

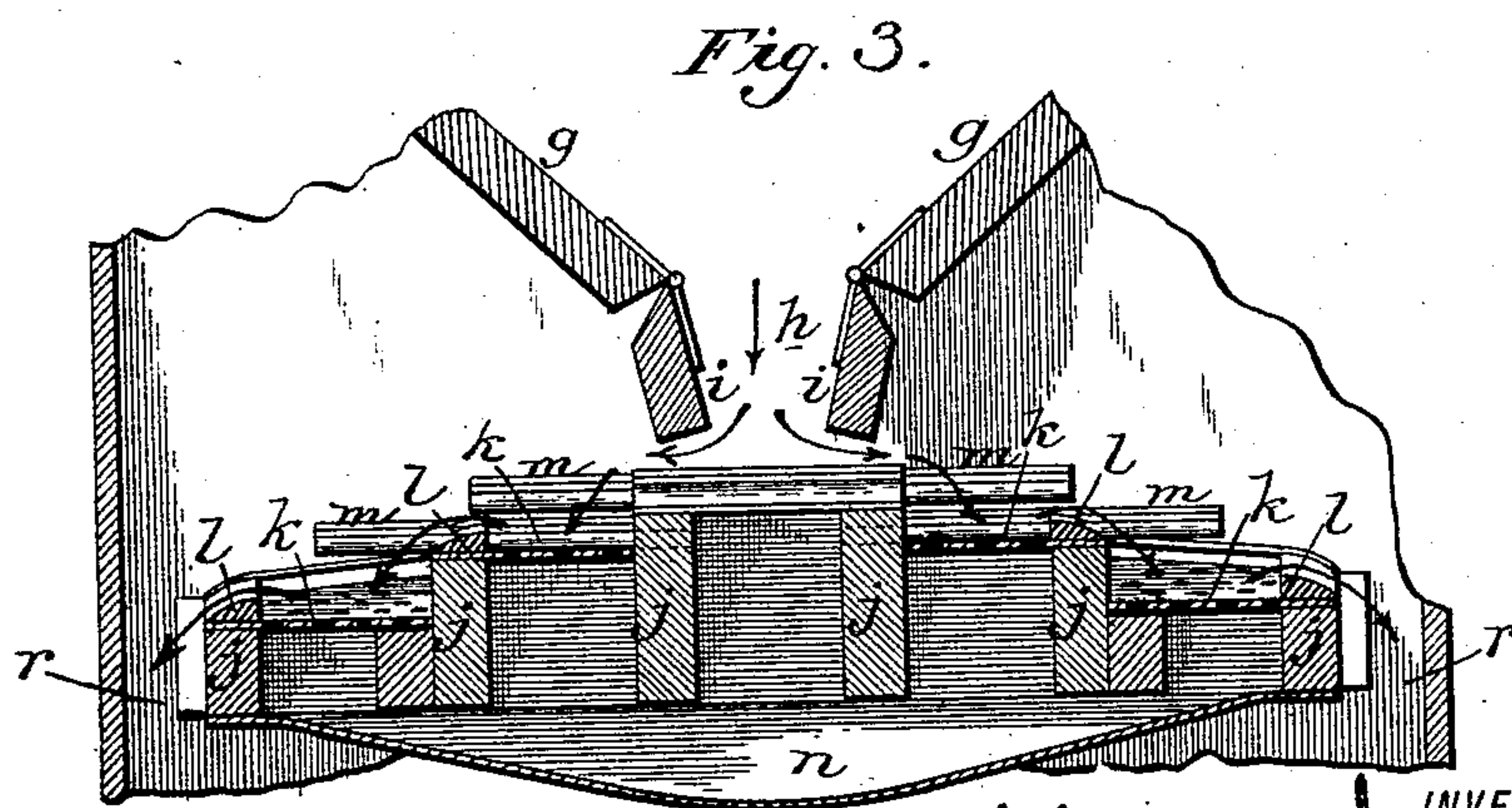
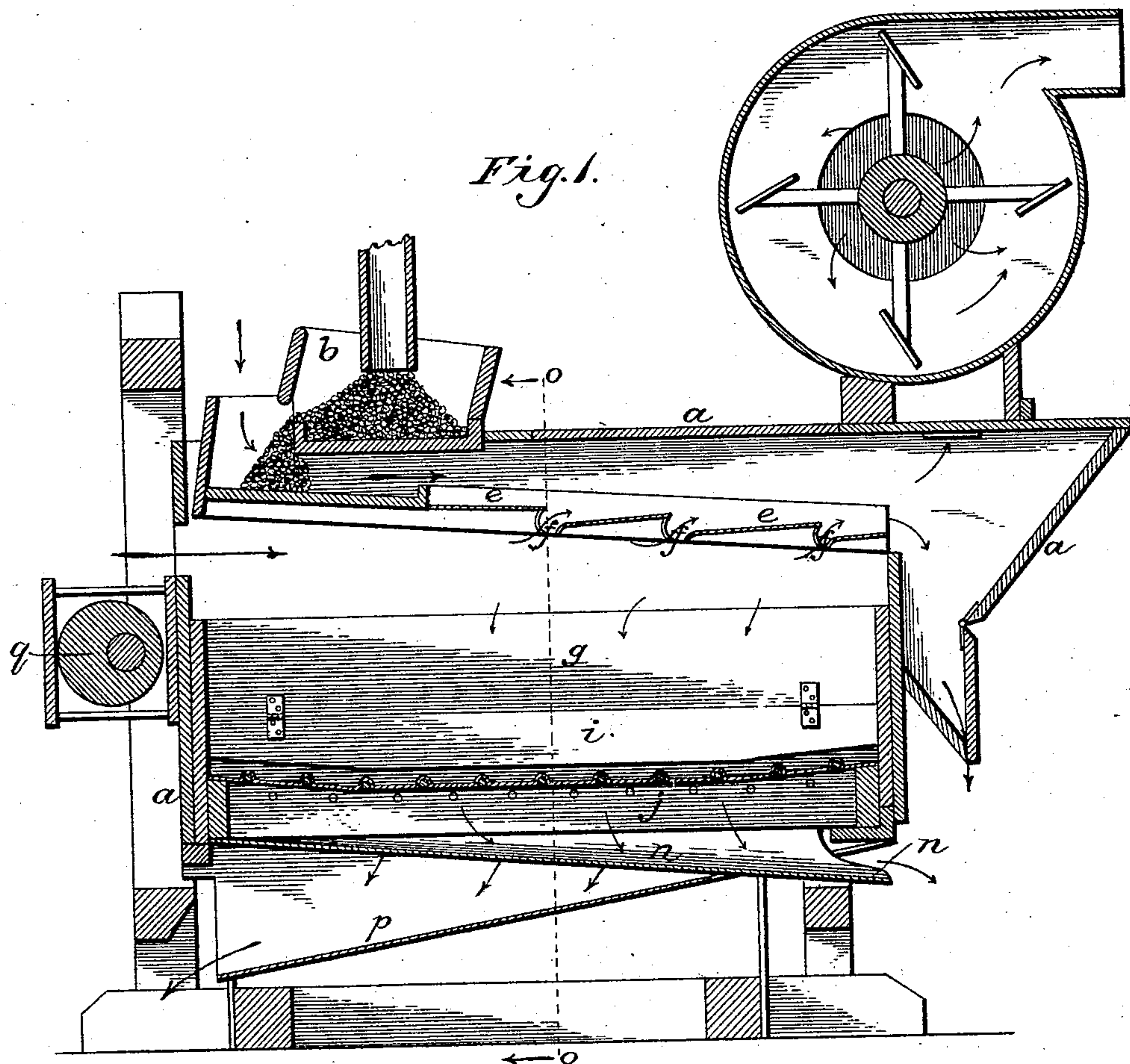
(No Model.)

