

(No Model.)

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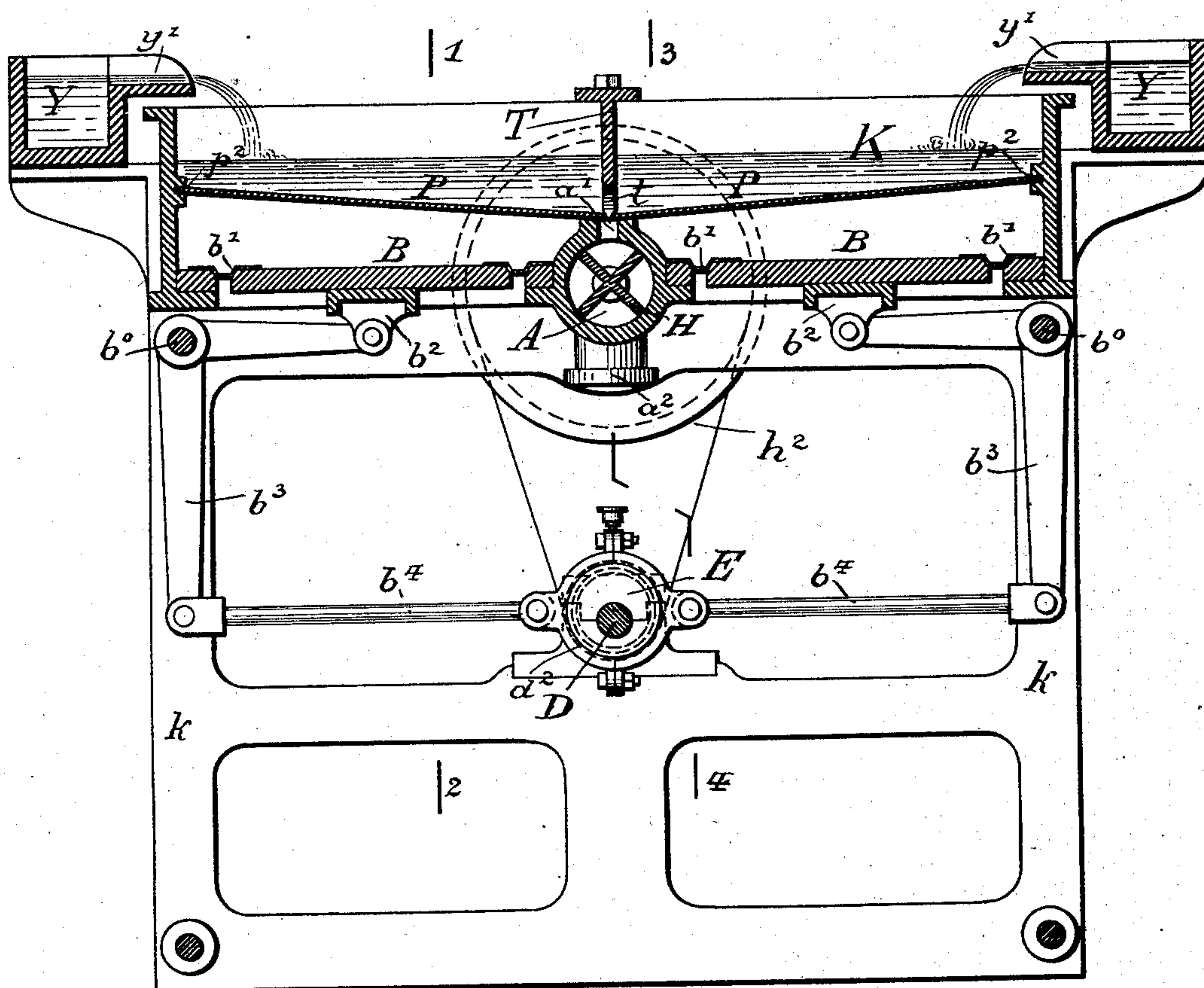
R. KRON.

SELF CLEANING PULP STRAINING MACHINE.

No. 315,420.

Patented Apr. 7, 1885.

Fig. 2



Witnesses:

Reni Zuckaas
E. Lidenmäyety

Inventor:

Inventor:
Randolph Horn
by Bruns & Co. Attys

(No Model.)

