

(Model.)

P. H. CRAGIN.
PAPER PULP SCREEN.

No. 277,239.

Patented May 8, 1883.

Fig 1

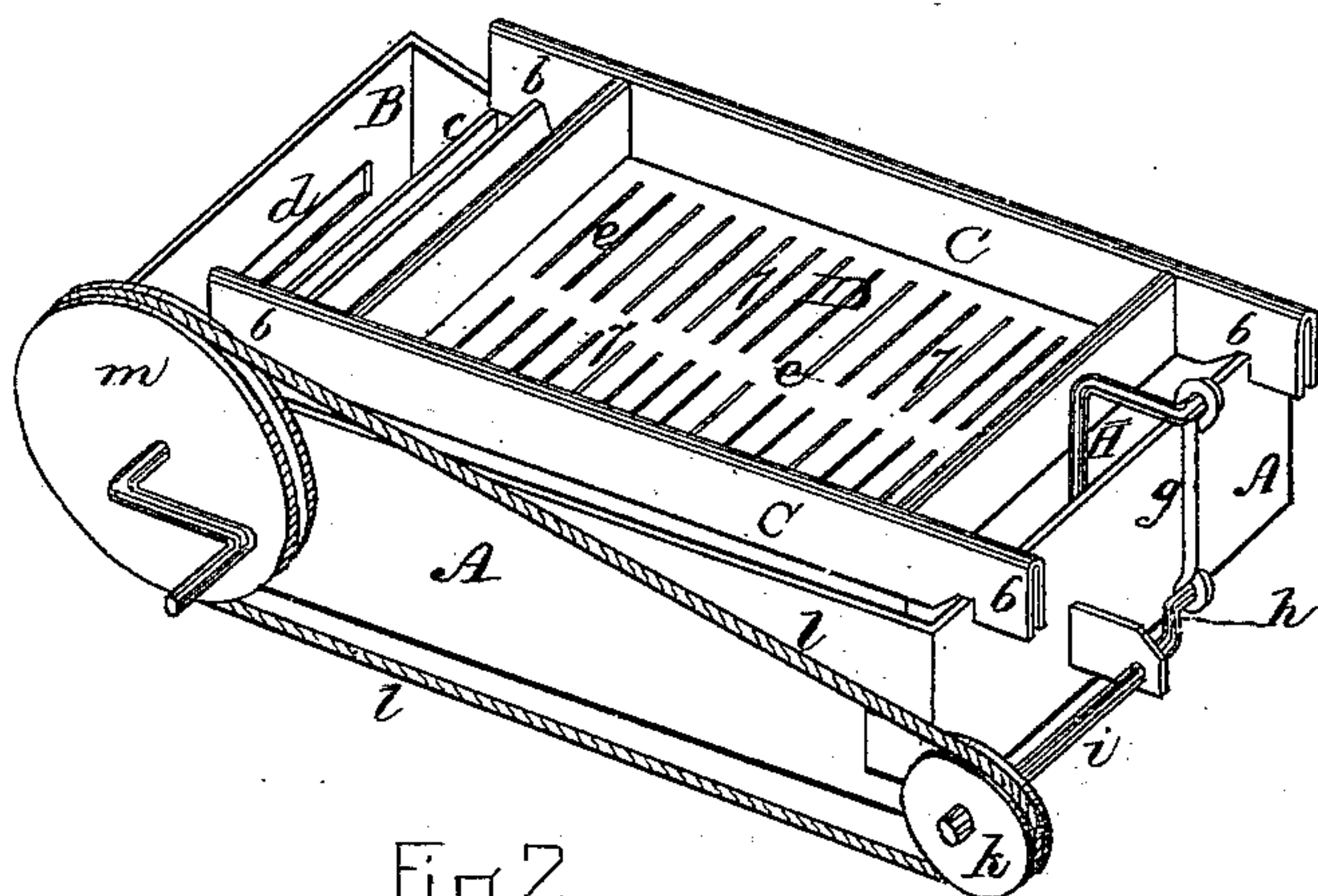


Fig 2

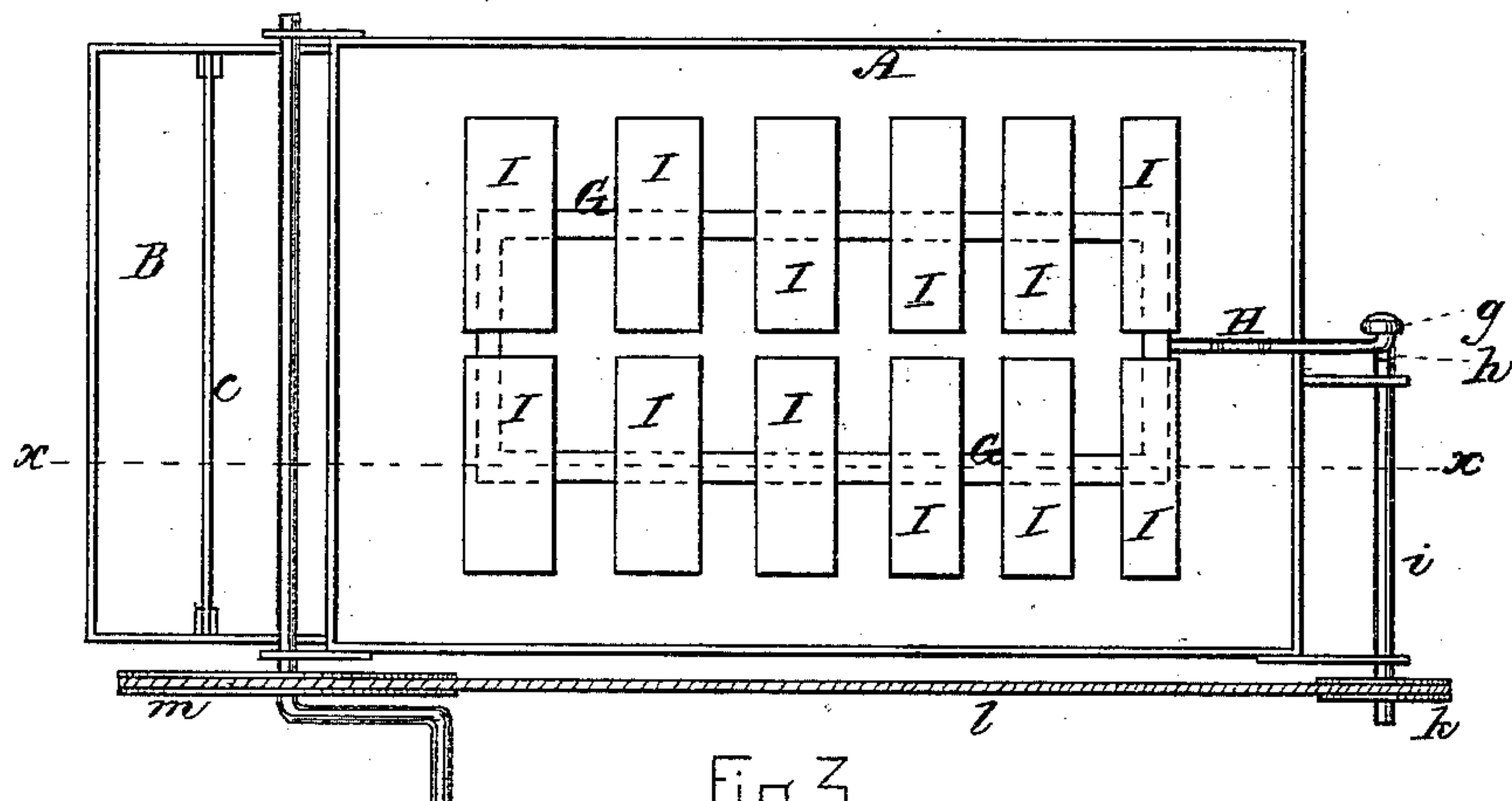


