(No Model.) 3 Sheets—Sheet 1.

J. W. SMITH.

PAPER PULP STRAINER.

No. 574,638. Patented Jan. 5, 1897

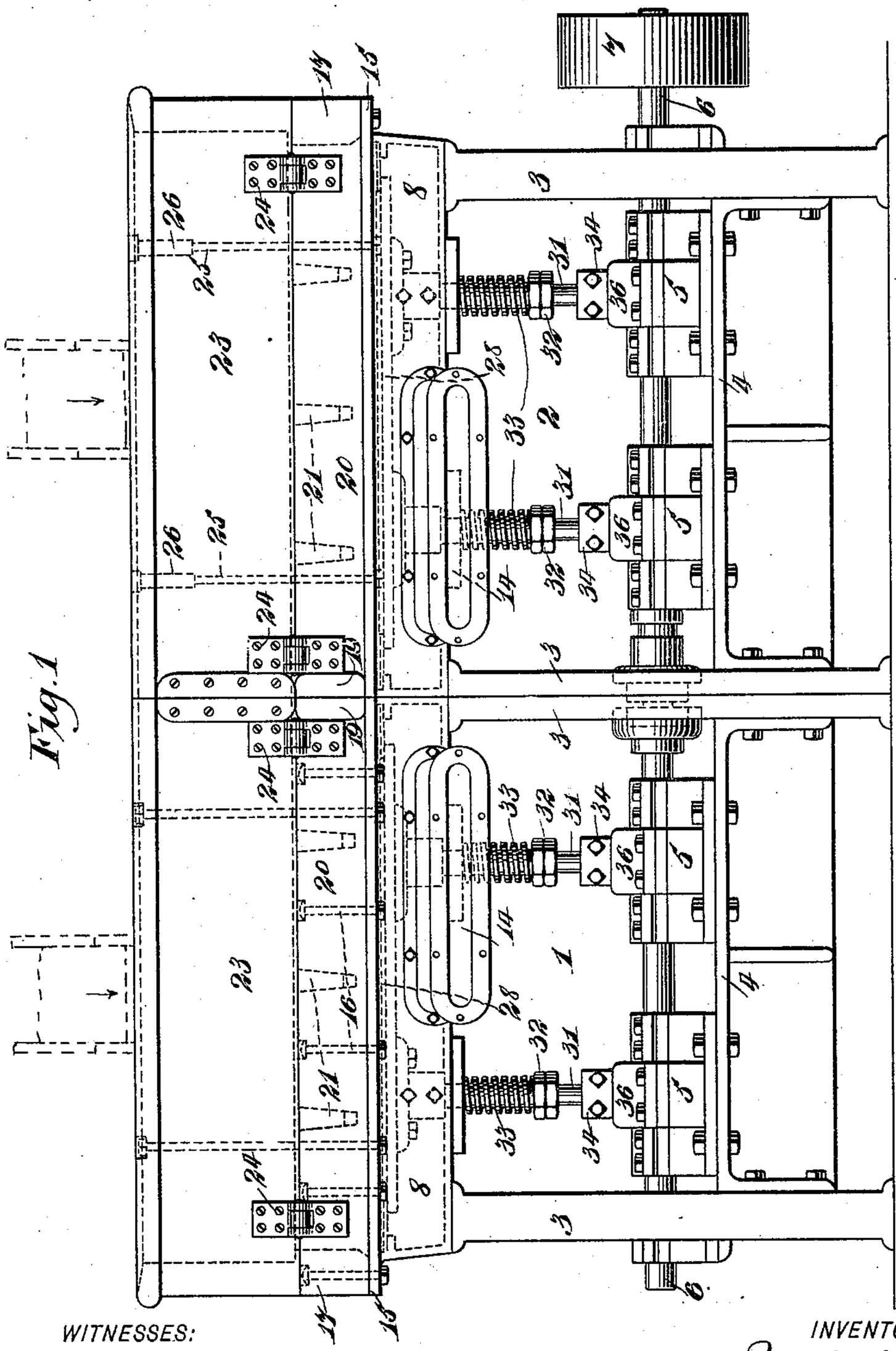

Fig. 1

WITNESSES:

Edward Thorpe.

J. L. Laplinger

INVENTOR

J. W. Smith

BY

ATTORNEYS.