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Fig. 4

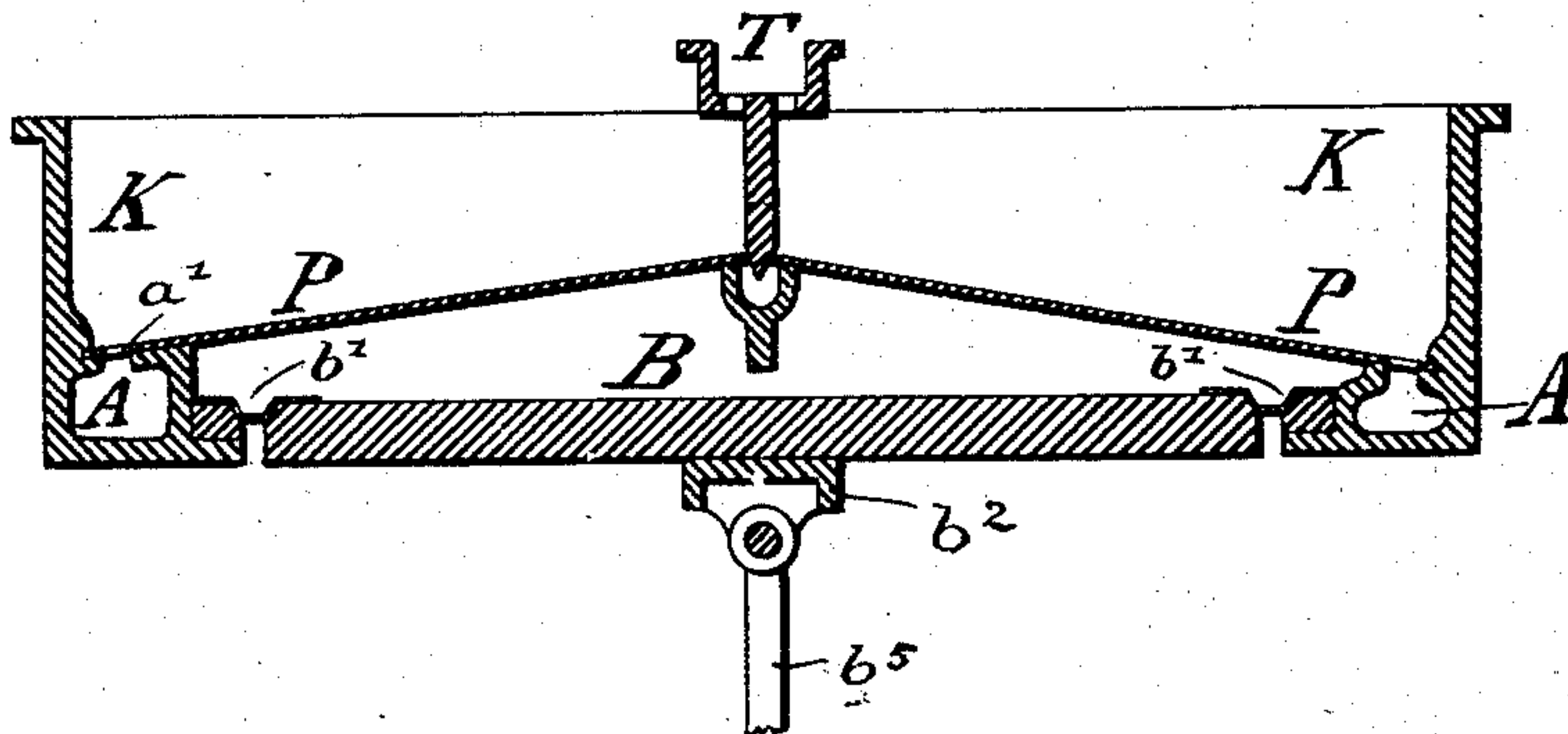
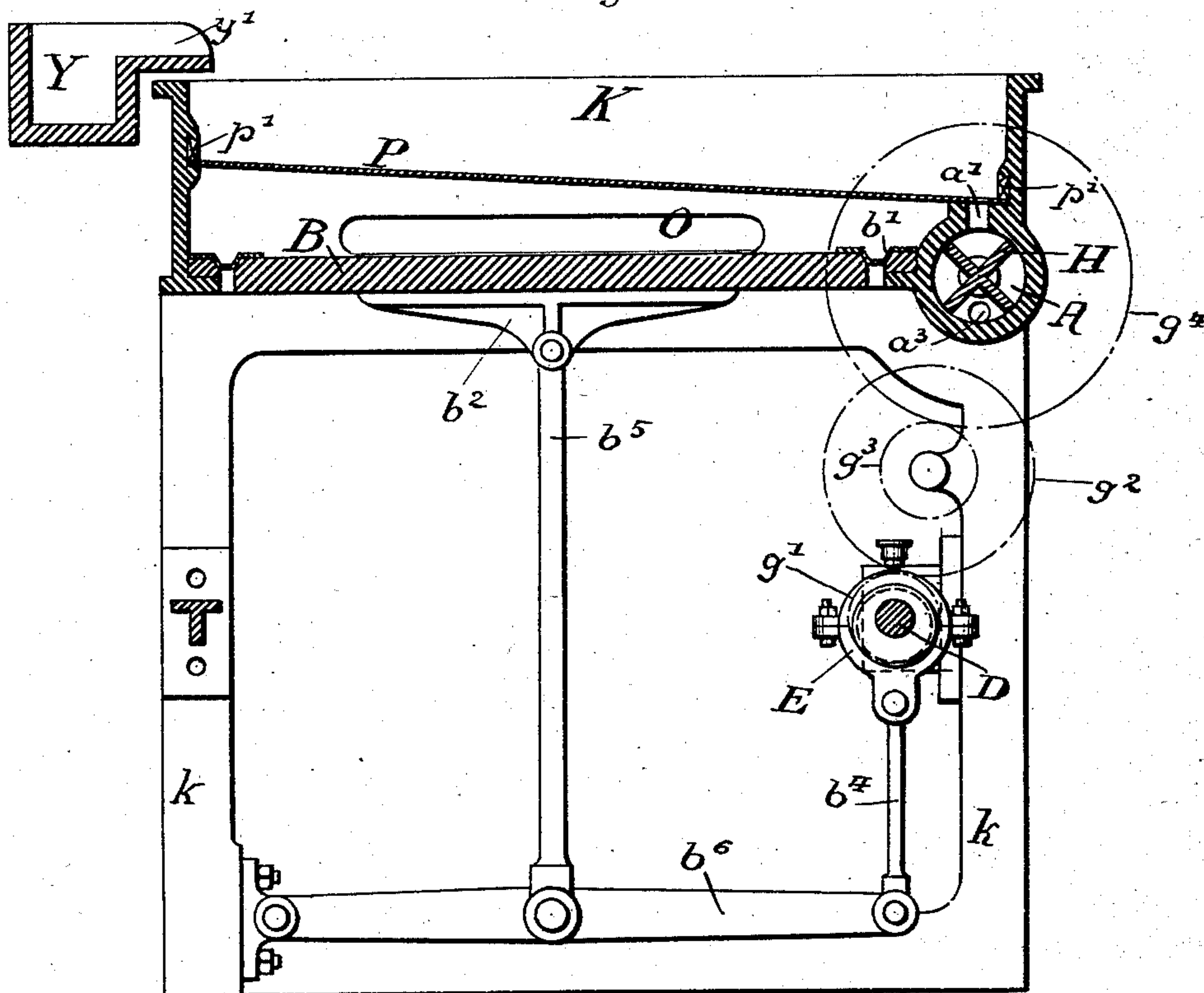


Fig. 3



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(No Model.)

