No. 863,794. PATENTED AUG. 20, 1907.

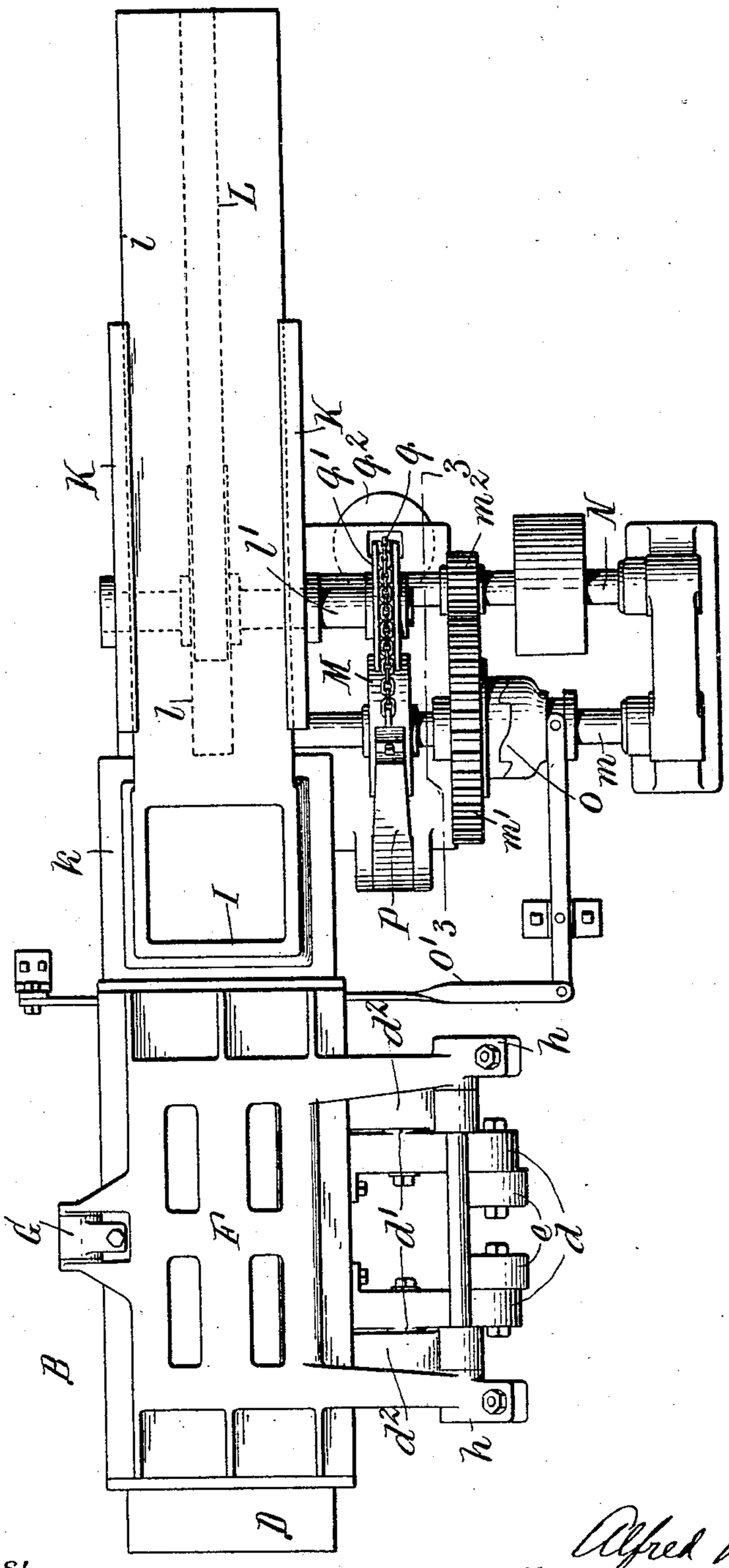
A. W. FRENCH.

MACHINE FOR FORMING OIL CAKES.

APPLICATION FILED JULY 2, 1906.

3 SHEETS—SHEET 1.

Fig. 1.



