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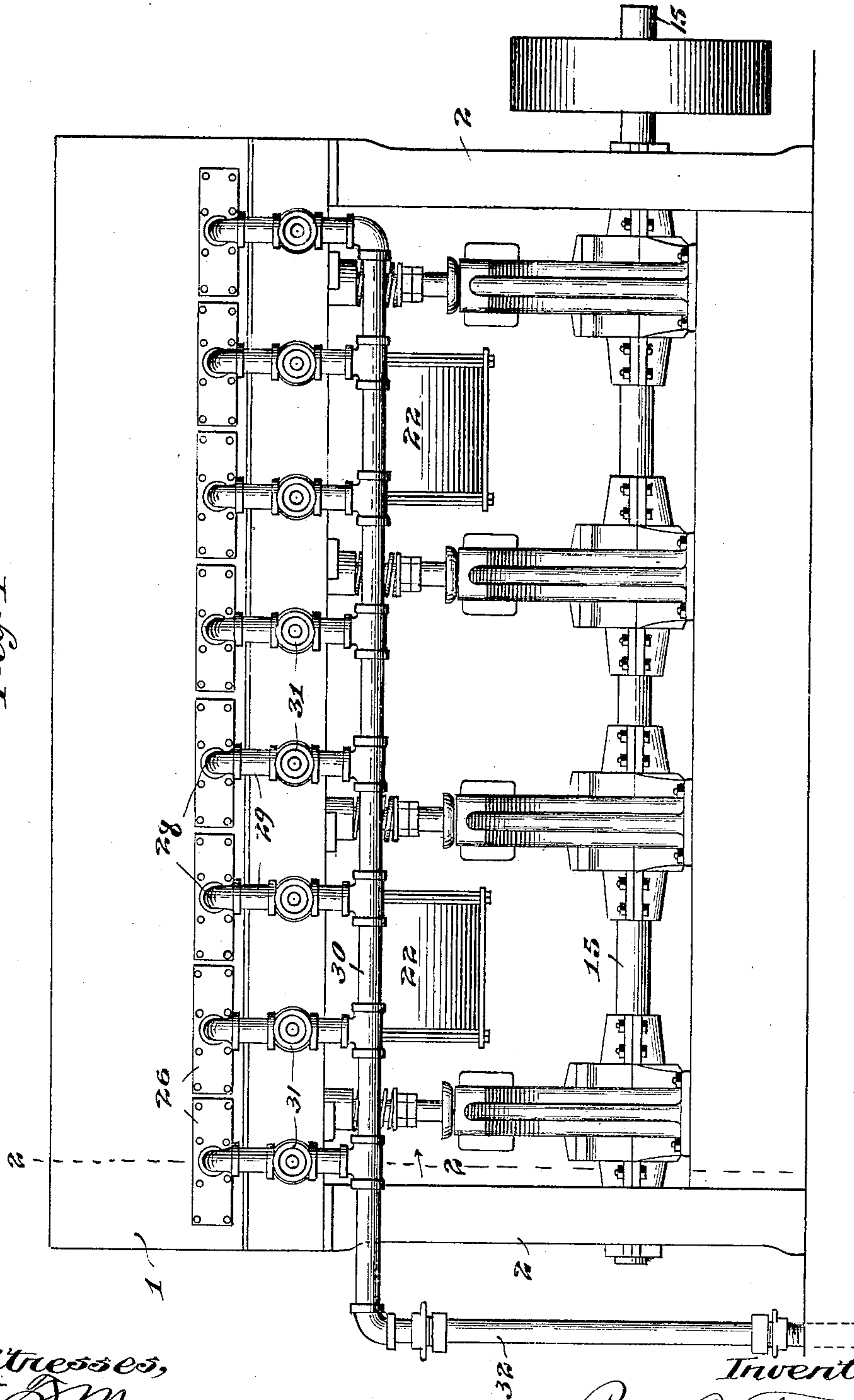
PATENTED MAR. 13, 1906.

P. R. THOM.
MACHINE FOR SCREENING FIBROUS PULP.

APPLICATION FILED MAY 31, 1904.

3 SHEETS—SHEET 1.

Fig. 1.



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Fig. 2.