(No Model.) 3 Sheets—Sheet 2.

J. W. SMITH.

PAPER PULP STRAINER.

No. 574,638. Patented Jan. 5, 1897.

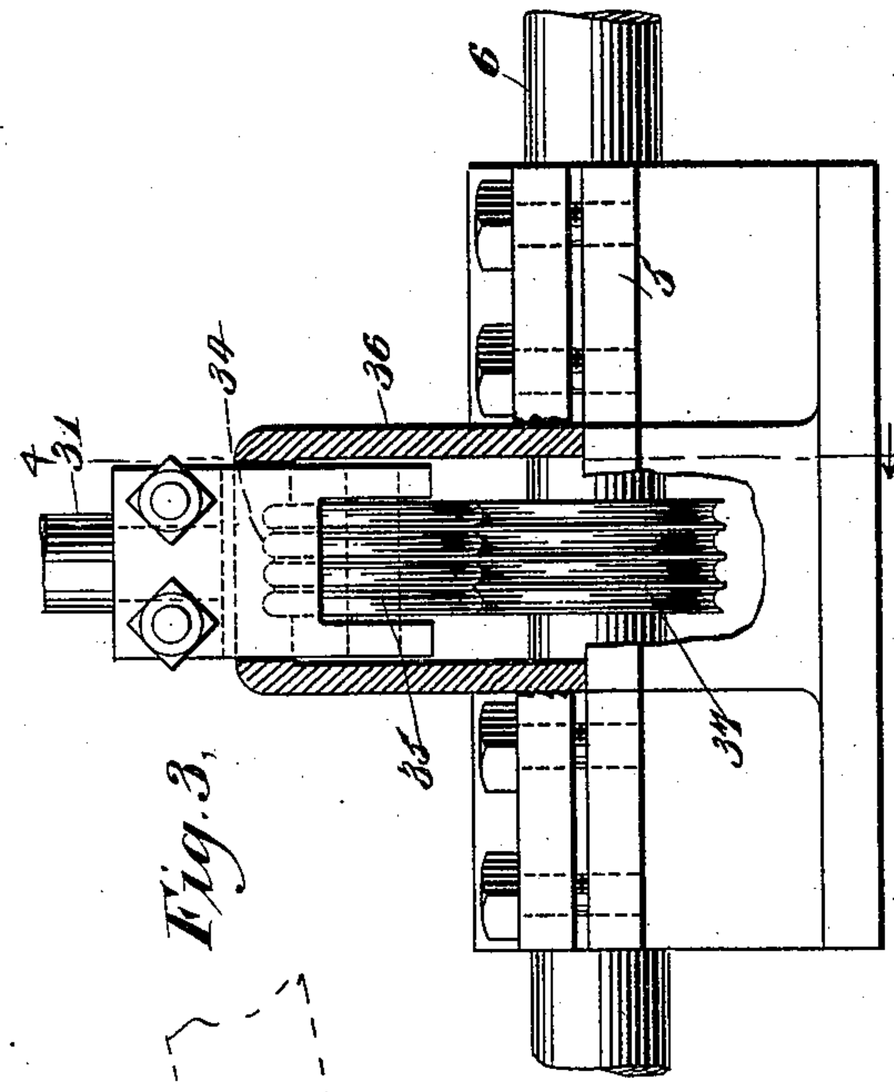

Fig. 3.