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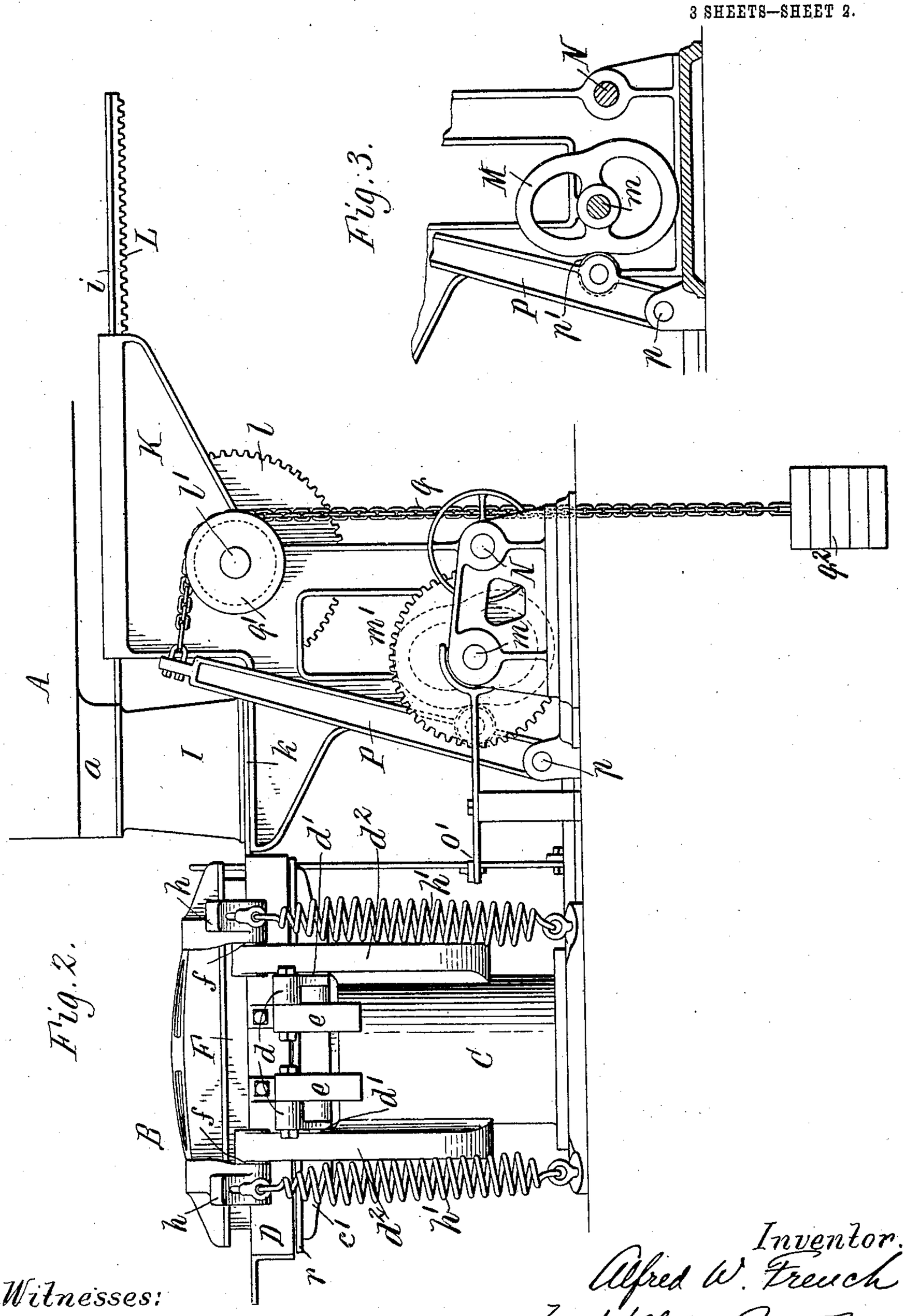

Fig. 2.

Fig. 3.