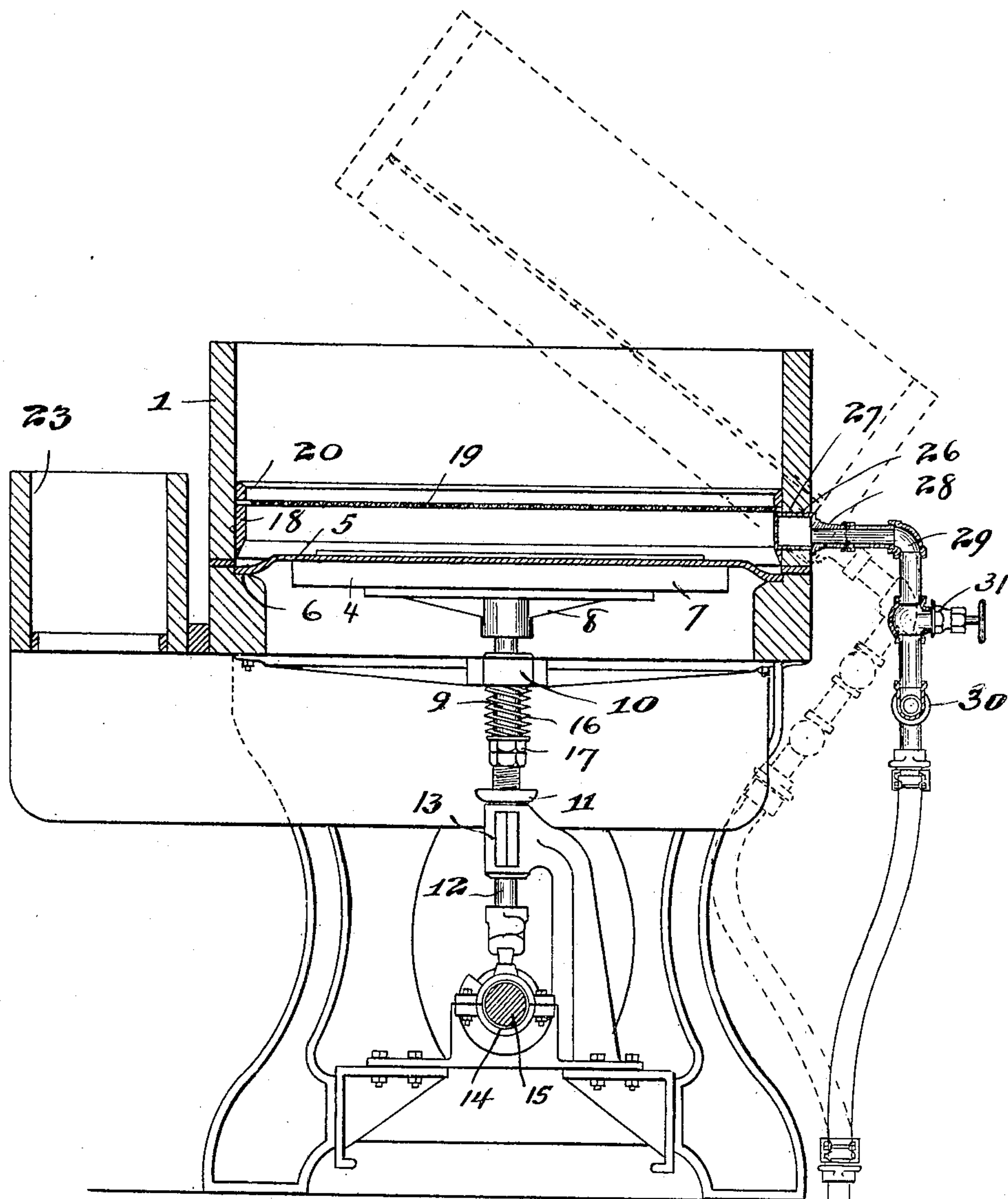


Fig. 5.