Fig 3

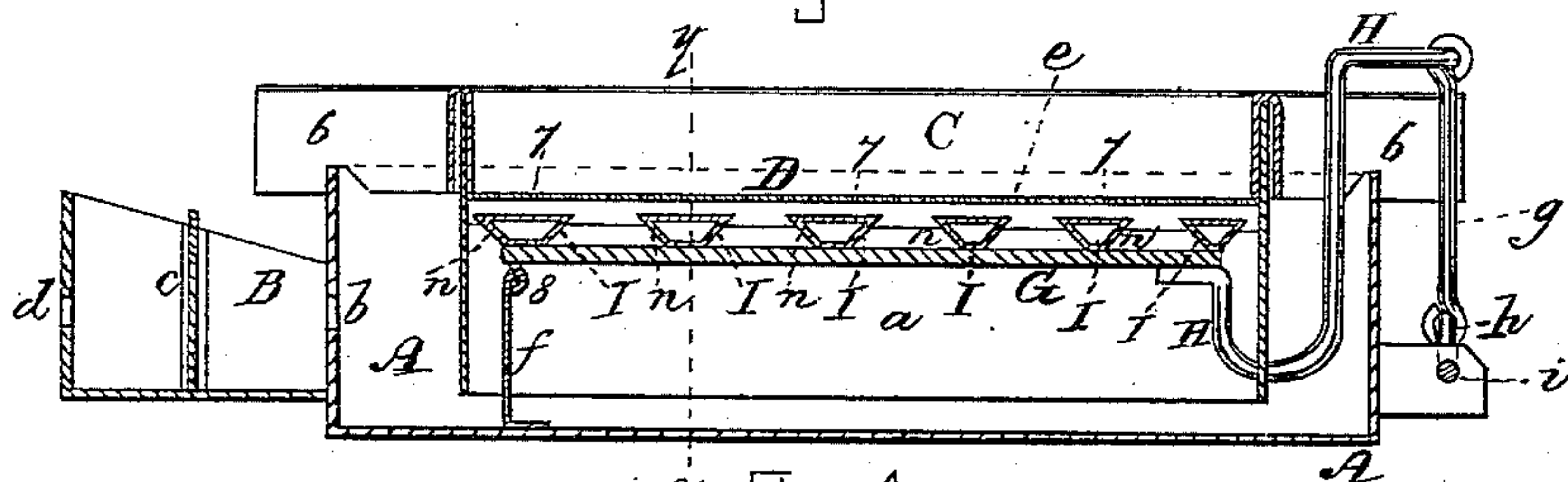
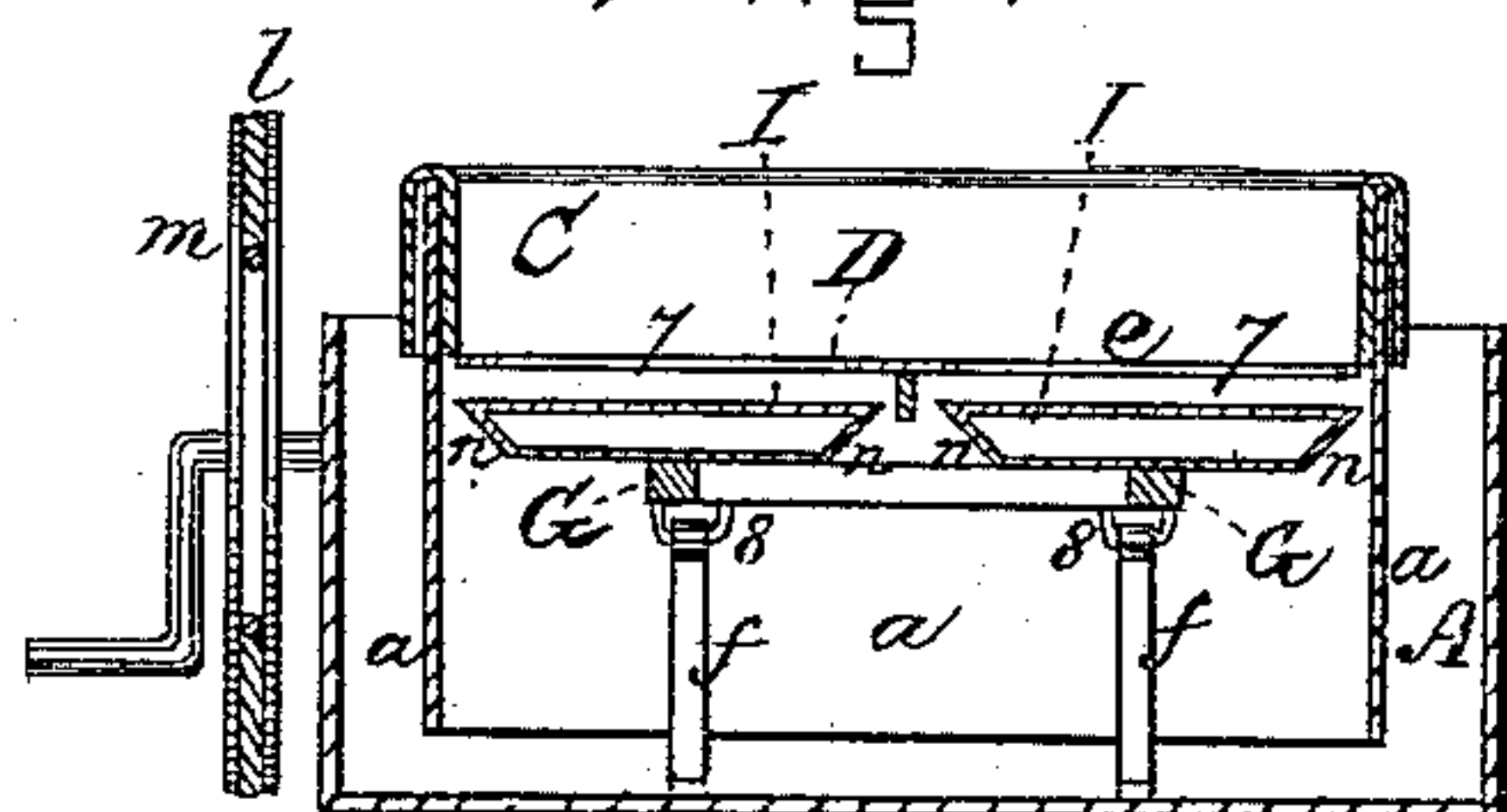