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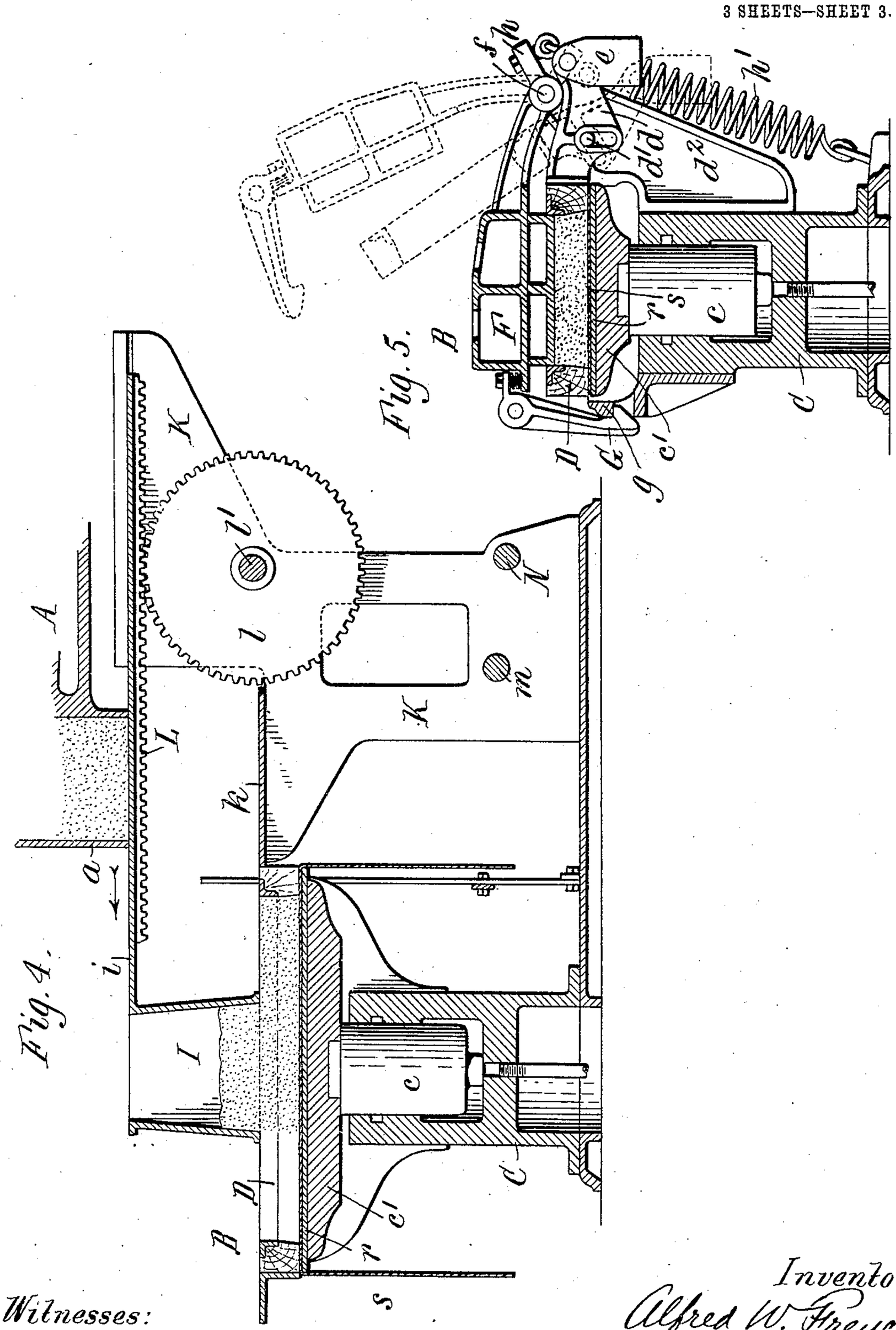

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UNITED STATES PATENT OFFICE.

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MACHINE FOR FORMING OIL-CAKES.

No. 863,794. Specification of Letters Patent. Patented Aug. 20, 1907.

Application filed July 2, 1906. Serial No. 324,433.

To all whom it may concern:

Be it known that I, ALFRED W. FRENCH, a citizen of the United States, residing at Piqua, in the county of Miami and State of Ohio, have invented a new and useful Improvement in Machines for Forming Oil-Cakes, of which the following is a specification.