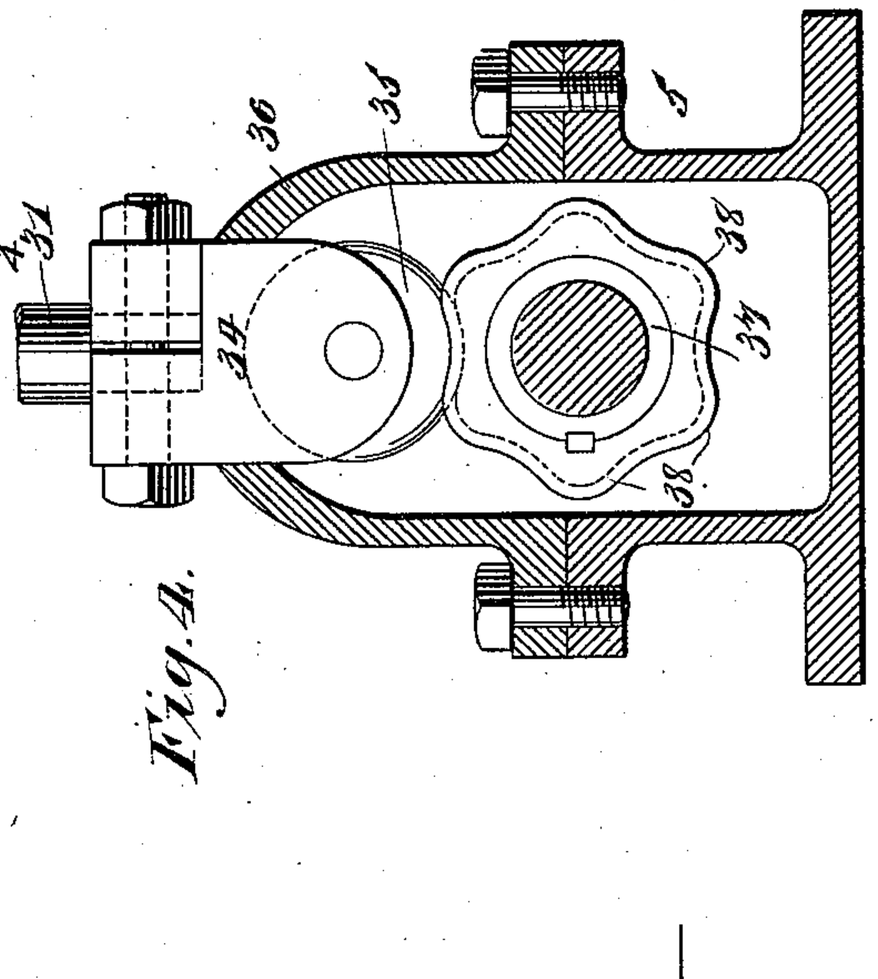

Fig. 4.