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Fig. 5

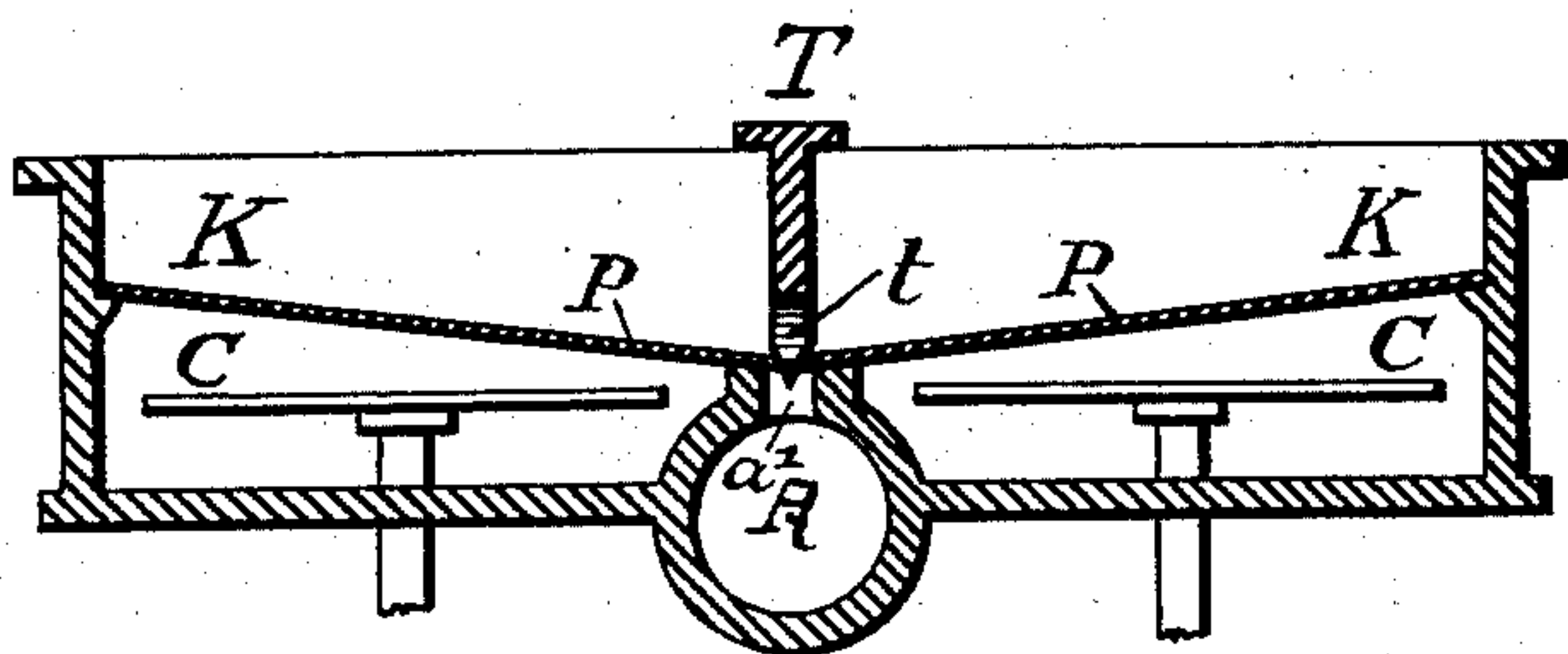
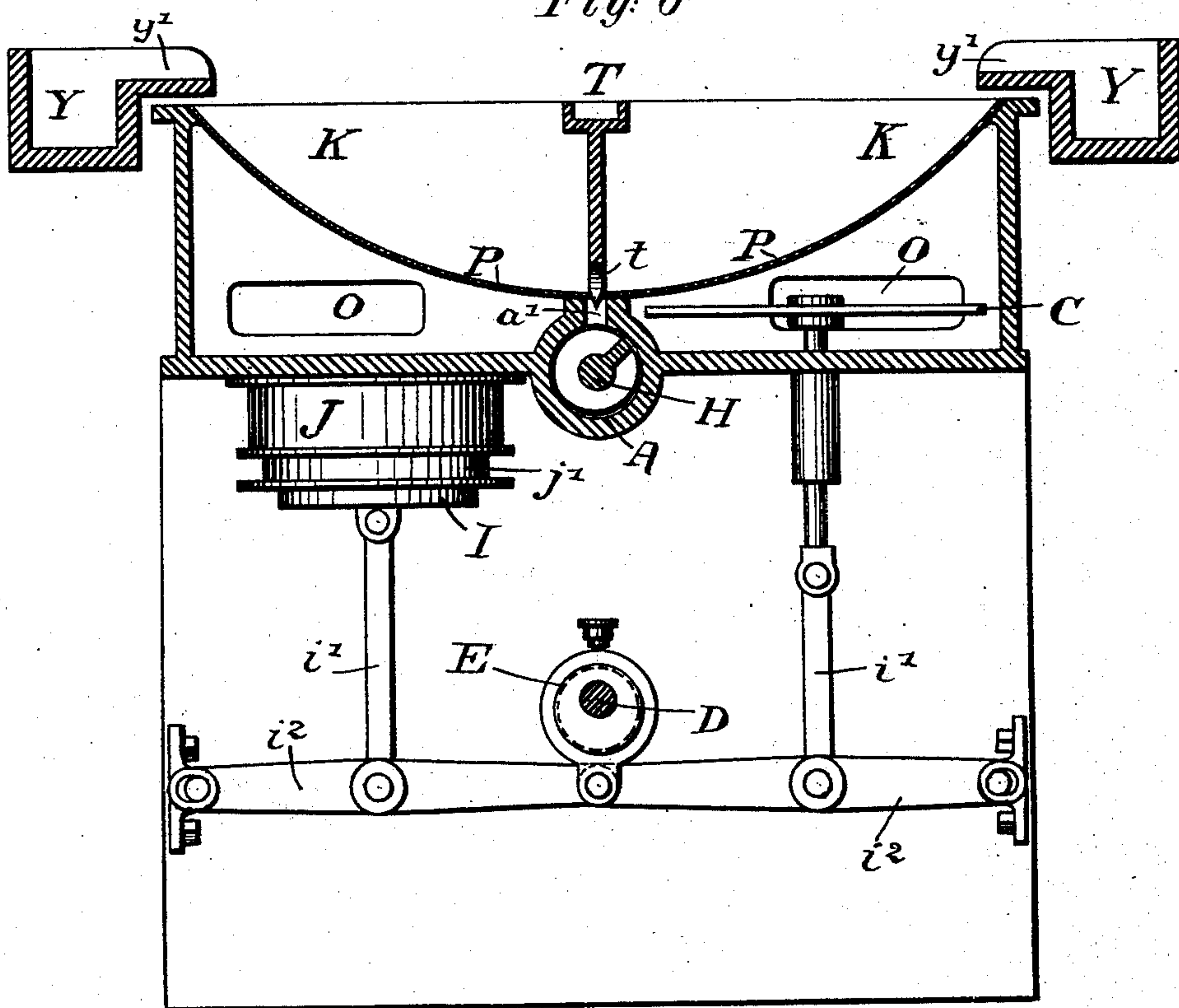


Fig. 6



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(No Model.)

5 Sheets—Sheet 5.

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SELF CLEANING PULP STRAINING MACHINE.

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Patented Apr. 7, 1885.