In expressing oil from meal the usual course of procedure is to cook or temper the meal and then mold it into cakes which are wrapped in cloths and placed in the press. The cakes are molded in a form or mold box and an open-ended charging or distributing box is employed which is moved beneath the discharge opening of the cooking or tempering kettle to be filled with meal therefrom and is then moved over the mold box to deposit this measured charge of meal into the mold box, the charging box being reciprocated back and forth over the mold box to properly spread or distribute the meal therein. In most mills the charge box is operated by hand, and as this is a laborious operation the operatives frequently do not reciprocate the charge box over the mold box sufficiently to evenly distribute the meal in the mold box and as a consequence the cakes are uneven and the maximum quantity of oil cannot be produced therefrom. Cake forming machines have been devised in which the charge box is reciprocated mechanically, but in the machines of this purpose, of which I am aware, the charge box is simply moved once over the mold box and retracted, and such machines also fail to evenly distribute the meal in the mold box.

This invention relates to machines for forming oil cakes, and the primary object of the invention is to provide an efficient, simple and practical machine in which the charge box is moved from the filling position beneath the kettle to the mold box, reciprocated a plurality of times over the mold box to evenly distribute the meal therein, and is then returned to the filling position.

Another object of the invention is to improve and simplify the construction of cake-forming machines in the respects hereinafter described and set forth in the claims.

In the accompanying drawings, consisting of three sheets: Figure 1 is a plan view of a cake-forming machine embodying the invention. Fig. 2 is a side elevation thereof, showing a portion of the cooking or tempering kettle. Fig. 3 is a fragmentary sectional elevation of the lower portion of the machine, in line 3—3, Fig. 1, showing the operating mechanism for the charge box. Fig. 4 is a longitudinal sectional elevation of the machine, showing the charge box in discharging position over the mold box. Fig. 5 is a transverse sectional elevation of the cake molding press, showing different positions of the mold box and press head by full and broken lines.

Like letters of reference refer to like parts in the several figures.

A, Fig. 2, represents a portion of an ordinary meal cooking or tempering kettle, or other receptacle for the meal, *a* the discharge spout or opening thereof, and B the cake molding press, which may be of any usual or suitable construction, but which is preferably constructed as follows, see Figs. 2, 4 and 5: C represents a press cylinder in which is arranged to move vertically a ram *c* provided at its upper end with a platen or table *c'*. D represents a mold box or frame in which the meal is compressed into the form of a cake. This mold box has hinge arms *d* hinged at *d'* to brackets d^2 rising from the press cylinder, and is adapted to occupy the horizontal position over the press platen, shown in Fig. 5, and to be swung upwardly therefrom, as shown by broken lines in said figure. The mold box is also adapted to move vertically with the press plunger to compress the cake, for which purpose its hinge arms *d* are shown as provided with vertically elongated slots to receive the hinge pins for the mold box. The hinge arms of the mold box also preferably extend beyond the hinges and have connected thereto suitable counterbalancing means, such as the weights *e*, which tend to swing the mold box upwardly and hold it up, thus reducing the labor of operating the mold box. F represents a press head which is of a size to enter the mold box and coöperate with the press platen in compressing the cake. This press head is hinged in any suitable manner at *f* to the brackets d^2 rising from the press cylinder or other suitable parts, so that it can be held horizontally over the mold box in the full line position shown in Fig. 5, or swung upwardly, as indicated by broken lines in said figure. The press head is provided with a suitable latch G adapted to engage with a stationary keeper, such as the part *g* on the press cylinder, to hold the press head down in its horizontal position over the press platen, and is preferably provided with suitable counterbalancing means, for which purpose its hinge arms *h* are shown as extending beyond their hinges and connected to the base of the press cylinder, or other suitable stationary part, by springs *h'* which tend to swing the press head upwardly and hold it up in the position indicated by broken lines in Fig. 5. This construction of the cake molding press or device is desirable and assists in the rapid, easy operation of the machine, but in so far as the other part of the machine, about to be described, is concerned, the cake pressing device could be of any other preferred construction.

I represents the charge box or measuring device for carrying the meal from the tempering kettle to the mold box. The charge box, as usual, is open at its upper and lower ends and is adapted to travel from the receiving position beneath the discharge opening of the

kettle, see Fig. 2, to the discharging position over the mold box which is located in front of or laterally beyond the discharge opening of the kettle, see Fig. 4. The charge box can be supported and guided in any suitable manner, for instance, it is secured to one end of a horizontal plate or apron *i* which is arranged to slide in horizontal guide ways in slides K of the frame of the machine. The apron is located immediately beneath the plane of the discharge opening of the kettle and serves as a gate or closure for the discharge opening when the charge box is moved forward to fill the mold box. The machine frame is provided below the discharge opening of the kettle, in the horizontal plane of the top of the mold box, with a table *k* which supports the mold box and forms a bottom therefor when beneath the discharge opening of the kettle.