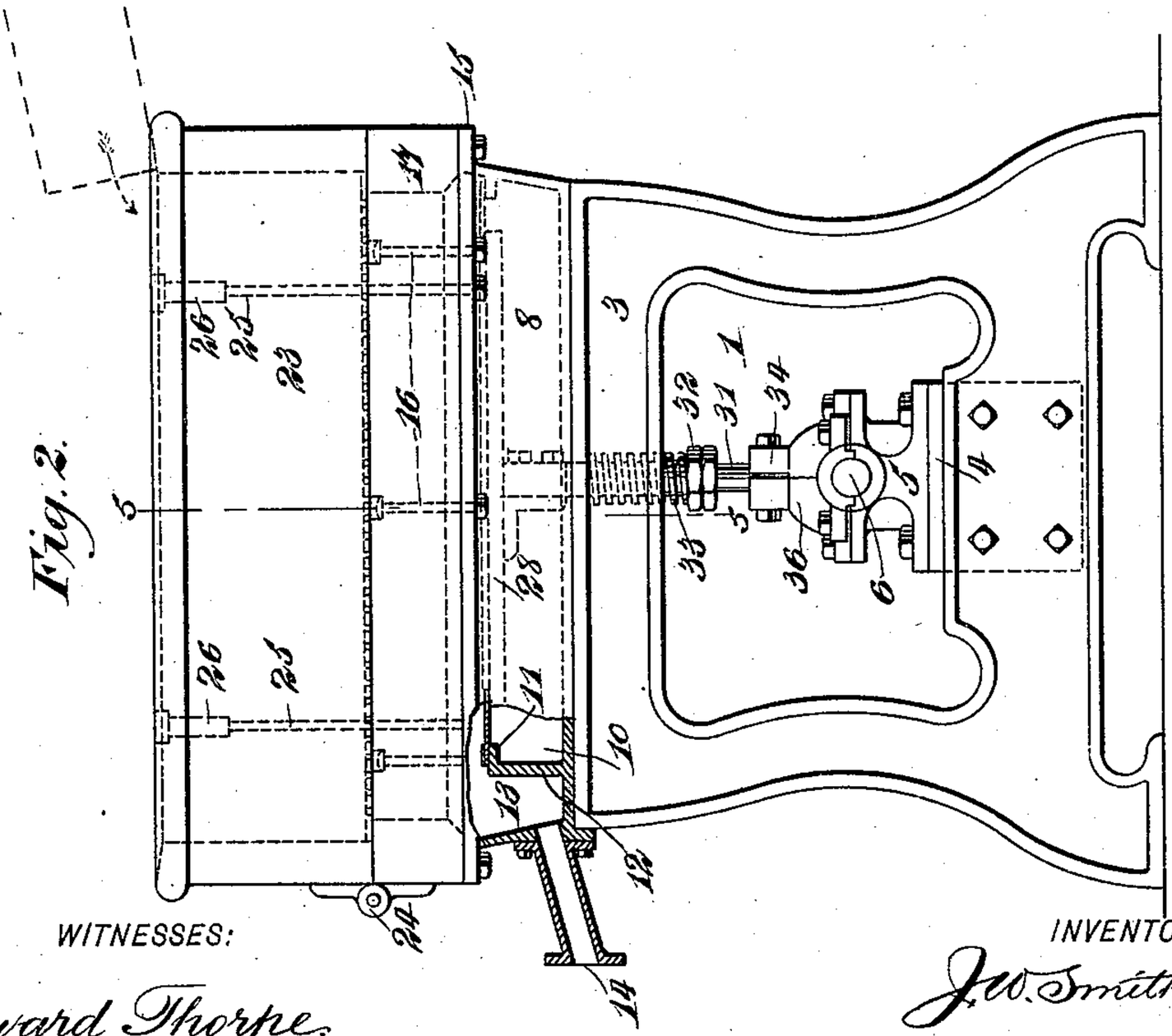

Fig. 2.

WITNESSES:

Edward Thorpe.

J. L. Loeplinger

INVENTOR

J. W. Smith

BY

Munn & Co

ATTORNEYS.

(No Model.) 3 Sheets—Sheet 3.

J. W. SMITH.

PAPER PULP STRAINER.

No. 574,638. Patented Jan. 5, 1897.