Fig: 7

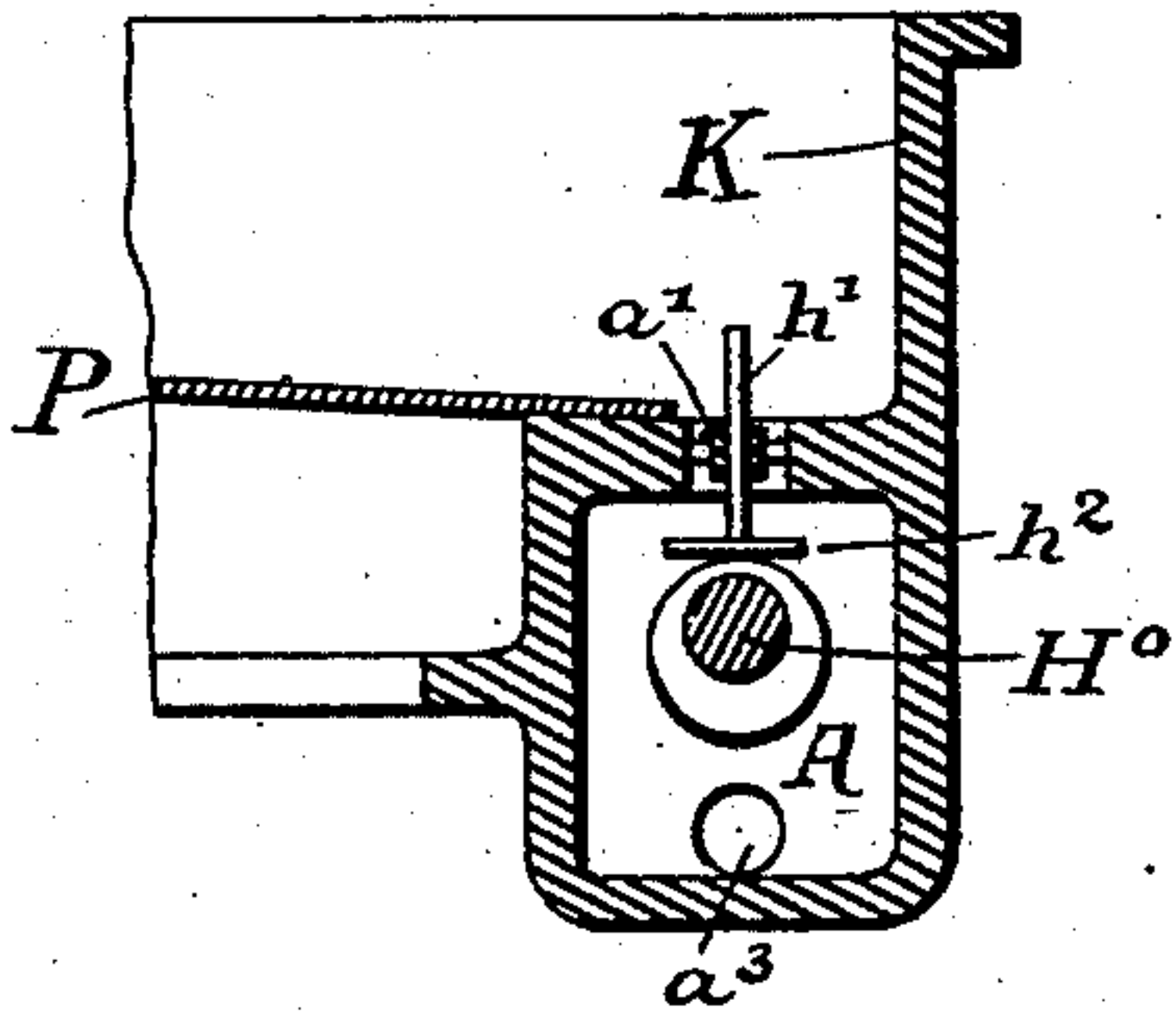


Fig: 9

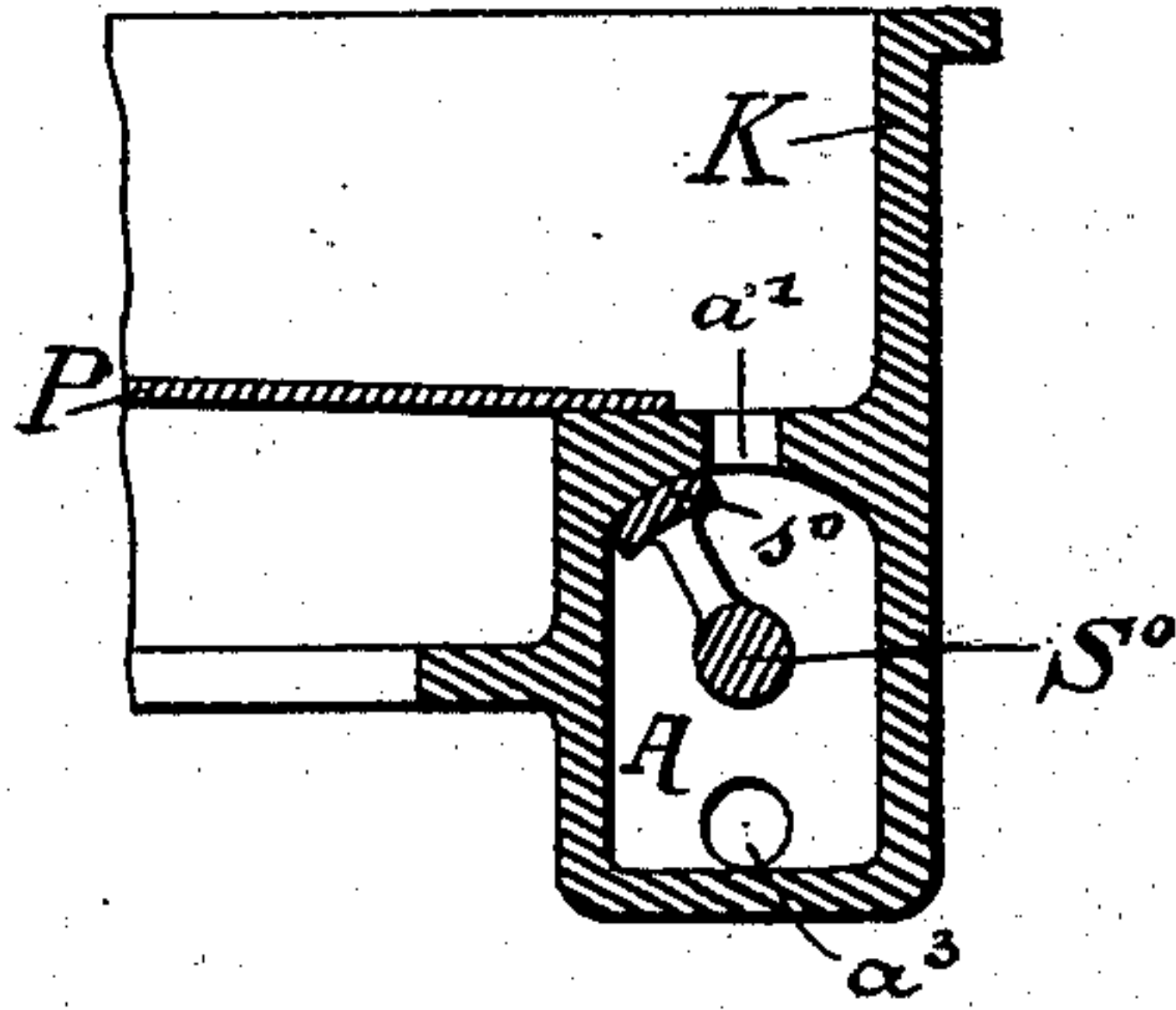


Fig: 8

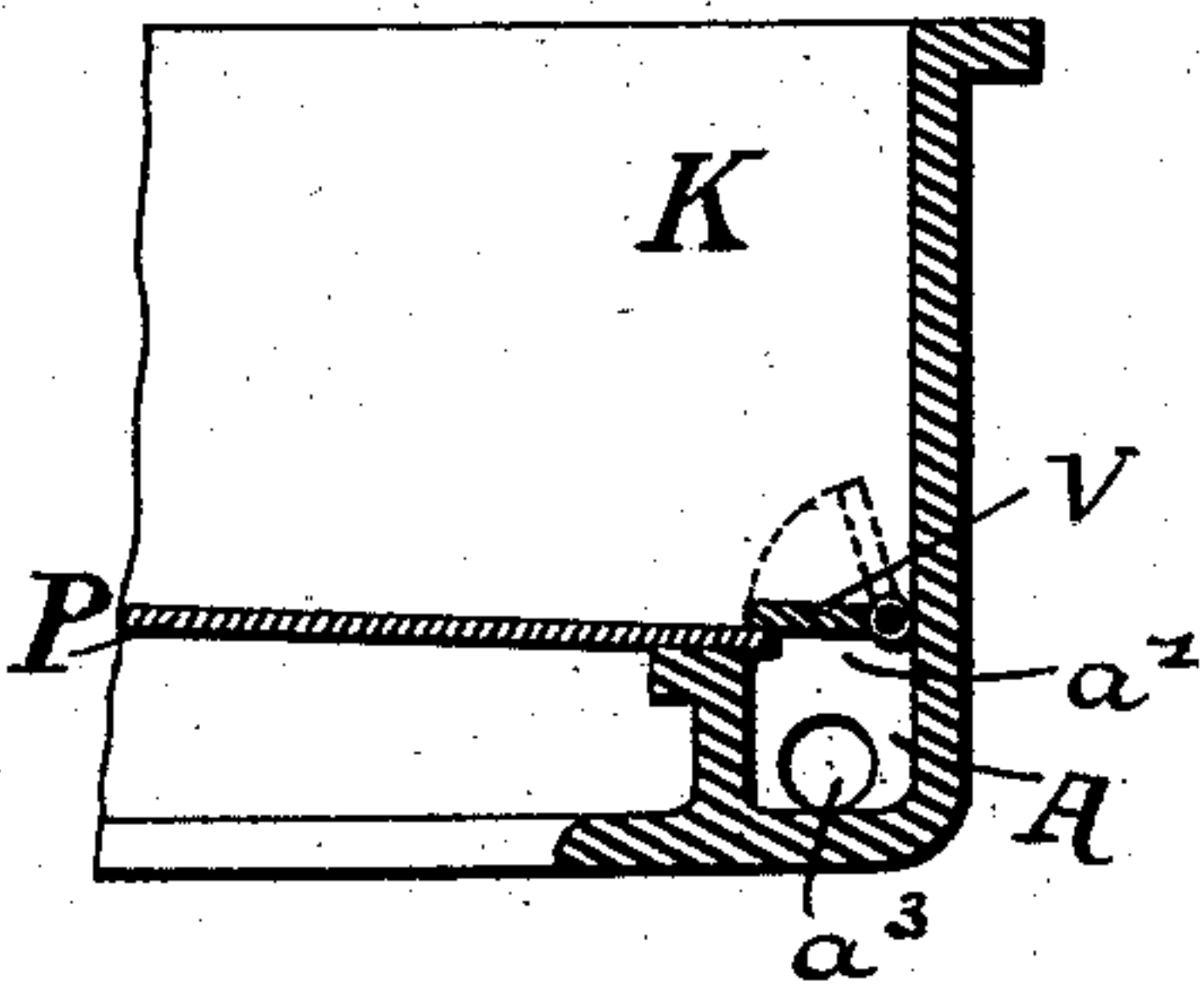


Fig: 10

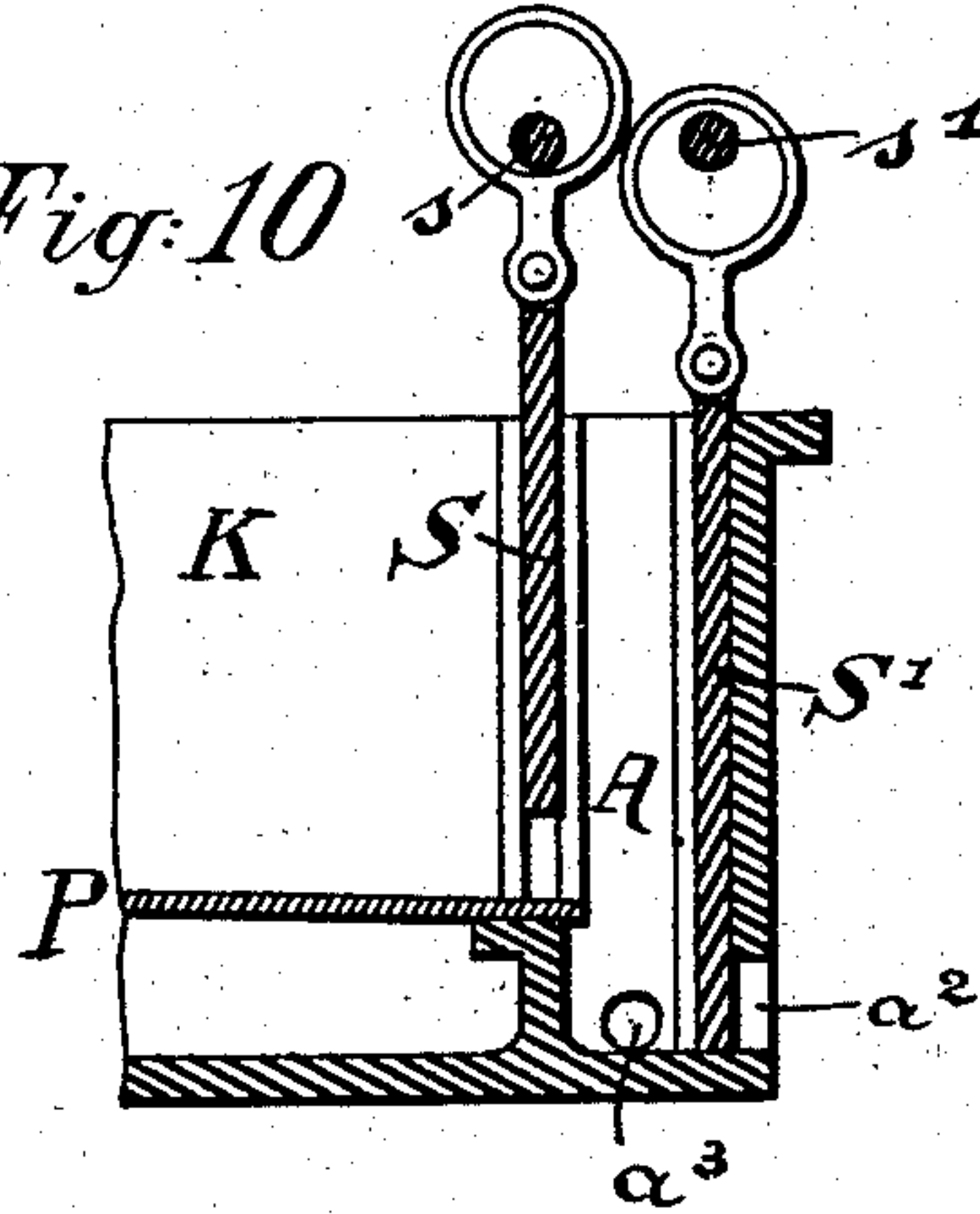
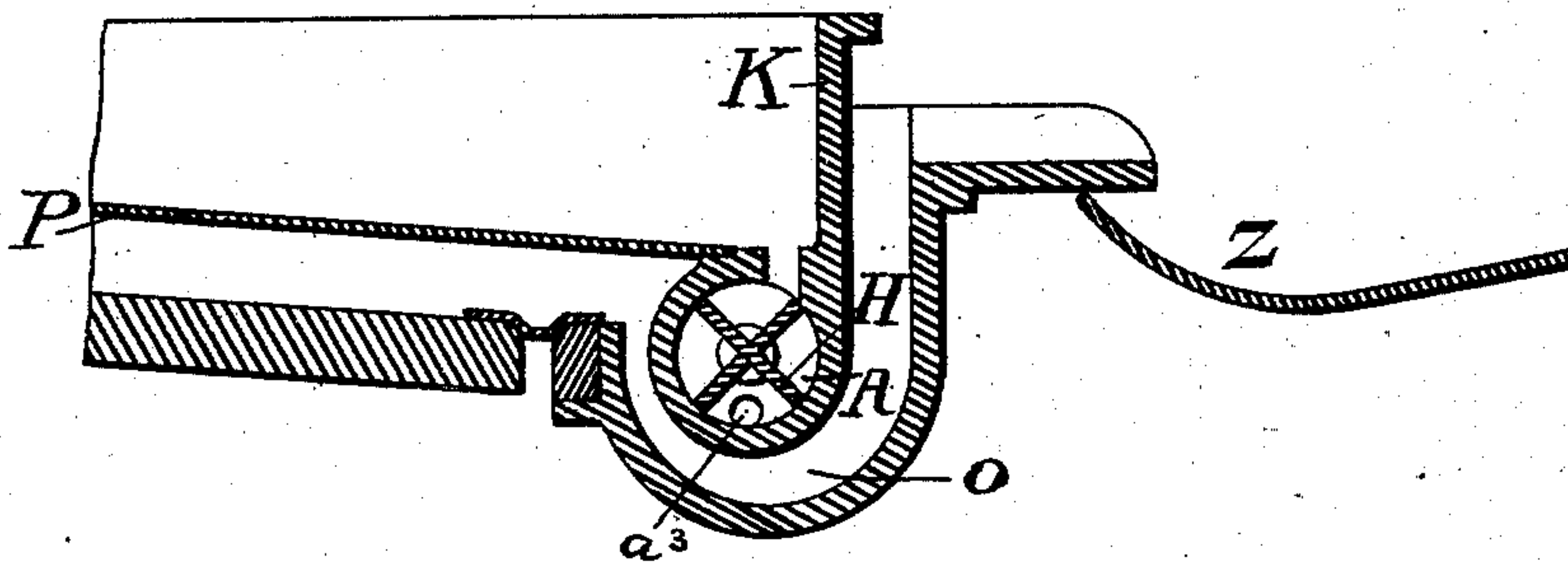


Fig: 11



Witnesses:

René Jeelhaar.
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Inventor:

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UNITED STATES PATENT OFFICE.

RUDOLF KRON, OF UNTERSTRASS, NEAR ZURICH, SWITZERLAND.

SELF-CLEANING PULP-STRAINING MACHINE.

SPECIFICATION forming part of Letters Patent No. 315,420, dated April 7, 1885.

Application filed January 8, 1885. (No model.)

To all whom it may concern:

Be it known that I, RUDOLF KRON, a citizen of the Republic of Switzerland, residing at Unterstrass, near Zurich, in Switzerland, have invented certain new and useful Improvements in Self-Cleaning Pulp-Straining Machines, of which the following is a specification.

My invention relates to machines for sifting paper-pulp; and it mainly consists in the combination, with stationary curved or flat horizontal or inclined screens, of suitably-located flues or pipes for leading off the impurities of the pulp.