The operating mechanism for the charge box is preferably constructed as follows: L represents a toothed rack which is secured to or formed on the underside of the apron *i*, and *l* a gear wheel which is secured to a horizontal shaft *l'* journaled in suitable bearings in the machine frame, and meshes with the toothed rack. M, Figs. 1—3, represents a cam which is suitably driven and has opposite salient convex portions joined by opposite reëntrant or concaved portions. In the construction shown, the cam is secured to a shaft *m* journaled in suitable bearings in the machine frame and this shaft is driven by intermeshing gear wheels *m'* m^2 properly proportioned to produce the desired speed of the cam. The gear wheel m^2 is secured to a main drive shaft N, while the other gear wheel *m'* is loose on the shaft *m*, and a clutch O of any suitable construction is employed for connecting this wheel to its shaft *m* to drive the latter. The clutch shown consists of a toothed sleeve which is splined or otherwise secured to the shaft *m* to turn therewith and slide thereon into and out of engagement with coöperating clutch teeth on the hub of the gear wheel. The clutch can be operated by any usual or suitable means O' leading to a convenient point within reach of the operator, whereby he can throw the cam shaft and cam into and out of action at will. P represents a lever which is fulcrumed at *p* in any suitable manner to the machine frame, and is provided with an anti-friction roller *p'* which bears against the cam so that the lever is oscillated during the revolutions of the cam. The lever is connected preferably at its upper portion to one end of a chain or flexible connection *q* which passes over a chain wheel *q'* secured to the shaft *l'* and has attached to its free end weights q^2 or other means acting to draw the chain in one direction. The cam M acts to move the lever P away from the chain wheel and pull the chain against the action of the weights, thereby turning the chain wheel and attached shaft *l'* and gear wheel *l* in one direction, and the weights serve to hold the lever against the cam and to return the chain and the lever and rotate the chain wheel *q'* and the shaft and gear wheel to which it is attached in the reverse direction. Owing to the described formation of the cam, the lever, during one revolution of the cam, is first moved forwardly a long stroke, then retracted part way by the weighted chain, then again moved to the limit of its forward stroke, and then completely retracted to its initial position, shown in Fig. 2. As the chain *q*, chain wheel *q'*, shaft *l'*, gear wheel *l* and toothed rack L partake in these movements of the lever, the charge box I is moved forwardly from its receiving position beneath the discharge spout to the extreme forward end of the mold box, is reciprocated twice over the mold box, from end to end thereof, to evenly spread or distribute the meal therein and is then retracted to the receiving position. Intermediate connections other than those described could be employed between the cam and charge box for producing the described motion of the latter, but the connections shown are efficient and desirable.

The operation of the machine is as follows: The mold box D and press head F are first swung upwardly to the position shown by broken lines in Fig. 5. A cake molding pan *r* is placed on the press platen and a press cloth *s* laid thereon with its ends depending, as shown in Fig. 4. The mold box D is then lowered onto the press cloth, and the clutch O is operated to start the cam M, which, through the mechanism described, moves the charge box forwardly over the mold box to fill the latter, reciprocates the charge box to spread the meal evenly therein, and then returns the charge box to receiving position. After the charge box is returned, the clutch O is operated to throw the cam out of gear and the press head is then lowered over the mold box and secured by engaging the latch G with its keeper, as shown by full lines in Fig. 5. Pressure is then admitted to the press cylinder C by the operation of the usual valve (not shown) and the ram is forced upwardly, the press platen carrying the mold box upwardly therewith so that the meal is compressed into a cake in the mold box between the press platen and head. The press ram is then lowered, the latch released and the press head and mold box thrown upwardly, after which the depending ends of the cloth are folded over the top of the cake, and the cloth-wrapped cake is removed to be placed in the press for expressing the oil. The parts of the forming machine are then in position for a repetition of the cake-forming operation.