Fig 4



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PATRICK H. CRAGIN, OF FRANKLIN, NEW HAMPSHIRE, ASSIGNOR OF ONE-HALF TO RICHARDS & CO., OF GARDINER, MAINE.

PAPER-PULP SCREEN.

SPECIFICATION forming part of Letters Patent No. 277,239, dated May 8, 1883.

Application filed August 20, 1881. (Model.)

To all whom it may concern:

Be it known that I, PATRICK H. CRAGIN, a citizen of the United States, residing at Franklin, in the county of Merrimack and State of New Hampshire, have invented certain Improvements in Paper-Pulp Screens, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a perspective view of a machine for screening paper-pulp, embodying my invention. Fig. 2 is a plan of the same with the screen removed to illustrate the interior construction. Fig. 3 is a longitudinal vertical section through the machine on the line *xx* of Fig. 2. Fig. 4 is a transverse vertical section on the line *yy* of Fig. 3. Fig. 5 is a perspective view of one of the air-exhausting plates or buckets inverted.

My invention has for its object to produce a machine by means of which paper-pulp may be more effectually cleansed of its impurities than heretofore, and also more thoroughly stirred within the vat for the purpose of maintaining a more uniform consistency throughout the mass, and thus preventing it from settling and becoming more dense at some points than at others; and my invention consists in the combination, with a stationary screen and pulp-vat, of a series of air-exhausting plates or buckets which are attached to a movable frame arranged immediately beneath the screen, by means of which the air is partially exhausted from the closed space at this point for the purpose of causing the pulp to be forced through the screen in a perfect and expeditious manner by the atmospheric pressure above it.