My invention also consists in fastening said screens by means of wedge-shaped partition-walls, and further consists in the combination, with said flues either of suitable spiral conveyers or valves and slides for continuously removing and leading off the impurities with or without the help of water.

My invention also consists in the combination, with said screens and with said flues, of suitable shaking mechanism or suction devices, such as, for instance, a movable or elastic bottom or diaphragm or pump-piston operated by eccentric disks, cams, or wiper-wheels.

The devices hitherto in use for sifting paper-pulp with the object of either removing the impurities therefrom or of assorting the pulp into coarse and fine pulp, consisted of shaking flat screens. All these screens heretofore in use have many and serious defects. The flat screens will get obstructed or choked up in a short time by the impurities remaining on the surface of the same, and thereby the weight of the paper will vary considerably. On the other hand, it is not only troublesome to keep said screens clean, but also the cause of numerous spots in the paper. The cylindrical and prismatic screens, which are mostly rotary screens, are either complicated and expensive or not very easily exchangeable or to be kept clean, and great loss of pulp is necessarily connected with their running as well as with the exchange of screens. The object of my improvements is to obviate all these defects and to construct screens which need little tending,

which are easily washed and exchanged, and which run noiselessly.

In the accompanying drawings, Figure 1 represents half-longitudinal sections on lines 1 2 and 3 4 of Fig. 2, which is a vertical cross-section of a machine with my improvements for sifting paper-pulp, and with the screen-plates inclined toward each other. Fig. 3 is a cross-section through a machine with only one screen-plate. Fig. 4 is a part cross-section with two screen-plates inclined both toward the outside; Fig. 5, a part cross-section with two curved screen-plates, and Fig. 6 a cross-section through a machine with two curved screen-plates and with two different means for shaking the pulp. Figs. 7, 8, 9, 10, and 11 are part sections showing modifications of the flue leading off the impurities.

Similar letters of reference in different figures indicate similar parts.

In Figs. 1 and 2, K represents the box of wood or cast-iron containing the two sifting screen-plates P, which are provided with slots or holes suiting the fineness of pulp which is desired. The screens P are declining toward the center of the box and are placed with their lower edge on top of the cast-iron flue A, which is cast integral with box K, and which leads off the impurities of the pulp, with the upper edge of said screens resting within grooves p^2 , cast to the walls of the box K.

In order to secure the screens rigidly fast within said box, a cast-iron partition-plate, T, with a wedge-shaped bottom end is pressing on the lower ends of the screens, and retaining the upper ends of the same within the said grooves p^2 .

The partition-plate T, in order to facilitate the removal of the impurities, is provided with a number of openings, t , at its bottom end, whereby the two portions of the box are communicating.

The cast-iron pipe or flue A is provided with a slot, a' , beneath the lower ends of screens P, and with an outlet, a^2 , at one end for the impurities or coarser pulp retained by the screens.

A fan-valve, H, with a suitable number of blades, is journaled to box K concentrically with pipe A, and fitting like a valve, with

only a very little play, to the inside space of the same. This fan H is driven by means of a journaled shaft, D, which is the driving-shaft of the machine. A pulley, d' , receiving motion from some source of power, is keyed to said shaft like a pulley, d^2 , which is belted to the pulley h^2 of the shaft of fan-valve H. This shaft of fan H is provided at its journals with a suitable stuffing-box, h' , in order to prevent any water from leaking through the said journals. Driving-shaft D is journaled to the frame marked with k underneath box K.

Underneath the screens P a bottom or floor plate, B, of cast-iron or wood is secured water-tightly fast to the walls of box K on one side and to a flange cast to the outside of pipe A on the other side. This elastic connection is made by means of the rubber or leather bands b' , and a water-tight receptacle is thus formed underneath the screens P for the sifted pulp. This pulp will flow out through the outlet O, (see Fig. 1,) and may be conveyed to the Fourdrinier or other machines by means of the trough Z. As it is always necessary to keep the pulp in motion, a shaking device is provided for the elastically-attached bottom plate, B.

A rocker-shaft, b^0 , with the angular levers b^3 keyed thereon, is journaled underneath box K and plate B, and said angular levers are hinged with one arm to the eye-pieces b^2 , which are rigidly fast to the bottom plate, B, and with the other arm said levers are linked to an eccentric disk, E, by means of links b^4 , said eccentric disks E being mounted on shaft D. The mechanism just described will produce a vertical oscillating movement for plate B, and thereby no settling of the pulp will be possible, and the same will remain uniformly suspended within the water.

The pulp to be sifted is conducted to the machine by means of the flues Y, and by means of suitable overflows, y' , flows on the screens P. According to the size of holes or slots of the same a portion of the pulp with the water will go through the screens and drop into the receptacle with shaking-floor, and will flow therefrom through outlet O into the trough Z. The parts—such as impurities and the coarse pulp—which remain on the surface of the screens P will be washed off or flow down over the inclined surfaces of the screens P into the pipe A through the slot a' , and are still mixed with sufficient water as to flow off through the outlet a^2 . The revolving fan-valve H will prevent any settling of the pulp in pipe A, and will help to convey the same toward the outlet a^2 .

If it becomes necessary to exchange the screens P, the partition-plate T is taken off, and the screens can be easily removed.

As shown in Fig. 3, the machine may also be built with only one inclined flat screen-plate P, and then I prefer to fasten said plate by means of the wedges p' , made of wood or iron. The pipe A in this case is located on one side of the box, and is provided also with

slot a' , fan a^2 , and an outlet, which, however, is not to be seen in Fig. 3. In most cases it may become necessary to inject water for rinsing purposes into pipe A through an inlet, a^3 , (shown in Fig. 3,) at the bottom of pipe A. The fan H is shown in Fig. 3 driven from the driving-shaft D by means of a train of gear-wheels, the wheel g' keyed onto the driving-shaft D, wheel g^2 engaging wheel g' and cast together with gear-wheel g^3 , and both journaled on pin which is fast to frame k , and wheel g^3 engaging wheel g^4 at the end of shaft of fan-valve H. Box K is also provided with an elastically-attached bottom plate, B, and with an outlet, O. The vibratory motion of said plate B is obtained, as shown in Fig. 3, by means of a different lever combination. The eccentric disk E oscillates by means of an intermediate link, b^4 , the end of lever-arm b^6 , which is fulcrumed with its other end to the frame k of the machine, and which oscillates the plate B by means of the link b^5 and eye-piece b^2 .