In the machine shown, the gate or closure for the discharge opening of the kettle is in the form of a plate connected to and movable with the charge box, but such arrangement is not essential to the invention and a gate constructed and operated in any other suitable manner could be employed. The machine described is continuously driven, but in so far as the invention is concerned it could be constructed to operate intermittently, that is, so as to be set in operation by the attendant and to come to rest after each complete cycle of its operation. The charge box travels at all times at the proper speed to best discharge and distribute the meal in the mold box and is reciprocated a plurality of times over the mold box, thus insuring a cake of uniform thickness without special care upon the part of the operative, who is entirely relieved of the labor of operating the charge box.

I claim as my invention:

1. The combination of a meal receptacle, a cake molding device, a charge box movable from a position to receive a charge from said meal receptacle to a discharging position adjacent to the cake molding device, and automatic mechanism constructed to move said charge box from the receiving position to the discharging position, then reciprocate it adjacent to the cake molding device through a distance less than its full travel and finally return it to the receiving position, substantially as set forth.

2. The combination of a meal receptacle, a cake molding device, a charge box movable from a receiving position ad-

jacent to said receptacle to a discharging position adjacent to said molding device, and automatic mechanism constructed to advance the charge box from the receiving position to the discharging position, then partially retract it, then again advance it, and finally return it to the receiving position, substantially as set forth.

3. The combination of a meal receptacle, a cake molding device, a charge box, and cam mechanism for operating said charge box from a position to receive a charge from said meal receptacle to a discharging position adjacent to the cake molding device, then reciprocate it adjacent to the cake molding device through a distance less than its full travel, and finally return it to the receiving position, substantially as set forth.

4. The combination of a meal receptacle, a cake molding device, a charge box movable from a receiving position beneath said receptacle to a discharging position over said molding device, a cam, and connections between said cam and said charge box for moving the latter from the filling position to a position over the molding device, reciprocating the same over the molding device and returning the charge box to the receiving position, substantially as set forth.

5. The combination of a meal receptacle, a molding device, a charge box movable from a position beneath the meal receptacle to a position over the molding device, a cam, a lever operated by said cam, a flexible connection attached to said lever, a wheel operated by said flexible connection and connected to said charge box, and means acting on said flexible connection to hold said lever against said cam, substantially as set forth.

6. The combination of a meal receptacle, a cake molding device, a charge box movable from a position beneath said meal receptacle to a position over said molding device, a cam, a lever operated by said cam, a flexible connection attached to said lever, a wheel operated by said flexible connection, a gear wheel connected to said last mentioned wheel, a toothed rack secured to said charge box and meshing with said gear wheel, and means attached to said flexible connection for holding said lever against said cam, substantially as set forth.

7. The combination of a meal receptacle, a cake forming device, a charge box movable from said receptacle to said forming device, operating mechanism for said charge box, a drive element, and means for connecting said operating mechanism to and disconnecting it from said drive element, said operating mechanism being constructed to move said charge box from said receptacle to said cake molding device, then reciprocate said charge box adjacent to said molding device and then return said charge box to said meal receptacle, substantially as set forth.

8. The combination of a meal receptacle, a cake molding device, a charge box movable from said meal receptacle to said mold device, a cam, a driving element for said cam, means for connecting said cam to and disconnecting it from said driving element, and connections between said cam and said charge box, said cam and connections being constructed to move said charge box from said receptacle to said cake molding device, then reciprocate said charge box adjacent to said molding device and then return said charge box to said meal receptacle, substantially as set forth.

9. In a cake forming machine, the combination of a press platen, a mold box which is hinged to swing toward and from the platen and is also movable with the platen, and a press head movable relative to the mold box, substantially as set forth.

10. In a cake forming machine, the combination of a press platen, a mold box which is hinged to swing toward and from the platen and is also movable with the platen, a press head movable relative to the mold box, and counterbalancing means for said mold box, substantially as set forth.

11. In a cake forming machine, the combination of a press platen, a mold box which is hinged to swing toward and from the platen and is also movable with the platen, a press head hinged to swing independently of the mold box toward and from the platen, and counterbalancing means for said box and press head, substantially as set forth.

Witness my hand, this 21st day of June, 1906.

ALFRED W. FRENCH.

Witnesses:
C. B. HORNBECK,
A. L. MCGEE.