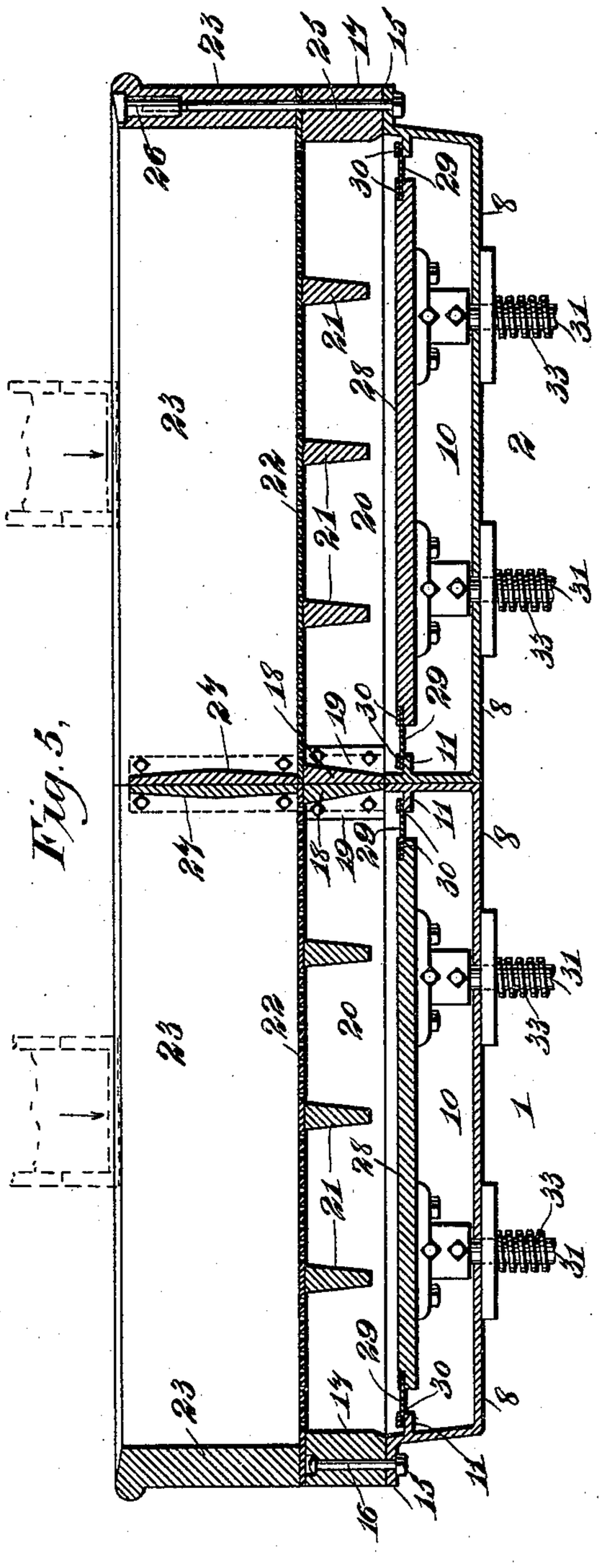

Fig. 5.

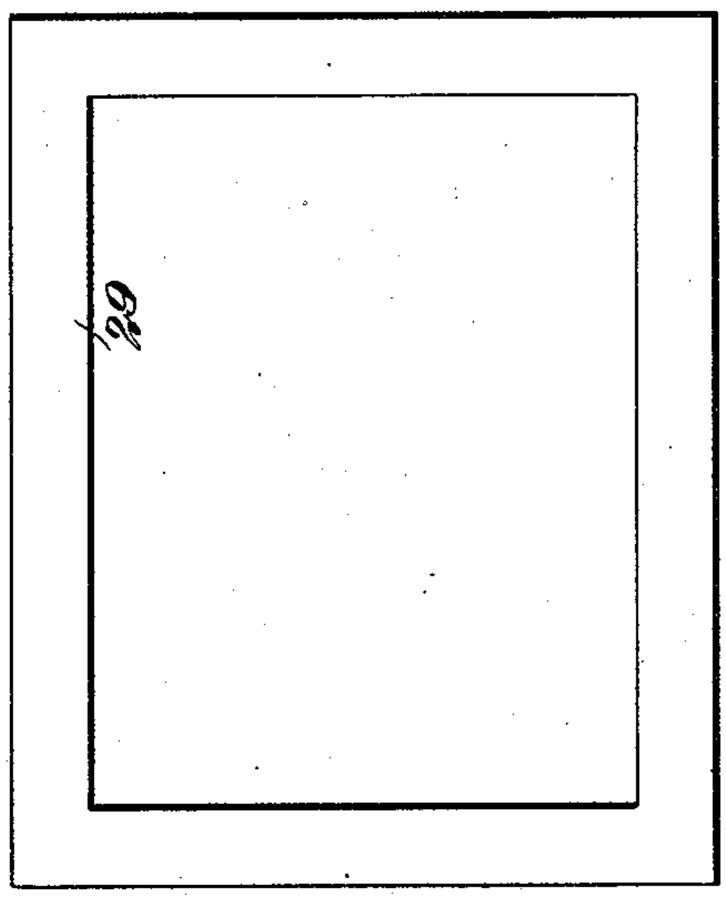

Fig. 6.

WITNESSES:

Edward Thorpe.

J. B. Baptinger

INVENTOR

J. W. Smith

BY

Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

JOHN W. SMITH, OF SANDY HILL, NEW YORK.

PAPER-PULP STRAINER.

SPECIFICATION forming part of Letters Patent No. 574,638, dated January 5, 1897.

Application filed September 10, 1895. Serial No. 562,106. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. SMITH, of Sandy Hill, in the county of Washington and State of New York, have invented certain new and useful Improvements in Paper-Pulp Strainers, of which the following is a full, clear, and exact description.

This invention relates to that class of devices commonly known as "pulp-strainers" and "screens" which are employed to strain or screen the pulp in the manufacture of paper, and the object of the invention is to provide a device of this character of a novel and inexpensive construction, having two independent screening surfaces or sections, the construction and arrangement of the parts being such that one of said sections may be placed out of action without affecting the operation of the other screening-section whenever it is desired to make repairs or to clean the parts.

The invention contemplates certain novel features of the construction, combination, and arrangements of the several parts of the improved device, whereby certain important advantages are attained and the device is made simpler, less expensive, and otherwise more convenient and better adapted for use than various other forms of pulp-strainers and screens heretofore employed, all as will be hereinafter fully set forth.