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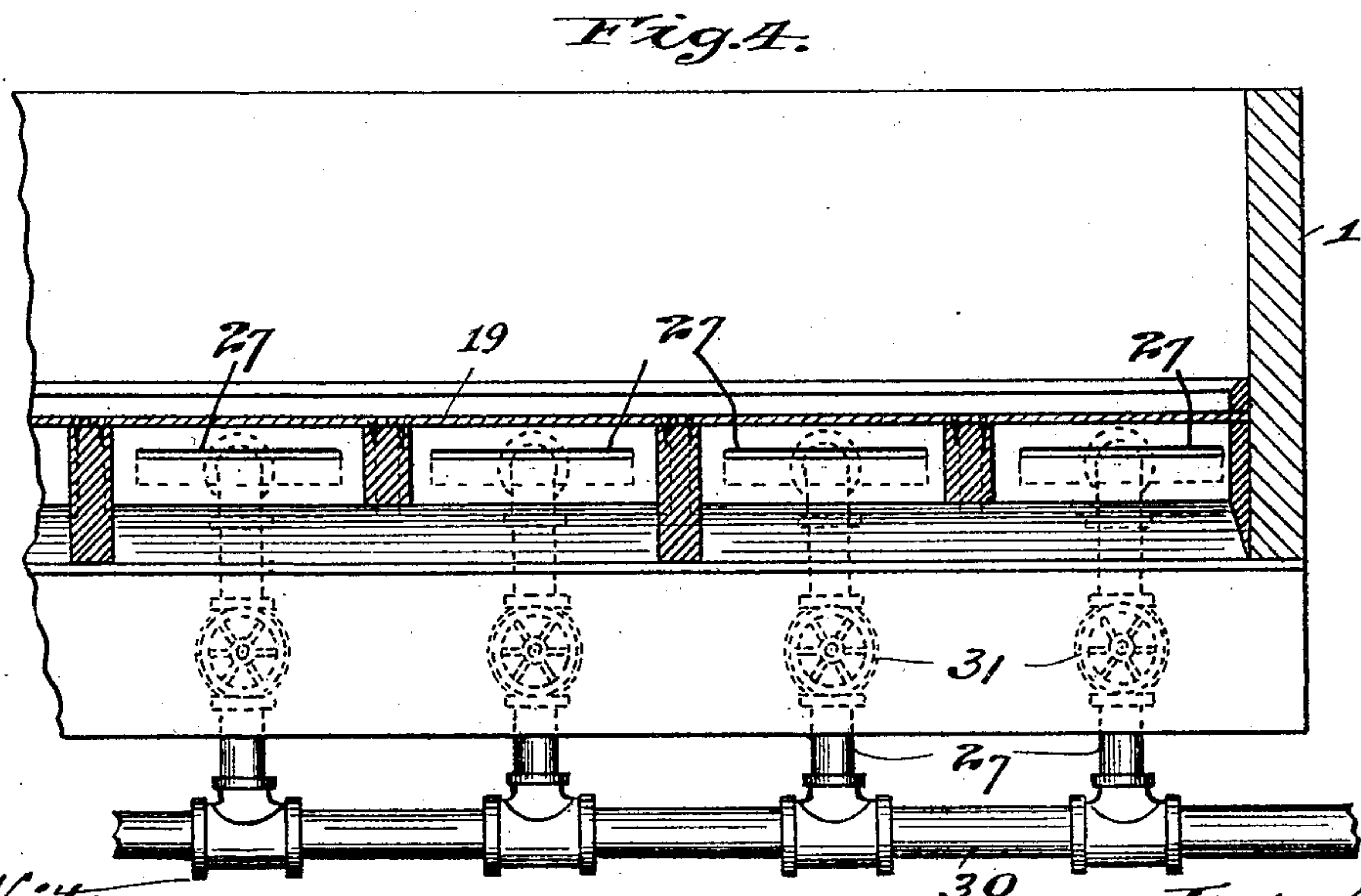