3 Sheets—Sheet 1.

C. CLOSZ.
GRAIN SEPARATOR.

No. 455,997.

Patented July 14, 1891.



WITNESSES:

Howell Bartle
Philip F. Lerner.

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BY
Johnson & Johnson
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(No Model.)

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Fig. 2.

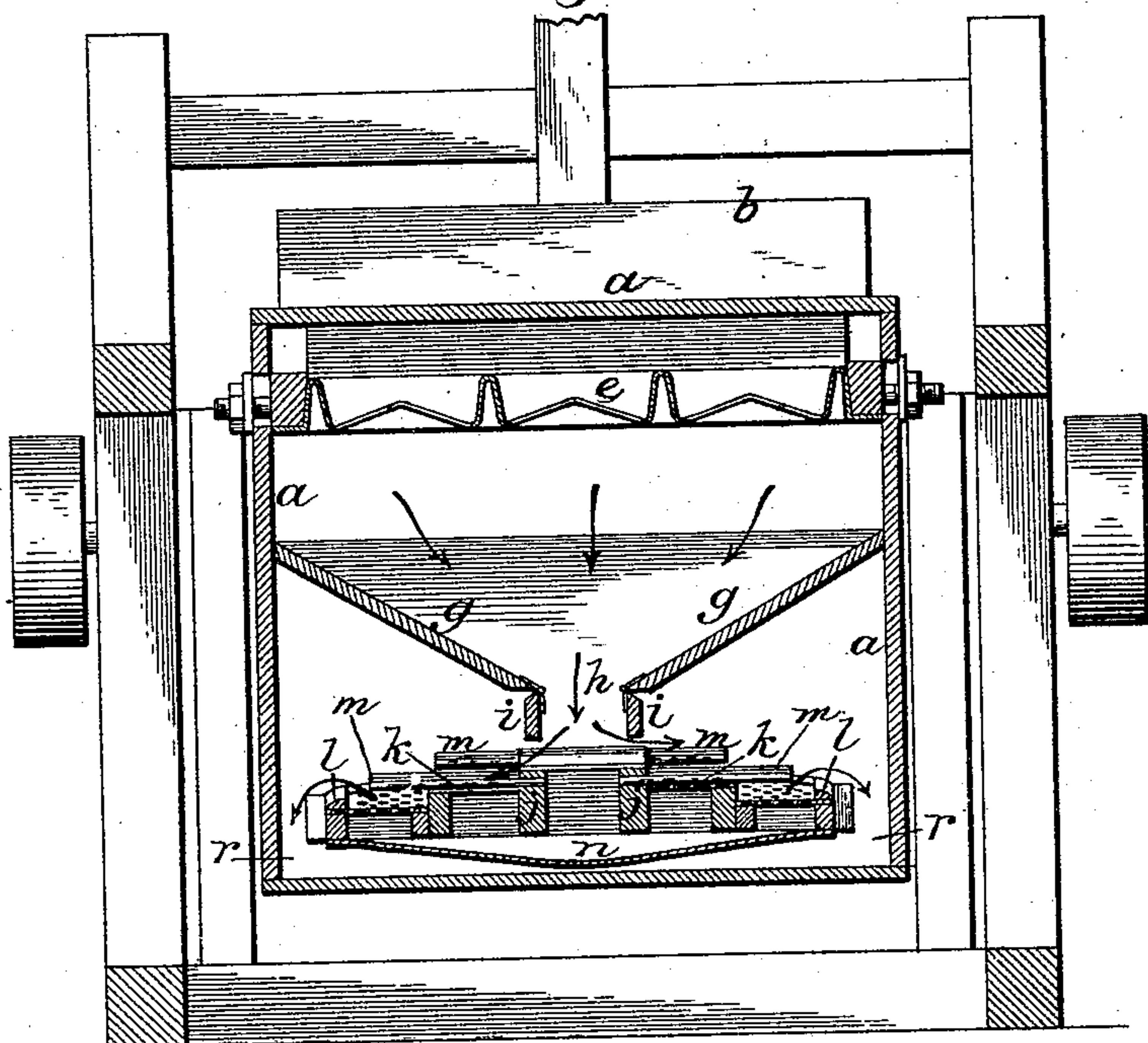
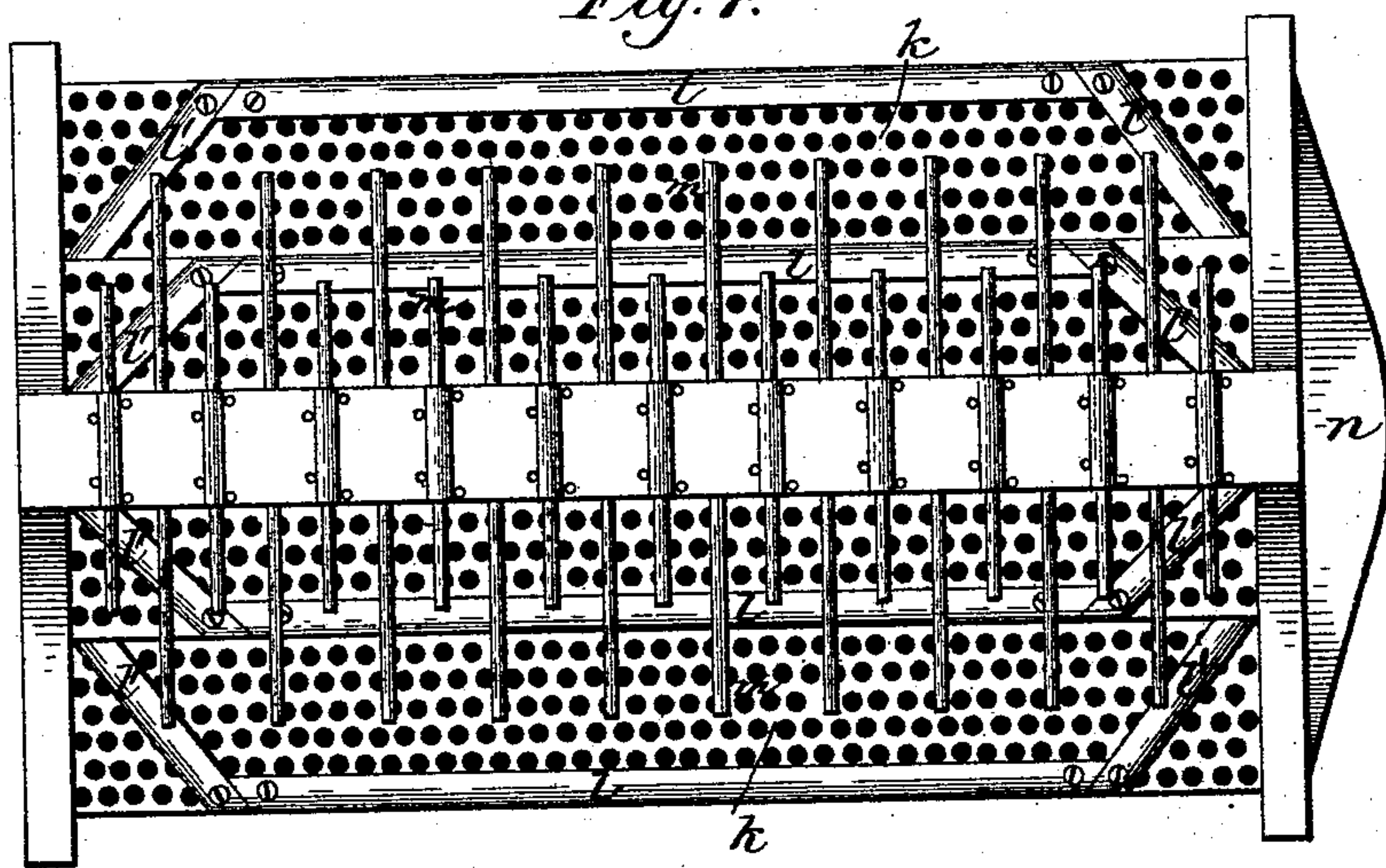