The novel features of the invention will be carefully defined in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of a pulp screen or strainer constructed according to my invention, and Fig. 2 is an end elevation of the same. Fig. 3 is a detached and enlarged detail view showing the cam employed for operating the diaphragm; and Fig. 4 is a sectional side elevation taken through the inclosing casing of said cam, the plane on which the section is taken being indicated by the line $x\ x$ in Fig. 3. Fig. 5 is a longitudinal section taken through the screen-box of the machine in the plane indicated by the line $y\ y$ in Fig. 2 and showing various features of construction to be hereinafter set forth, and Fig. 6 is a detail view showing the rubber gasket employed for filling in the spaces at the edges of the diaphragm.

The frame of the machine may be of any preferred construction, being, as herein shown, formed in two sections 1 and 2, arranged end to end and having uprights 3 3 at their opposite ends, said sections being provided with corresponding longitudinal bed-plates 4, whereon is journaled in suitable boxes 5 a shaft 6, having a driving-pulley 7, arranged to be engaged by a belt whereby the machine may be operated from a counter-shaft in a well-known way. On the upper part of each section 1 and 2 of the frame is arranged a table 8, hollowed in its upper part, as indicated at 10 in Fig. 5, and provided just beneath its upper edge with an interiorly-projecting flange or rib 11, extending around three sides of the said table and along the side of a partition 12, formed longitudinally through the hollow 10 of each table, said partition 12 forming between its outer surface and the adjacent side wall of the table an outlet or discharge-chamber 13, the discharge-chamber 13 of each table being provided with a discharge spout or pipe 14, whereat the screened pulp is discharged. The arrangement of partition 12 is clearly shown in Fig. 2.

Each table 8 is provided around its outer edge with a projecting marginal flange 15, to which is secured, by means of bolts 16 or equivalent devices, the lower section or frame 17 of the screen box or casing, said sections being fitted together, as shown in Fig. 5, with their adjacent end surfaces abutting. The adjacent end bars 18 of the sections 17 are in the nature of removable wooden cross-bars held at their ends in sockets formed in metal clips 19, serving to hold the adjacent ends of the side bars 20 of said sections 17 together, as indicated in Figs. 1 and 5. The side bars 20 of the sections 17 of the screen boxes or casings are correspondingly notched along their inner sides to receive the ends of removable cross-bars 21, also of wood, having their upper faces flush with the upper edges of the sections 17 and serving to support the sections 22 of the screen-plate, the edges of which project over the bars of the lower section 17, as seen in Fig. 5, in position to be clamped between said lower sections 17 and

the upper sections 23 of the screen boxes or casings, said upper sections 23 being each open at the top and hinged at one side to the lower section by means of hinges 24. To hold the sections of the boxes together when closed, bolts 25 are employed, passing up through openings in the bars of said sections and having threaded upper ends to receive nuts 26, as seen in Fig. 5.

The adjacent end bars 27 of the upper sections 23 of the screen-boxes are formed by castings extending between the side bars of said sections 23, and are adapted to engage the upper sides of the screen-plate sections 22 when the boxes are closed, so as to hold said sections securely in place. The end bars 27 serve to close the adjacent ends of the respective screen-boxes, so as to prevent leakage from one box to the other when one box is closed and the other is open.

The diaphragms 28 are made of any suitable material, usually rectangular in form and of dimensions somewhat less than the space inside the flanges 11 of the table 8, and these diaphragms 28 are connected to said flanges by means of gaskets 29, of rubber or similar elastic waterproof material, the edges of said gaskets 29 being held down to said flanges and to the edges of the diaphragms 28 by means of the metal strips 30. Said gaskets 29 are, as seen in Fig. 6, of a general rectangular form. To the under side of each diaphragm 28, at each end thereof, is secured the upper end of a plunger 31, extending down through the table 8, beneath the same, and having a stop or nut 32 secured on it, between which and the under side of the table is arranged a spring 33, coiled on the plunger 31, and arranged to act to normally hold the said plunger 31 and the diaphragm 28, connected therewith, drawn downwardly, and on the lower end of each plunger 31 is mounted a head or enlargement 34, in which is rotatively mounted a roller 35, having, as clearly seen in Fig. 3, a series of circumferential grooves formed in its periphery.