My invention also consists in constructing the air-exhausting plates or buckets with their sides and ends inclined inward and downward, which facilitates the movement through the mass of pulp in the vat and prevents it from collecting beneath them and being afterward detached in lumps, which are objectionable, as they produce bunches or imperfections in the paper.

My invention also consists in producing the oscillating or tilting movement of the frame, which carries the air-exhausting plates, by

means of a bent arm extending up within the pulp-vat and over the upper edge thereof, where it is connected with the driving mechanism, whereby the construction is simplified and the power required to operate the machine reduced to a minimum.

My invention furthermore consists in gradually increasing the surface areas of the air-exhausting plates or buckets as they approach the pivoted end of their supporting-frame, whereby the suction upon the different portions of the screen is equalized and the pulp uniformly drawn through all portions of the same.

My invention also consists in the combination, with the pulp-vat, of a screen-frame disconnected from the pulp-vat and adapted to be lifted therefrom and replaced by another having a different screen, whereby the labor of changing the screens as required for different kinds of paper is materially diminished and the operation greatly simplified.

In the said drawings, A represents the pulp-vat provided as usual at one end with the chamber B, communicating with the vat by means of a long narrow aperture, *b*, and having an adjustable gate, *c*, for regulating the level of the pulp in the vat, and a long narrow exit-aperture, *d*, through which the pulp is discharged onto the apron which carries it to the paper-machine.

D is the screen, the ends *e* of the frame of which rest upon the upper edges of the vat A, while the edges of the lower portion, *a*, extend down into the vat below the level of the pulp therein. This screen-frame C, which is made exceedingly light, being disconnected from the pulp-vat A, (see Figs. 1 and 3,) can be readily lifted off with its screen D, and replaced, if desired, by another similar frame having a screen of a different kind adapted for another variety of paper, the operation of removing one screen-frame from the pulp-vat and putting another in its place being easily effected with very little labor, whereas in paper-pulp screens as hitherto constructed the screen-frame has been made extremely heavy, and has been hinged or pivoted at one end to the pulp-vat, and adapted to be raised or swung up on its pivots by a cord and pulley or other device, while the

screen itself was secured to the bottom of its frame by screws, which it was necessary to remove when the screen required to be changed for one of a different kind, the latter operation involving the expenditure of considerable time and labor, which is saved by my improved construction. The removable bottom plate, *e*, of the screen is provided, as usual, with long narrow slits or apertures 7, for the passage of the pulp, and rests on suitable supports extending across the interior of the frame or out from the sides thereof.

Within the space inclosed by the lower portion, *a*, of the screen-frame, and immediately under the screen-plate *e*, is arranged a frame, *G*, which is pivoted at one end, at 8 8, to suitable supports or standards, *f*, rising from the bottom of the vat *A*, the opposite or free end of the frame *G* being supported by a bent arm, *H*, which extends up over the upper edge of the vat, where it is connected with a pitman, *g*, the lower end of which is attached to a crank, *h*, on the end of a horizontal shaft, *i*, carrying at its outer end a pulley, *k*, which is driven by a belt, *l*, passing over a large pulley, *m*, rotated by any suitable power, and thus, through the connections described, as the shaft *i* is rotated, the frame *G* is rocked or oscillated on its pivots, for a purpose to be presently described. Any other suitable mechanism having the required movement may, however, be connected with the bent arm *H* for the purpose of imparting the desired movements to the frame *G*.