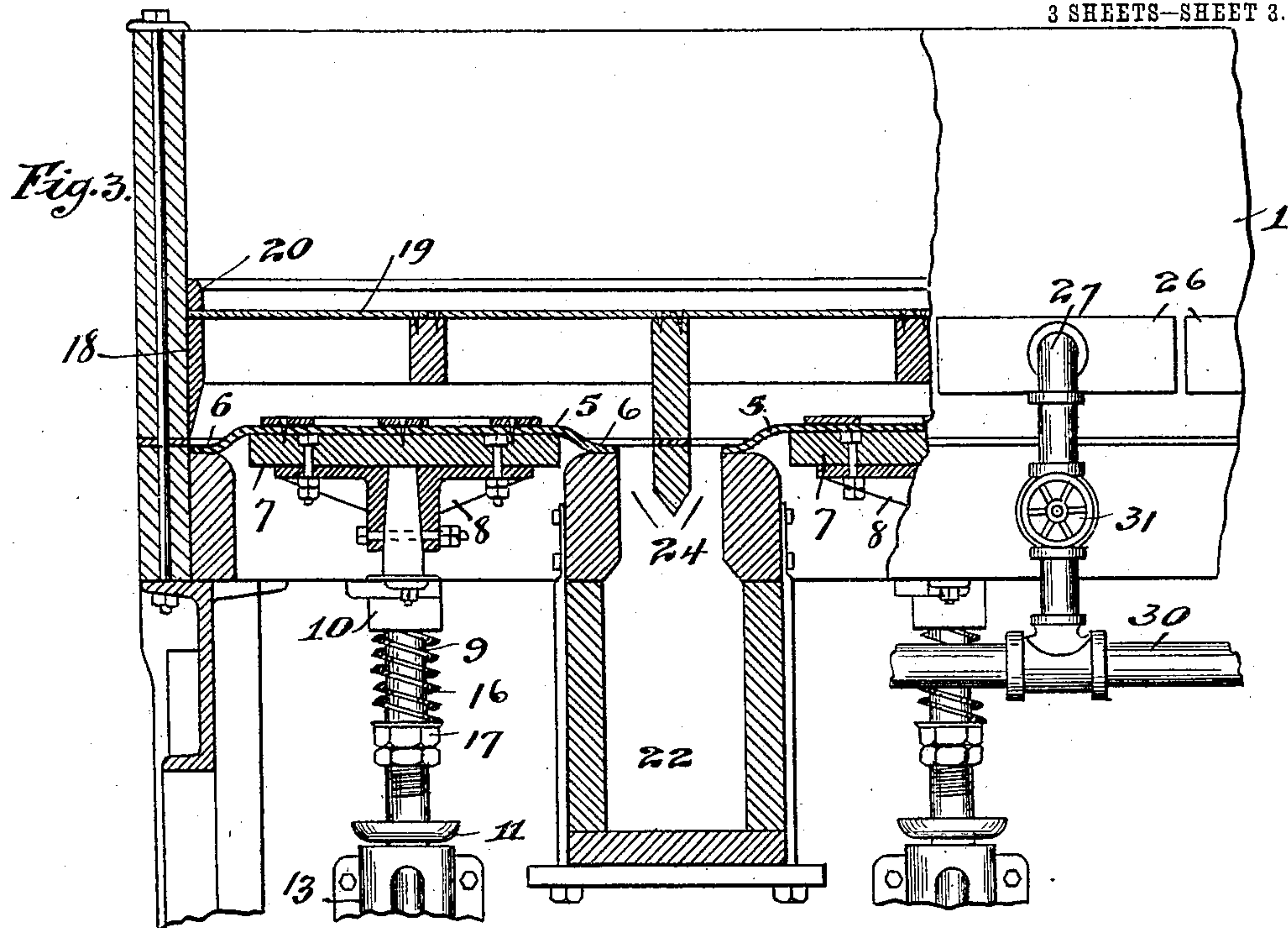
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APPLICATION FILED MAY 31, 1904.