The head 34 on each plunger 31 is arranged to play through an opening in a casing 36, secured to one of the blocks 5 on bed-plate 4, as seen in Figs. 3 and 4, and inside said casing the roller 35 is arranged to engage a grooved cam 37, fixed on shaft 6, and having a series of wave-like cam-surfaces 38 formed on its circumference, adapted to act successively on said roller as the shaft 6 rotates to impart a rapid series of pulsations of the diaphragm 28, with which said roller is connected.

In operation the pulp to be strained is placed in the open tops of the screen-boxes, and the shaft 6 being set in rapid movement the diaphragms 28 have imparted to them a series of rapidly-recurring pulsations, whereby the pulp is drawn through the sections 22 of the screen-plate and forced into the discharge-chamber 13, whence it passes by way of the outlet-pipes 14.

Should it be desired to place one of the sections of the apparatus out of operation for purposes of repair or cleansing, this can be done at any time without in any way affecting the operation of the other section, whereby it will be seen that by the use of the device constructed according to my invention the straining of the pulp may be continued even while repairs are in progress. Moreover, by reason of the wave-like character of the cam-surfaces on cams 37 a single rotation of shaft 6 will serve to impart a plurality of pulsations to each diaphragm, so that the action of said diaphragms in drawing the pulp through the screen-plate sections and forcing it out of the machine is rendered uniform and regular.

The device constructed as above set forth is of an extremely simple and inexpensive character, and is especially well adapted for the purposes for which it is designed, owing to the fact that one or the other of the sections may be maintained in action at all times, even during repairing or cleaning of the machine, and it will also be obvious that the device is susceptible of considerable modification without material departure from its principles and spirit, and for this reason I do not wish to be understood as limiting myself to the exact form herein set forth in carrying my invention into practice.

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

1. A pulp screen or strainer, comprising a screen-box composed of two sections detachably connected together, a screen-plate held between the sections by the detachable connections between said sections and capable of being removed when the sections are separated, means to supply pulp to said box on one side of the screen, means to discharge the pulp from the box on the other side of the screen, and means to draw the pulp through the screen, substantially as set forth.

2. A pulp screen or strainer, comprising an open-top lower box-section having its side bars correspondingly notched along their inner sides, cross-bars extending transversely across the lower section with their lower ends held removable in said notches in the side bars, a removable screen-plate extending across the open top of the lower section and fitting flush on the edges of the same, the central portion of said screen being supported on the upper surfaces of said cross-bars, an upper section having an open bottom fitting flush on the screen-plate, said upper section being detachably connected to the lower section and having its connections arranged to hold the screen-plate against removal from the screen-box when the sections are closed together, means to supply pulp to the upper section, means to withdraw pulp from the lower section, and means to draw the pulp through said screen-plate, substantially as set forth.

3. In a pulp screen or strainer, the combination of a table having a hollow upper face

and having a partition formed vertically in and extending longitudinally along the hollow at one side of the table, whereby a passage is formed in the table along one side of the main portion of the hollow therein and forming an outlet for the pulp, a diaphragm vertically movable in the main portion of the hollow, means for actuating the diaphragm, a flexible gasket extending across the spaces between the edges of the diaphragm and the walls of the hollow in the table, a lower box-section having its bottom and top open, said section being arranged on the top of the table and having its bottom formed by the diaphragm and its interior in communication with the passage along the side of the hollow in the table, a removable screen-plate extending across the open top of said lower section and supported at its edges upon the edges thereof, and an upper box-section having an open bottom and provided with means for supplying pulp to it, said upper section being arranged with its lower edges resting upon the edges of the screen-plate and detachably connected to the edges of the lower box-section, substantially as set forth.

4. A pulp screen or strainer having two screen-boxes provided with screen-plates and diaphragms and arranged end to end, said screen-boxes each being composed of two sections and having the adjacent ends of their lower sections formed by removable cross-bars each box having means for closing the end of its upper section adjacent to the other box, whereby when one box is open the other may be in operation, substantially as set forth.

JOHN W. SMITH.

Witnesses:
JAMES S. MORRIS,
WALTER C. HOWE.