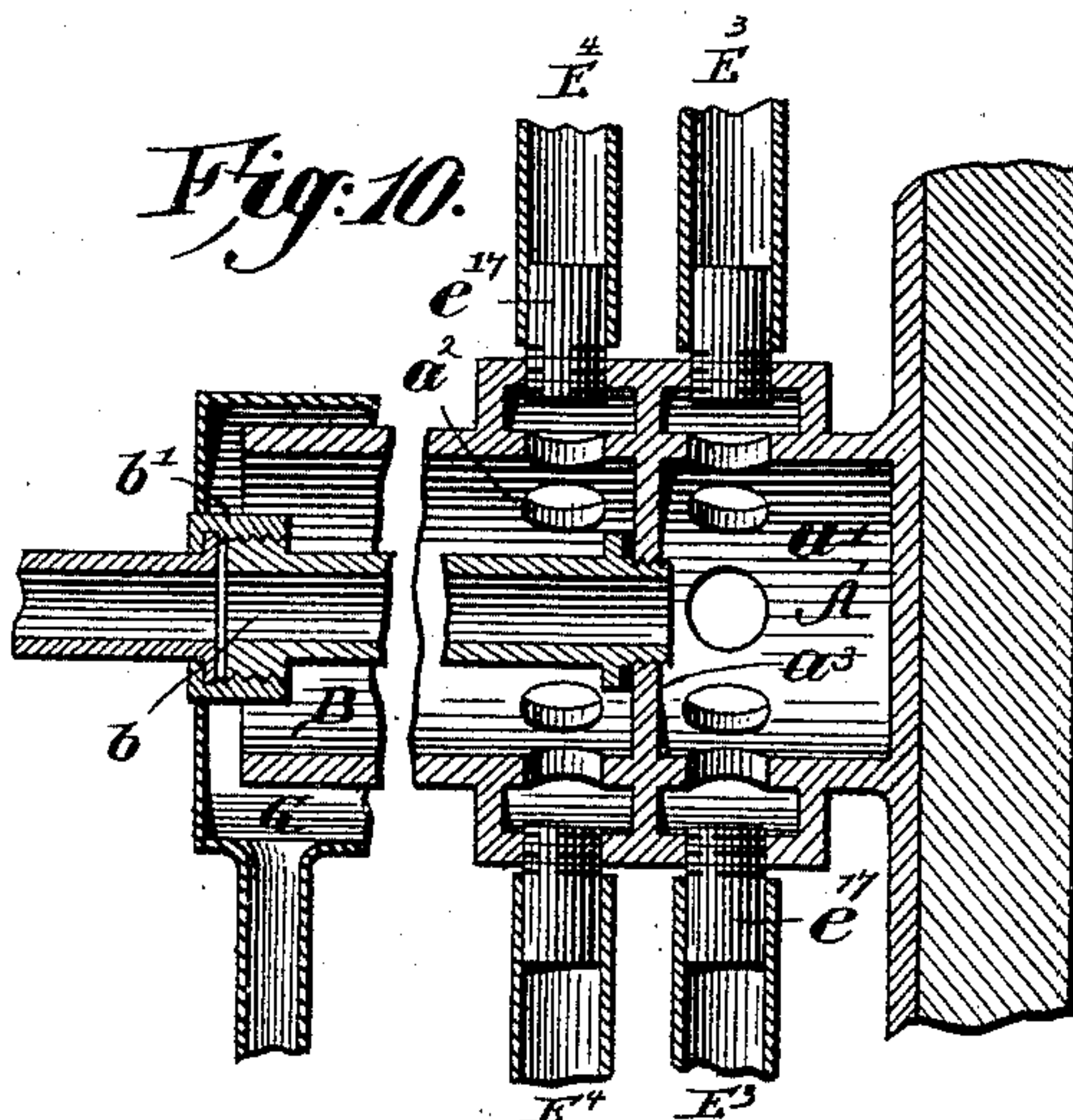
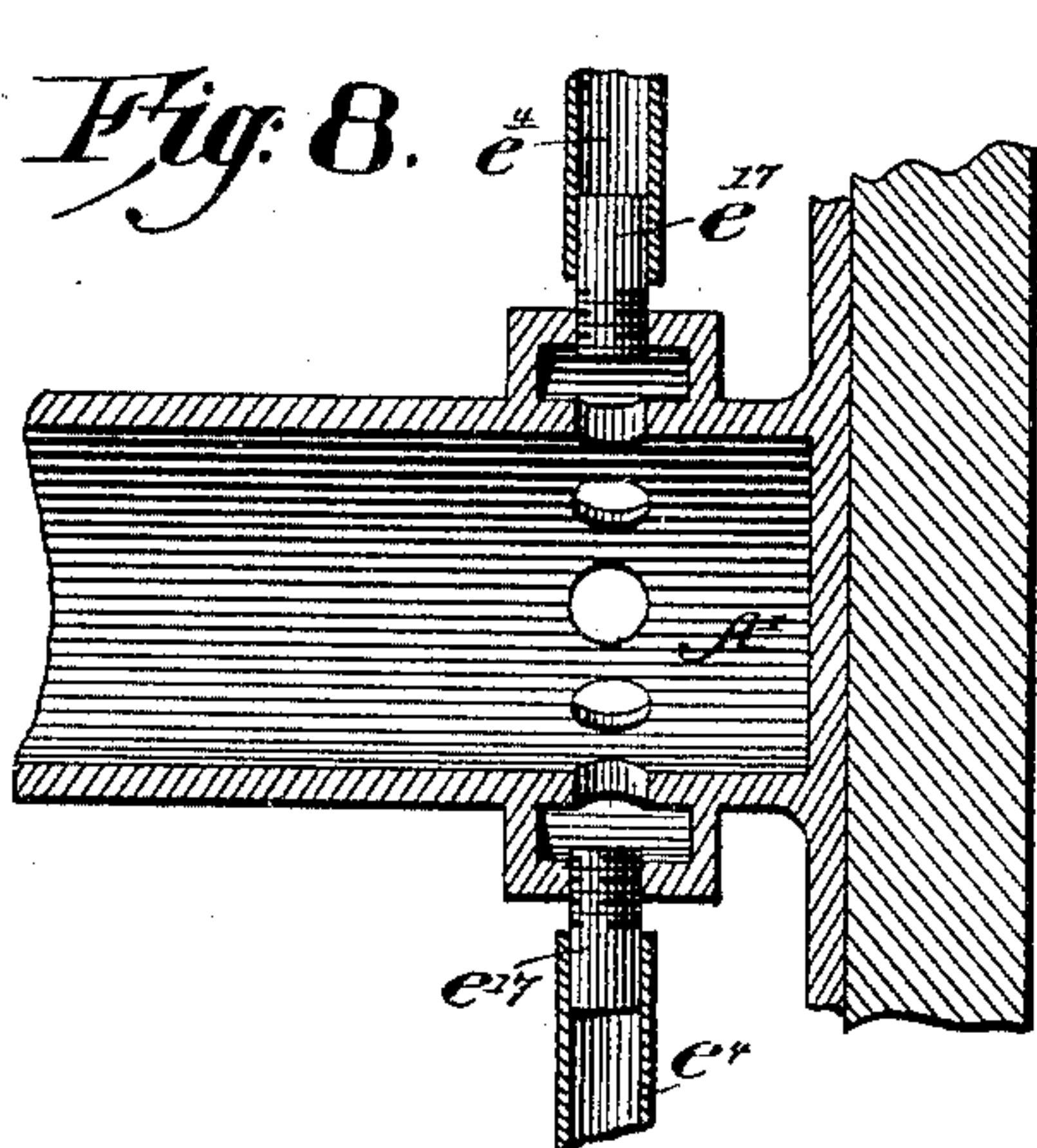