Fig. 4.



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(No Model.)

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Fig. 5.

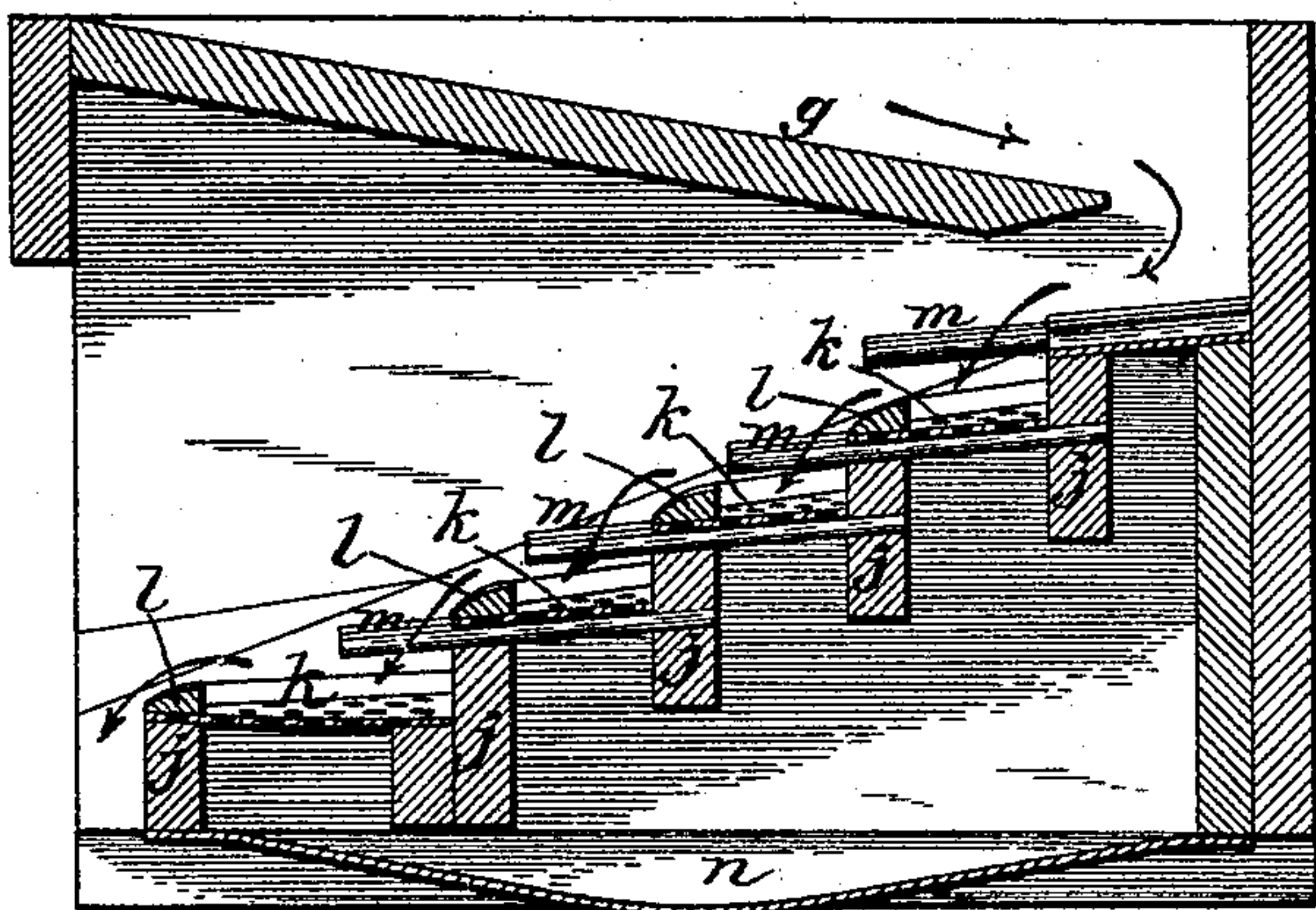


Fig. 7.

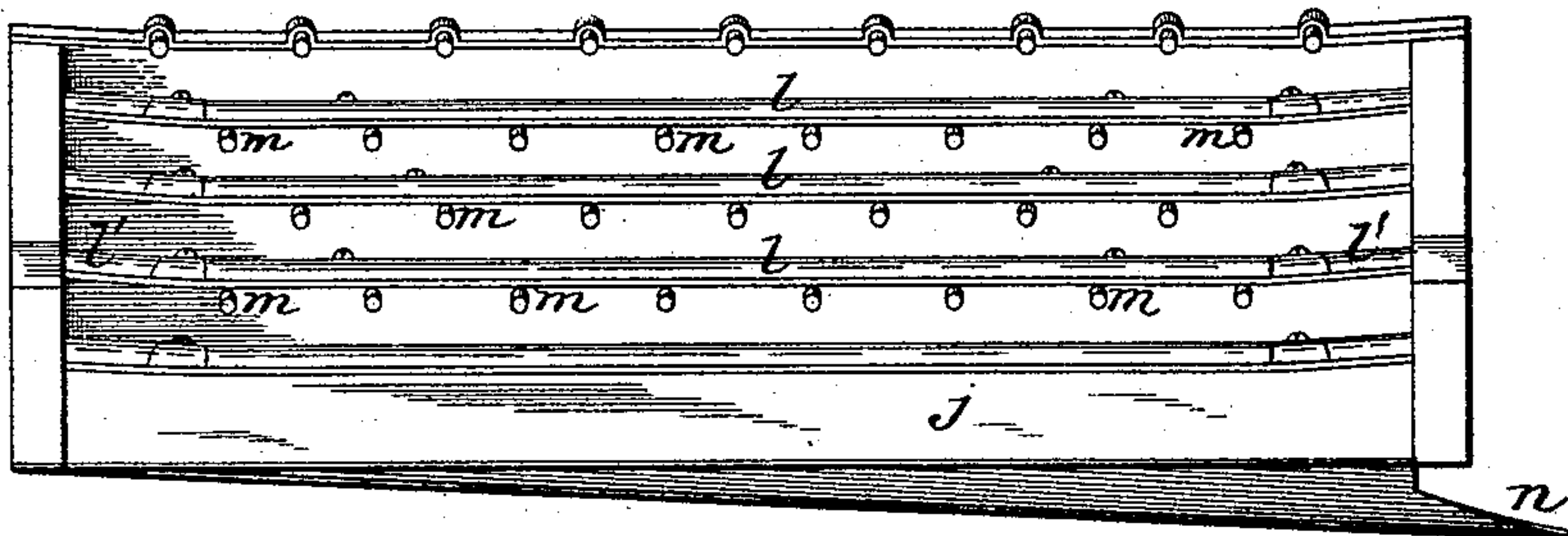
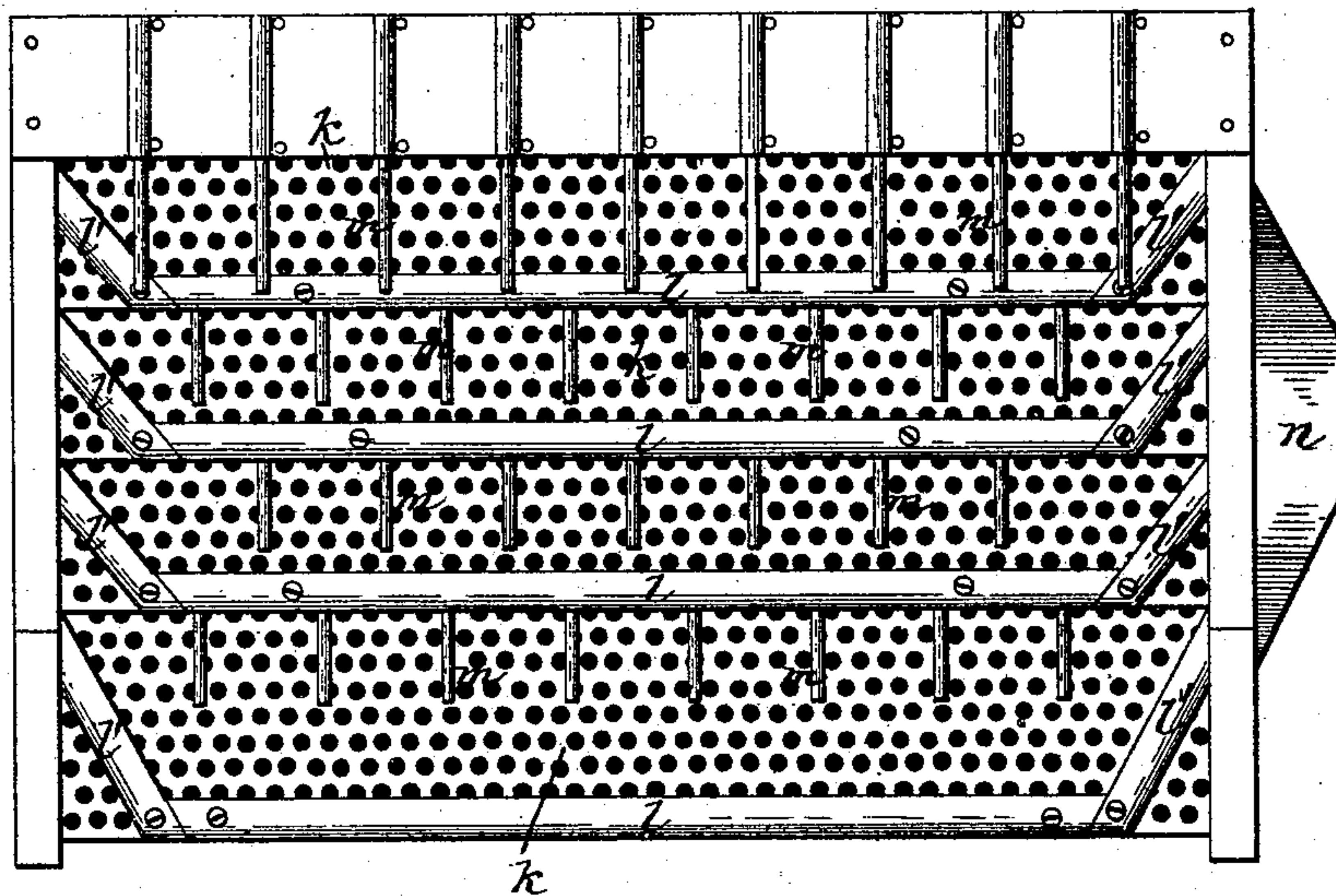