Upon the upper surface of the oscillating frame *G* are secured, at a short distance apart, a series of plates or buckets, *I*, which are immersed in the pulp contained in the vat *A*—being always below the level thereof—and when the frame *G* is drawn down by the mechanism above described, these plates or buckets *I*, in their passage through the pulp, serve to exhaust a portion of the air from the closed space immediately beneath the screen, thus creating a partial vacuum at this point, which causes the pulp to be forced through the screen-plate *e* by the atmospheric pressure above it in such a manner that it is found to be more effectually cleansed of all impurities and foreign substances than has heretofore been possible. The sides and ends *n* of the buckets *I*, beneath the upper surface, are inclined, preferably at an angle of about forty-five degrees inward and downward, as seen in Figs. 3, 4, and 5, which construction greatly facilitates their downward movement through the mass of pulp, as the inclined sides afford a ready relief, and also prevent the pulp from collecting beneath the buckets, which would be objectionable, as it would become solidified and be detached in lumps, which would produce bunches and imperfections in the paper.

It will be seen that the surface area of the exhausting plates or buckets *I* increases gradually from the end of the frame to which the arm *H* is secured, where the movement is the greatest, to the opposite or pivoted end, where the frame has the least motion, as seen in Fig.

2, which thus causes the suction to be equalized throughout the entire surface area of the screen, as is necessary to produce a uniform delivery of the pulp from the screen to the vat *A* beneath.

Another advantage incident to the employment of the movable buckets *I* is that they serve to violently and constantly agitate the pulp within the vat *A* to such an extent as to maintain it at a uniform consistency and prevent all liability of its settling and becoming thicker or more dense at some parts than at others, which is an important consideration, as it insures the production of a better quality of paper.

By pivoting the frame *G* at one end, as shown, each of the plates or buckets *I* is caused to move up and down in the arc of a circle, which causes them to act with better effect in keeping the bottom of the screen clear and free from hanging pulp than if they moved in a strictly vertical plane, and effectually prevents the pulp from assuming a stringy form as it passes through the screen, which would be liable to cause imperfections in the paper.

By attaching a bent arm, *H*, to the oscillating frame *G*, and extending it up over the edge of the vat *A* to the point where it is connected with the actuating mechanism, the movement of the latter is communicated to the frame in a much more convenient and reliable manner than if a connecting-rod was passed directly up through the bottom of the vat *A*, which would necessitate the employment of a stuffing-box, and the construction is thus simplified and the power required to operate the machine reduced to a minimum.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a paper-pulp screen, the combination, with a stationary screen and pulp-vat, of a series of air-exhausting plates or buckets, *I*, attached to a movable frame, *G*, arranged immediately beneath the screen, and operating, substantially as described, to partially exhaust the air from the closed space beneath the screen, and thus cause the pulp to be forced through the latter by the atmospheric pressure above it, as set forth.

2. In a paper-pulp screen, the combination, with a stationary screen and pulp-vat, of the air-exhausting plates or buckets *I*, secured to a movable frame, and constructed with the sides inclined inward and downward, substantially in the manner and for the purpose described.

3. In a paper-pulp screen, the combination, with the oscillating pivoted frame *G* and its air-exhausting plates or buckets *I*, of the bent arm *H*, attached to the frame and extending up over the upper edge of the pulp-vat, and connected with the driving mechanism by which the frame is oscillated, substantially as and for the purpose set forth.

4. In a paper-pulp screen, the combination, with the stationary screen *D* and the pulp-vat *A*, of a series of air-exhausting plates or buck-

ets, I, secured to an oscillating or rocking frame, G, and having their surface areas gradually increasing from one end of the frame to the other as they approach the pivotal point on which the frame rocks, whereby the suction on different portions of the screen is equalized, substantially as described.

5 5. In a paper-pulp screen, the air-exhausting plates or buckets I, mounted upon a pivoted frame, G, and having a movement in the arc of a circle, for the purpose of clearing the bottom of the screen and preventing the pulp from assuming a stringy form, substantially as set forth.

6. In a paper-pulp screen, the combination, 15 with the pulp-vat, of the screen-frame C, supporting screen D, and disconnected from the pulp-vat, and adapted to be lifted off therefrom and replaced by another frame, substantially as and for the purpose set forth. 20

Witness my hand this 26th day of July, A. D. 1881.

PATRICK H. CRAGIN.

In presence of—

WARREN F. DANIELS,
WILLIAM M. BARNARD.