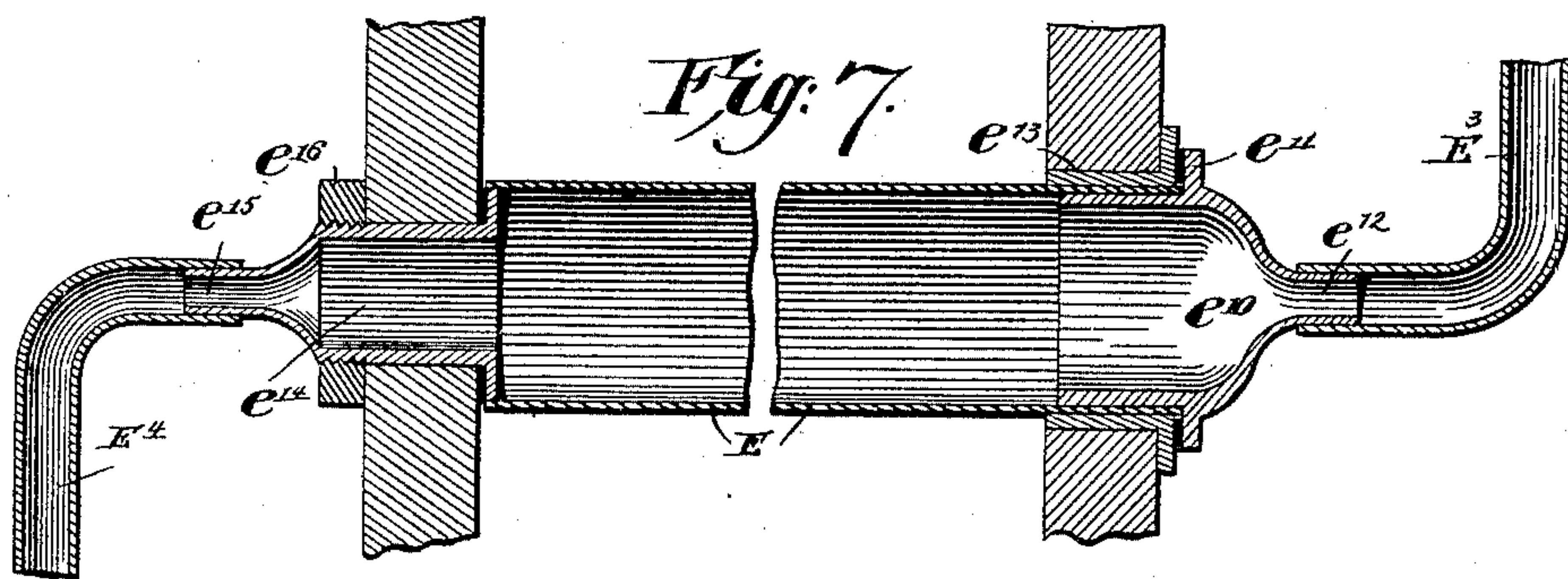
(No Model.)