In Fig. 4, the flat screen-plates P are shown declining from the center toward both sides, and two flues or pipes, A, for the coarse pulp or for the impurities are shown cast integral with box K of square cross-section, but also provided with slots a' in their top walls. The flue Y is shown above the partition-wall T, which in this case wedges down the upper ends of the screens P, while the lower edges of the same are inserted in grooves cast integral with the side walls of box K. The overflows y of the flue Y are shown in the bottom of the same on both sides of the partition-wall T.

Fig. 11 shows a very convenient modification of the arrangement of the outlet O and the overflow into flue Z, as shown in Figs. 1 and 3, said outlet being led, like a siphon, around and underneath the pipe A.

In Figs. 5 and 6 different means from those shown in Figs. 1, 2, 3, 4, and 11 for agitating the sifted pulp are shown. The bottom of box K is cast rigid and integral with the side walls, and instead of having a vertically-oscillating bottom plate, B, circular disks or square plates C, as shown in Figs. 5 and the right-hand side of Fig. 6, are rigidly fast to the top of sleeved rods and are made to move up and down underneath the screens P within the receptacle for the sifted pulp. By this contrivance an alternate section will be created on the unsifted pulp, so as to facilitate and accelerate the sifting process, and at the same time the sifted pulp is strongly agitated, so as to be kept in a uniform state of fluidness. The same result as by the disks C is obtained by the device shown on the left-hand side in Fig. 6. A cylinder, J, like that of a pump, with stuffing-box j' is secured rigidly fast underneath and to the bottom of box K, and a piston, I, is fitted therein and moved up and down, so as to produce alternately a suction within the receptacle. The piston I of the pump-cylinder as well as the disk C with

sleeved rod receive their movement from a driving-rod, D, which is journaled to the frame K, and provided with similar eccentric disks E, as shown in Figs. 1 and 2. The piston I and the end of rod-carrying disk D are linked each by means of an intermediate link, i' , to a lever-arm, i^2 , which is linked to the eccentric disk E, as shown in Fig. 6. In the same figure the machine is shown with two curved screen-plates, P, and with a helical conveyer, H, within the pipe A for carrying off the coarse pulp and the coarse impurities. This helical conveyer H is fully equivalent to the four-bladed fan shown in Figs. 1, 2, 3, and 11, and these organs, besides preventing any settling of the pulp in said pipe A, have for their object to shut off alternately the pipe A from the pulp on top of the screens in order to prevent too great a loss of fine pulp by checking from time to time the flowing down of the pulp over the screens. Devices for the same purpose, which may all be considered as equivalents, are shown in Figs. 7, 8, 9, and 10.

In Fig. 7 the helical conveyer H is shown substituted by a shaft, H^0 , with cam-disks, which alternately shut and open the slot a' by means of a flat bar, h^2 , which is guided vertically by means of the studs h' , secured thereto, said studs sleeved in suitable rings cast integral with the box K. In order to prevent the settling of the pulp in pipe A, in this case, like in Figs. 8, 9, and 10, an inlet, a^3 , is shown for injecting water for rinsing purposes. Said fan-valve H is revolved by similar means as those shown in Fig. 2, or those in Fig. 3 for the fan H.

In Fig. 9 the slot a' is alternately shut and opened by means of an oscillating segmental bar, s^0 , which is cast integral with the cast-iron journaled shaft S^0 . The oscillation of shaft S^0 may be obtained in a similar way as the movement of the plate B in Fig. 3 by connecting a link connected to the driving-shaft D in said figure, like the link b^5 , to the end of a horizontal arm, which is keyed to the end of shaft S^0 .

Another contrivance is shown in Fig. 8, where the slot a' is shut and opened alternately by a hinged cover, V, which may be oscillated by similar means as has been described for segmental bar s^0 in Fig. 9.

In Fig. 10, finally, the flue A is shown separated from the space above the screen P by a slide, S, and the outlet a^2 of flue A is shut or opened by a slide, S' . Both these slides S S' are alternately shut and opened by the eccentrics on shafts s s' , respectively, and said shafts may be driven from a driving-shaft in the same way by belt or gears, as shown in Figs. 2 and 3, respectively, for the shaft of the fan H, which is driven from the driving-shaft D.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a box (as K) and flues with overflows, (as Y y'), of two inclined screen-plates, (as P,) means for holding the same in place, (such as grooves p^2 and wedge-shaped partition-plates T,) flues (as A) located at the lower end of said screen-plates, with slots (as a') and outlet (as a^2), a fan-valve, (as H,) mechanism for working the same, (as driving-shaft D and pulleys d^2 h^2), and means for rinsing said flues, (as inlet a^3), all as shown and described, and for the purpose set forth.

2. The combination, with a box (as K) containing two screen-plates, (as P,) of means for holding said plates in place, said means consisting of grooves (as p^2) and wedge-shaped partition-plate, (as T,) all substantially as shown and described, and for the purpose set forth.

3. The combination, with screens for sifting paper-pulp, (as P,) of flues (as A) for leading off the impurities, and mechanism for the purpose set forth, said mechanism consisting of a fan-valve, (as H,) driving-shaft, (as D,) and pulleys, (as d^2 and h^2), all to operate as set forth, and substantially as shown and described.

4. The combination, with screens for sifting paper-pulp (as P) and a box with outlet (as K O) which contains the same, and feeding-flues with overflows, (as Y and y'), of an elastically-attached bottom plate, (as B and b'), and mechanism for shaking the same, as driving-shaft D, eccentric disks, (as E,) angular levers, (as b^3), eye-pieces, (as b^2), and connecting-links, (as b^4), all to operate as set forth, and as shown and described.

5. The combination, substantially as shown and described, of the box K, with outlet O, the inclined flat screens P, located therein, the grooves p' , integral with the box and the partition-plate T, the feed-flues with overflows Y y' , the flue A, for the impurities, with slot a' and outlet a^2 , and the fan-valve H, the elastically-attached floor-plate (as B b') of the box, the frame k , mechanism for shaking said floor-plate, as shaft D, eccentrics E, rods b^4 , angular levers b^3 , and eye-pieces b^2 , and mechanism for operating the said fan-valve, as pulleys h^2 and d^2 , all to operate as set forth.

In testimony whereof I hereunto sign my name, in the presence of two subscribing witnesses, this 21st day of November, 1884.

RUDOLF KRON.

Witnesses:

EMIL BLUM,
ED. EGLI.