3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR SCREENING FIBROUS PULP.

No. 814,748.

Specification of Letters Patent.

Patented March 13, 1906.

Application filed May 31, 1904. Serial No. 210,484.

To all whom it may concern:

Be it known that I, PETER R. THOM, a citizen of the United States, residing at Appleton, in the county of Outagamie and State of Wisconsin, have invented certain new and useful Improvements in Machines for Screening Fibrous Pulp, of which the following is a specification.

This invention relates to improvements in machines for screening fibrous pulp, and refers more specifically to an improved mechanism for cleaning the screening-plates periodically in order to prevent the accumulation of clots of pulp upon the plates.

The salient objects of the invention are to provide mechanism whereby the screen-plates may be cleaned without interrupting the operation of the screening-machine or practically without interruption; to provide means for effecting this cleaning of the screen-plates which will not deteriorate or modify the quality of the pulp; to provide mechanism embodied in the screening-machine whereby the cleaning operation may be performed at intervals as often as may be found necessary, each such operation requiring but a few moments time for cleaning it out; to provide an embodiment of my invention which may be applied to screening-machines as now commonly constructed without substantially reconstructing the same, and in general to provide a simple and improved mechanism of the character referred to.

To the above ends the invention consists in the matters hereinafter described, and more particularly pointed out in the appended claims, and the invention will be readily understood from the following description, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of a screening-machine equipped with my invention. Fig. 2 is a transverse sectional view taken approximately on line 2 2 of Fig. 1 and looking in the direction of the arrows. Fig. 3 is a detail view showing parts in side elevation and parts in longitudinal vertical section. Fig. 4 is a detail view taken longitudinally and vertically through the screen-box and looking at the inlet-openings through which the steam or other cleansing fluid is injected, and Fig. 5 is a detail view of a screen-plate.

In the drawings, 1 designates as a whole a

screen box or vat mounted upon a suitable supporting-frame, (designated as a whole 2,) said box being preferably of oblong rectangular form and provided with a plurality of movable bottom sections 4, each being connected with a vertically-reciprocating plunger, whereby they are alternately raised and lowered a short distance to impart a pumping action to the liquid contained in the vat. Describing one of such sections in detail, (all being substantially alike,) 5 designates a flexible sheet of impervious material secured at its margins to the bottom edges of the vat, as indicated at 6, and supported throughout its principal area by an underlying plate 7, which is mounted upon the upper end of a plunger-head 8. The plunger-head is mounted upon a suitable stem 9, mounted to reciprocate vertically through bearings 10, carried by the main frame, the lower end of the stem terminating in a tappet-head 11, which is engaged by the upper end of a tappet-shaft 12, also mounted to reciprocate vertically through suitable bearings 13, carried by the main frame. The lower end of the tappet-shaft 12 is operatively connected with an eccentric 14 upon a main shaft 15, extending throughout the length of the machine. During the descent of the plunger the movable bottom section exerts an exhaust action upon the liquid contained in the vat, which tends to draw the same through screen-plates which are supported some distance above the bottom. In order to insure a more certain and prompt downward movement of the plunger, a coiled expansion-spring 16 is interposed between the cross support or bearing 10 and an adjustable collar 17 upon the plunger-stem.

Independently-removable screen-plates are provided above the bottom sections of the vat, and to this end I provide a lower box-like supporting-frame 18, secured with its lower edge coincident with the bottom of the vat, its upper edge serving to support the screen-plates 19. In order to hold the screen-plates in position, a somewhat similar overlying frame 20 is provided, which rests at its lower edge directly upon the screen-plates, it being understood that the overlying frame 20 and the screen-plates 19 may be lifted out of the vat when so desired. Each screen-plate, as best seen in detail Fig. 5, is provided with a series of narrow parallel screen-slots 21,

which are downwardly flaring or have diverging walls as viewed in cross-section. These slots 21 are made of the requisite width to suitably screen the pulp, and inasmuch as such slots are necessarily comparatively narrow it is found in practice that the pulp passing therethrough flows down the side walls of the slots and accumulates in clots, which depend from the lower side of the plates. The fibrous nature of the pulp facilitates the formation of such clots or strings and gradually results in the closing of the slots, so that it becomes necessary to clean the screen-plates from time to time. Moreover, the clots or strings accumulate and drop off from time to time into the screened pulp, and these clots preserve their identity in the pulp, passing out over the distributing-wire and causing the paper to break or forming blotches or uneven spots in the finished paper. Heretofore it has been necessary to completely interrupt the operation of the screening-machine and to tilt up the screen-plate box or vat into the position indicated in dotted lines, Fig. 2, so that access could be had to the lower sides of the screen-plates and the latter cleaned by removing the clots manually and flush out the slots by means of a jet of water. Obviously this is an operation requiring considerable time, and, moreover, the flushing out of the slots resulted in loss of the pulp in the machine, which in itself is a serious objection.