3 Sheets—Sheet 3.

A. SPIES.
CHURN.

No. 461,933.

Patented Oct. 27, 1891.



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UNITED STATES PATENT OFFICE.

ADAM SPIES, OF MUDGEES, NEW SOUTH WALES.

CHURN.

SPECIFICATION forming part of Letters Patent No. 461,933, dated October 27, 1891.

Application filed May 1, 1891. Serial No. 391,186. (No model.)

To all whom it may concern:

Be it known that I, ADAM SPIES, mechanical engineer, a subject of the Queen of Great Britain, residing at Mudgee, in the British Colony of New South Wales, have invented new and useful Improvements in Churns, of which the following is a specification.

This invention relates to certain improvements in churns by which it is made possible at a very cheap cost to keep the cream at a uniform and the most serviceable temperature during its churning into butter and at the same time to have a churn which may be easily freed of the made butter and be easily and quickly cleaned.

A churn constructed according to this invention has within it a series of circulating-pipes through which is passed a fluid, whose temperature is naturally suitable for the purpose of reducing or increasing the temperature of the contents of the churn to the required degree, or a fluid whose temperature is regulated by artificial means to the most suitable degree for such purpose. While such circulating-pipes might be made part of the beaters of the churn in which the container is stationary, yet it is preferred that the container should have motion and the churning be achieved by the continuous throwing of the cream against its sides. A churn constructed according to this invention, of whatever sectional form that may be desired, is hung upon hollow trunnions, which form the supply and discharge of the circulating fluid, which, passing in by one of them, is distributed by radial pipes to the tubes or pipes and again passes to the center and away by the other trunnion. The circulating tubes or pipes are constructed with peculiar heads or caps, so that they may be quickly and easily withdrawn from the churn in order that the latter may be thoroughly washed or otherwise cleansed. A dummy plug is placed in the orifice left by the withdrawal of the pipes, so that a flush surface is presented during the cleansing process. The circulating pipes or tubes may be straight-through pipes, or they may be compound pipes or tubes, so that the supply and discharge may take place at one end and thus, while making the one trunnion a compound pipe, avoid the necessity of both trunnions being hollow.

In order that this invention may be clearly understood, reference will now be made to the drawings herewith, in which—

Figures 1 and 2 are longitudinal sectional elevation and end elevation, partly in section, respectively, of a square churn constructed according to the present improvements. Fig. 3 is a longitudinal sectional elevation, on a larger scale, of a through circulating tube or pipe in such churn; and Fig. 4, a similar view of a compound circulating tube or pipe which might be used as a modification. Figs. 5 and 6 show the constructions of hollow and solid dummy flush-plugs. Fig. 7 is a sectional elevation of a modified construction of a through circulating-pipe, and Fig. 8 a similar view of a center piece to be used in connection therewith. Fig. 9 is a similar view of a compound circulating tube or pipe, and Fig. 10 similar view of center piece for connecting to supply and discharge pipes.