Fig. 6.



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UNITED STATES PATENT OFFICE.

CHARLES CLOSZ, OF ST. ANSGAR, IOWA.

GRAIN-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 455,997, dated July 14, 1891.

Application filed November 6, 1890. Serial No. 370,468. (No model.)

To all whom it may concern:

Be it known that I, CHARLES CLOSZ, a citizen of the United States, residing at St. Ansgar, in the county of Mitchell and State of Iowa, have invented new and useful Improvements in Grain-Separators, of which the following is a specification.

My invention is directed to improvements in grain-separators whereby the separation is effected by gravity in an apparatus having a longitudinal reciprocating movement and a side overflow-discharge from a foraminated shelved tray, in each shelf or step of which the heavy foreign matter accumulates and is retained, while the grain passes off sidewise from one shelf to another.

The object of my invention is to provide a retarded step-like movement of the grain sidewise over the separating-surface, which forms shallow side overflow shelves or trays arranged at relative different levels to retain such matter as nails, pieces of metal, or gravel that are sometimes found in the grain. The several shelves or steps are provided with wires or fingers which stand at right angles to the direction of the shaking movement and serve to render the separation more effective by agitating and opening the grain in its movement from shelf to shelf. The dust and small seeds are sifted from the grain in its step-like movement under the longitudinal shaking action which the shelved tray receives in the machine wherein it is arranged for use.

The accompanying drawings illustrate my invention, which I will now describe in connection with such drawings, and will specifically designate in the concluding claims the parts and combination of parts which constitute my improvements.