To the ends of a wooden container or churn A, made in the usual manner, the center pieces A' are affixed by screws or bolts, such center pieces forming the terminations of pipes or trunnions B, which have bearings in plumber-blocks B' on top of frame or trestles B², and terminate in universal joints B³, connecting them, respectively, to supply and discharge pipes C and D, but at the same time allowing of free movement. The circulating tubes or pipes E rest in flanged cap-pieces E', fixed on the outside ends of the churn, said cap-pieces having removable caps E² and connecting-pipes E³ and E⁴, the former to supply center pieces and the latter to discharge center pieces. On one end of the tubes or pipes E is a flange E⁵, while the other has a male screw E⁶ and a nut E⁷, so that packing E⁸, being placed under said flange E⁵ and under the nut E⁷ and the latter being screwed up upon screw E⁶, a fluid-tight joint may be quickly made at both ends of the tube, and by removing caps E² and unscrewing nut E⁷ the pipe itself may be quickly withdrawn and a plug F jammed or screwed in the orifice, with its surface F' flush with the inside of the churn end.

In the modified construction of circulating-pipe E shown in Fig. 4, where the supply passes through one part e of a compound pipe and returns through the other part e', the one

end of the outside pipe terminates in a center piece e^2 , fitting in a socket e^3 , let into the inside of the churn end, while the other end terminates in orifices e^4 and has a double flange, through which the inner pipe passes to its terminating orifices e^5 . The center piece f has connections E^3 and E^4 to supply and discharge center pieces, one joining a pipe carried around on the outside to the center piece of the hollow trunnion or pipe on the opposite end of the churn or connecting with a pipe inside and revolving with the trunnion-pipe, from which it may be led away outside of a bearing-joint, which must be made on both the outer and inner pipes. The set-screw f' in the cap f^2 being screwed in makes joints by pressing flanges e^6 and e^7 on packing in recesses in said center piece f and prevents leakage into the churn or between the supply and discharge. The course of the circulating fluid is then from supply either through an independent pipe from a center piece A' , connected to the hollow trunnion on the opposite end of churn, or from one of a compound pipe forming the trunnion through pipe E^3 , orifices e^5 , pipe e , pipe e' , orifices e^4 to discharge connecting-pipe E^4 . The cap f^2 being removed, the compound pipe $e e'$ may be easily and quickly withdrawn and a dummy flush-plug F inserted in the orifice.

In operation a fluid, preferably water, either taken from an underground tank or well, which water is generally of about the temperature required, is pumped up to the supply-pipe C and thence passes through the circulating tubes or pipes and away either to waste or back to the tank or well, and in so passing through the churn reduces or increases the temperature of the cream therein, as may be required; but where well-water or other fluid of suitable temperature is not handy the water supplied may be artificially regulated to the temperature of, say, sixty to sixty-three degrees (60° to 63°) Fahrenheit, either by cooling it with ice or by other means or heating it with steam, fire, or other means, and being passed through the circulating-pipes at such temperature it will effectively serve the purpose of reducing or increasing the temperature of the contents.

Referring to Figs. 7 and 8, which show a modified arrangement of a circulating tube or pipe and of the connections between the same and the central supply and discharge pipes forming trunnions of the churn, the pipe or tube E has at one end a head e^{10} with flange e^{11} and reduced final e^{12} , and it fits water-tightly in flanged ring e^{13} , while the other end of said tube has reduced end or head e^{14} (and a further reduced final e^{15}) with screw-thread thereon, and a nut e^{16} for tightening the whole tube in and between the ends of the churn in such a way that said tubes may be easily removed for cleaning. With these tubes center pieces A' , as shown in Fig. 8, are used, being brazed or otherwise fixed on supply and discharge pipes forming the trun-

nions of the churn. These center pieces have stud-pipes or finals e^{17} protruding therefrom. Now in use flexible pipes or ordinary hose E^3 and E^4 make connection between the center pieces A' and the respective tubes E , one end of each hose being slipped over or thrust upon stud-pipes or finals e^{17} , while the other end takes over either final e^{12} or e^{15} , as the case may be.