In the drawings I have illustrated my invention in connection with a complete grain-separator; but it will be understood that my improved step-like tray or separator platform may be employed in grain-separators otherwise different in general operation and construction from that shown. In such machine I have shown my improved separating shelved tray having a step-like construction adapted for an overflow-discharge from each side of the device; but it will be understood

that such step-like construction may be adapted for an overflow-discharge at one side only of the device and can be readily placed in any grain-separating machine having provision for operating the step-like tray with a longitudinal shaking movement.

Referring to the drawings, Figure 1 represents a vertical longitudinal section of a grain-separating machine having my invention applied thereto. Fig. 2 is a vertical transverse section of the same, taken on the line *oo* of Fig. 1. Fig. 3 is an enlarged cross-section of the stepped or shelved separating-tray, showing its relation to the supply-hopper and the overflow-discharge of the grain at each side of the shelved tray. Fig. 4 is a top view of the stepped or shelved separating-tray shown in Fig. 3. Fig. 5 is a vertical cross-section of the stepped tray having an overflow-discharge at one side only. Fig. 6 is a top view of the stepped or shelved tray shown in Fig. 5, and Fig. 7 is a side view of the shelved tray.

As shown in the drawings, the separating, accumulating, and retaining tray parts of the apparatus for separating and cleaning grain are arranged in a box *a*, and with it they form the separator device; but the stepped tray may be arranged within any suitable closure adapted to receive the grain and to have a longitudinal shaking movement and an overflow side discharge. As shown, this box is suspended or mounted in a frame for longitudinal movement only.

b is a hopper, into which the grain is fed into the machine. *e* is a separator-platform extending from said hopper and receives the grain therefrom to separate the straw and long stuff which passes off at the end of this platform, while the grain and heavier matters pass through openings *f* down to the stepped separating-tray; but it will be understood that the grain may be delivered by hopper or otherwise directly upon the highest shelf of the said stepped tray, which may be suitably arranged in the machine for this purpose. As shown in Figs. 1 and 2 in the drawings, such hopper is arranged to receive the grain from this preliminary straw-separator and deliver it upon the stepped separating-tray, which is secured between the

walls of the box at the bottom thereof. I may use a construction of stepped tray having an overflow-discharge at its opposite sides, as shown in Figs. 2 and 3, or I may use a construction of stepped tray having an overflow-discharge at one side only, as shown in Figs. 5 and 6, both constructions being identical and operating in the same way, and the shelves are closed at each end by the box-walls. In Fig. 2 such hopper is shown as being formed of two boards *g g*, inclining downward from the box-walls, so as to form a middle slot *h*, having a length equal to that of the stepped tray and wide enough to let the grain pass freely down through it in a ridge or strip-like body upon the highest middle step or shelf, over and from which it passes sidewise in opposite directions. In Fig. 5 such hopper is shown as being formed of a flat wide spout or board *g*, arranged to deliver the grain upon the highest step or shelf in the direction of the one side discharge. In either case the hopper-delivery is in a comparatively thin sheet. In the construction in which the hopper forms the slot I prefer to form the walls of this slot of boards *i i*, hinged so as to yield outward within certain limits from each side of the slot by the falling grain, and thereby give a free uniform sheet-flow from the slot under the edges of the swinging walls. The shelved tray is constructed of a suitable frame of longitudinal timbers *j*, placed lengthwise at suitable distance apart and with their upper edges at relative different heights, on each of which I secure a strip of sheet metal *k*, which has perforations of a size to permit dust, dirt, and small seeds to pass through them, while the grain has a retarded movement sidewise from and over each shelf onto the one next below. I prefer to provide each shelf with an edge overflow-ridge *l*, the better to retard the movement of the grain, and to form a tray of each shelf, within which some of the heavy foreign matter would be retained. At the ends of these shelves I prefer to place overflow-ridges *l'* in oblique relation to the edge ridge *l* for the purpose of preventing the collection of the grain at the closed ends of these shelves, which, with a level and horizontal surface, it would be liable to do under the longitudinal movement of the device and cause an unequal overflow. Especially are these oblique overflow-ridges advantageous for this purpose in the lowest shelf to prevent an increased overflow at the ends, which might carry off some of the heavy matters which are intended to be retained in the tray. Standing out from the overflow edges or crossing the surfaces of the shelves are fingers or wires *m* for agitating the grain upon the surface of the tray or as the grain passes off from such surface, or both, and thus insure a more effective separation of the pieces of metal or stone from the grain. These wires or fingers are arranged at right angles to the endwise movement of the device and overhang the shelves, and they may cross on