Referring to the modifications shown in Figs. 9 and 10, the compound tube or pipe E terminates at one end in a center piece e^2 , fitting into a socket e^3 let into the inside of the churn end, (similar to that shown in Fig. 4,) while the other end has a head e^{18} with flanges e^{19} , which fits water-tightly into a center piece f^3 , having male screw f^4 , and flanged nut f^5 , which, when screwed up, makes a water-tight joint between flange e^{19} and center piece f^3 . The supply-pipe e is within tube E , passes through head e^{18} , and terminates in bend e^{20} , by means of which the fluid is supplied to tube E while a discharge-pipe e' is fitted to the head e^{18} and terminates in bend e^{21} . The center piece A' (shown in Fig. 10) is used in connection with this compound tube. The supply-pipe b , with universal joint b' , is water-tightly connected to the supply-chamber a' of center piece A' , which is divided from the discharge-chamber a^2 by partition a^3 , each chamber having stud-pipes or finals e^{17} , from which flexible pipes E^3 and E^4 make connection with the bends e^{20} and e^{21} , respectively, of pipes e and e' . In operation the water is supplied through pipe b to chamber a' and thence through flexible pipes E^3 , connected to stud-pipes or finals e^{17} and bends e^{20} , and passes through pipe e and back through tube E to discharge through pipe e' , flexible pipe E^4 , chamber a^2 , and pipe or trunnion B to waste pipe or hopper G . The compound tubes E may be easily and quickly withdrawn, so that the churn may be cleaned by slipping the hose or flexible pipes E^3 and E^4 off their respective bends e^{20} and e^{21} and then unscrewing nut f^5 from male screw f^4 , when the tube may be drawn out and a dummy plug F inserted in center piece f^3 .

It is to be understood that the fluid, instead of passing through one of the circulating tubes and pipes and then being discharged, might pass through two or more or the whole of the pipes before passing away, the essential feature of this invention being the circulating-pipes passing directly through the interior of the churn, and thus being in close contact with the contents.

Having now particularly described and explained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. The combination, with a churn and a bearing-sleeve, having its outer end enlarged, seated in an opening in the churn-head, the enlarged portion of the sleeve being screw-threaded exteriorly and provided with an interior offset, and a tubular branch leading to

said enlarged portion, a screw-cap screwing onto the latter, and a packing seated on the offset, of a radiator-tube seated in the bearing-sleeve and provided with a flange having bearing on the packing, and means such as described for pressing the flange to the packing, for the purpose set forth.

2. The combination, with a churn, of radiators comprising an outer radiator-pipe closed at one end and provided thereat with a journal fitting a bearing on the inner face of one of the churn-heads, the opposite end of said pipe extending through the corresponding churn-head, and a supply-pipe open at both ends and extending into the outer radiator-pipe to near the closed end thereof, as and for the purpose set forth.

3. The combination, with a churn having a tubular axis of rotation provided with supply and exhaust chambers, of radiators comprising an outer radiator-pipe closed at both ends and provided at one of said ends with a journal fitting a bearing on the inner face of one of the churn-heads, the opposite end of said pipe extending through the corresponding churn-head and being provided with an exhaust-branch, and a connection between said exhaust-branch and the exhaust-chamber of the tubular axis of rotation of the churn, and a supply-pipe arranged within the radiator-pipe with its inner open end in proximity to the inner closed end of said radiator-pipe, and a connection between the outer end of the supply-pipe and the supply-chamber of said axis of rotation of the churn, said connection extending through the outer or exhaust end of the radiator-pipe, for the purpose set forth.

4. The combination, with a churn provided in one of its heads with a journal-bearing e^3 and in the opposite head a sleeve-bearing f^3 , having a threaded flange f^4 , of the pipe E, having its inner closed end journaled in said bearing e^3 and extending into the bearing-

sleeve f^3 , the plug e^{18} closing the outer end of said pipe, said plug being provided with a flange e^{19} , fitting within the recess formed by the threaded flange f^4 of the bearing-sleeve f^3 , said plug being provided with two openings, the branch e' in one of said openings, and the pipe e extending through the other opening into and nearly to the inner closed end of pipe E of the flanged nut f^5 , screwing into the flange f^4 , for the purpose set forth.

5. The combination, with a churn provided in one of its heads with journal-bearings e^3 and in the opposite head corresponding bearing-sleeves f^3 , having a threaded flange f^4 , and an axial journal in which are formed a receiving-chamber provided with supply and delivery branches and with an exhaust-chamber provided with inlet branches, of radiator-pipes E, closed at one end and provided thereat with a journal e^2 , fitting a bearing e^3 in one of the churn-heads, the open ends of said pipes fitting loosely in their respective bearing-sleeves f^3 in the opposite churn-head, a plug e^{18} closing said open end of the pipe, said plug being provided with an exhaust branch e' and with a flange e^{19} , fitting into the recess formed by the threaded flange f^4 on bearing-sleeve f^3 , the flanged nut f^5 , screwing onto said flange f^4 , the pipe e , extending through the plug e^{18} into pipe E near to the inner closed end thereof, and a flexible connection between pipe e and a delivery branch of the receiving-chamber of the axial journal of the churn and a like connection between the branch e' and an inlet branch of the exhaust-chamber of said axial journal, for the purpose set forth.

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