the surfaces of the latter or project only from the edges of the shelves. When in the latter position, the surfaces of the shelves may be corrugated or ridged crosswise, as shown in the highest shelf, and in such case the fingers or wires may be secured in the corrugations under the metal strips, as in Figs. 4 and 6 of the drawings. These surface corrugations or wires and the projecting fingers give a shuffling action to the grain upon the perforated surface and at the point of overflow by the force of the shaking action produced by the movement of the shelved tray at right angles to the movement of the grain, which operates to thoroughly sift the dust, dirt, and small seeds from the grain. This bottom discharge serves to prevent the packing and clogging of the grain in the bottom of the tray, because if the grain should pack or clog in the tray-bottom the nails and heavy particles would be liable to pass off with the moving grain in the side overflow. I prefer to slightly incline the shelves toward the side to facilitate the movement of the grain from one shelf to the other, and in the construction in which the overflow-discharge is from both sides of the device the highest shelf is preferably of greater width than the hopper-slot, so that the grain will pass from the hopper-slot upon the shelf, and will pass over said shelf in a thin sheet from both sides of said slot into the next below, from which it overflows in a thin sheet, and so on to the bottom tray, each tray serving to give a slight retarded movement to the grain and to deliver it from the lowest tray cleaned and free from nails and heavy particles.

For effecting the separate discharge of the fine stuff and small seeds from the bottom of the shelved tray through its openings I provide a bottom *n*, arranged so as to discharge at one end of the device, while the overflow-discharge of the grain from the side or sides of the shelved-tray device is directed into a suitable receptacle by means of an inclined bottom *p*, such as shown in Fig. 1. The box or closure which contains the shelved-tray device is supported or mounted so as to have a reciprocating longitudinal movement only, which may be communicated to it in any suitable way, as by means of the eccentric *q*, which may be operated from any suitable power. This shelved-tray device is well adapted for use in the mill or in an elevator for handling and storing grain, and it may be used with or without an air-blast. The heavy matters which are retained in the trays can be removed through doors in the sides of the box or by any suitable means of access to the trays or shelves.

Referring to Fig. 3, it will be seen that the tray-closure proper is of less width than the box or closure within which it is mounted, so as to leave a space *r* between them for the overflowing grain to pass down at each side of the box into a receptacle arranged for the purpose.

It is evident that immaterial departures

may be permitted from the general construction and arrangement of parts contributing to my invention, and for this reason I do not wish to be understood as limiting myself thereto in precise detail—as, for instance, my invention is not confined to any particular construction of machine within which my shelved-tray separator may be used, either with a single or with two side discharges, or to any particular way of delivering the grain upon the shelved tray. The overflow-ridges of the intermediate shelves may be dispensed with, and the wires or fingers may be dispensed with, and the grain would still be subjected to a retarded step-like overflow movement at right angles to the line of the shaking movement. The number of the shelves employed will be determined by the construction of the machine in which the device may be used and the kind of work for which it may be designed.

The separation of the grain upon a surface of steps or shelves placed at relatively different heights by a sidewise movement over such steps, produced by a shaking movement in the line of said steps or shelves, gives the advantage of preventing the pushing action of the grain, and hence the heavy particles are not so liable to be carried off with the grain.

I claim as my improvement—

1. A shelved tray for separating grain, having shelves arranged at relatively different heights from the lower discharging to the highest receiving tray, which are perforated, provided with overflow edge ribs, and have a reciprocating movement at right angles to the side overflow movement of the grain, substantially as described.

2. A shelved tray for separating grain, having shelves arranged at relatively different heights from the lower discharging to the highest receiving tray, which are perforated and provided with edge overflow ribs and with fingers or wires standing out from the overflow edges of said shelves, and have a recip-

rocating movement at right angles to the side overflow movement of the grain, substantially as described.

3. A longitudinally-shaking tray for grain-separators, having foraminated shelves arranged in the line of the movement of said tray at relatively different heights from the lower discharging to the highest receiving shelf, the intermediate and lower shelves provided with edge overflow ribs terminating in oblique ribs at each end of the trays, and fingers or wires standing in the line of the overflow, substantially as described.

4. A longitudinally-shaking tray for grain-separators, having a foraminated bottom and a central longitudinal raised part terminating in stepped side overflow shelves arranged at relatively different heights from the lower discharging to the highest receiving tray, in combination with a hopper arranged to deliver the grain over both edges of the highest shelf, substantially as described.

5. A longitudinally-shaking tray for grain-separators, having foraminated shelves arranged at relatively different heights from the lower discharging to the highest receiving tray, the latter having a central longitudinal relation to said shelves and formed with transverse corrugations, in combination with a hopper arranged to deliver the grain upon the said central shelf, substantially as described.

6. A longitudinally-shaking tray for grain-separators, having a sidewise shelved or stepped overflow-discharge, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

CHARLES CLOSZ.

Witnesses:

MARTIN MOE,
LARS MOE.