The pulp which passes through the screen-plates is discharged through suitable openings in the stationary bottom sections of the machine into conveyer-troughs 22, which lead out from beneath the screen-plates to and communicate with a flow-trough 23, extending alongside of the screen, said conveyer-troughs 22 being arranged transversely of the machine on the under side thereof and between the plungers. The upper edge of said conveyer-trough in each case has attached thereto the proximate edges of each pair of flexible bottom members, thus leaving discharge-openings 24 into the troughs 22 and forming a sealed passage from the space below the screen-plates through said conveyer-troughs 22 to the flow-trough 23, this being necessary, because the flow-trough is higher than the conveyer-troughs. In this connection the fact should not be overlooked that in providing for the flow of pulp from the screen-plates downwardly through the openings in the bottoms of the sections and through the conveyer-troughs it is essential that such construction be adopted as to avoid the possibility of the pulp lodging upon projections, shoulders, &c., in the course of its flow. In case there be projecting parts, ledges, or other obstructions the pulp in its onward flow will gradually accumulate upon such obstructions until a considerable quan-

tity has accumulated and then drop off in the form of a wad or accumulation which produces a blotch or irregular spot in the finished paper.

Describing now in detail my improved mechanism for cleaning the screen-plates and referring more particularly to Figs. 1 and 2, 26 designates a series of header-boxes conveniently mounted in the side wall of the screen-plate box or cradle laterally opposite the space beneath the screen-plates and between the latter and the movable bottom sections. In the present instance there are two of these header-boxes 26 opposite each section, the number of header-boxes corresponding to the number of individual screen-plates. Each header-box extends through the woodwork of the screen-box and is provided in its inner face with a slot 27, extending the full length of the box or the full width of the screen-plate. At its outer side each box is provided with a nipple 28, with which communicates a supply-pipe 29, the several supply-pipes 29 being conveniently connected with a main header-pipe 30, which extends throughout the length of the series of header-boxes and each supply-pipe being conveniently provided with a valve 31. The main header-pipe 30 connects with a pipe 32, which leads to any suitable source of steam, water, or air under high pressure. In order that the screen box or cradle may be tilted up into the position shown in Fig. 2 in dotted lines, a section of the pipe 32 is desirably formed of flexible hose.

It will be noted that the location of the inlet-slots 27 is just below the lower face of the screen-plates, or, in other words, in alinement with the depending clots or strings which accumulate and hang down from the screen-plates.

With the parts constructed and arranged as described the operation of cleaning the screens is as follows: After the machine has been running long enough to cause an accumulation of clots or strings on the screen-plates steam or compressed air is injected through the several header-boxes by simply opening the controlling-valves 31, preferably successively and without necessarily interrupting the operation of the screening-machine. The steam or air entering the space beneath the screen-plates creates a reverse flow of the pulp through the screen-plates and at the same time sweeps forcibly across the lower side of said plates, thereby effectually dislodging the accumulated clots and disintegrating the latter to a greater or less extent. Obviously as soon as the clots have been dislodged the fibers which supported such clots by extending up through the slots of the plate may be readily driven back by the pressure created by injecting the steam, so as to very effectually clear said slots. The fact that the

slots through the screen-plates are comparatively small insures a sufficient pressure below said plates to act upon and clear all of the slots across the entire width of the box or vat.

5 It is to be noted that the comparatively small amount of liquid produced by the condensation of the steam injected is not sufficient to materially impair the pulp, and if compressed air be used instead of steam it will obviously
10 have no effect whatever in changing the constituency of the pulp.

I am aware that it is old to extend pipes beneath the screen, said pipes being provided in their upper sides with jet-openings, and to
15 force water therethrough upwardly against the under side of the screen in order to clean the latter. This method is not only not the same as I employ, but the water employed dilutes the pulp and is objectionable for this
20 reason. I have found that by using gas or steam under pressure, as above suggested, and discharging the same beneath the screen substantially as described the effect is to blow the downhanging clots or strings from the
25 screen, thereby cleaning the same without the necessity of stopping the machine and without appreciably diluting or otherwise affecting the pulp.

It will be understood from the foregoing
30 description that the spaces and passages below the screen-plates are devoid of projections upon which the pulp might lodge and accumulate in the manner hereinbefore described and that I accomplish the dislodg-
35 ment of the clots and clearing of the screen-plates without introducing any mechanism into these flow-passages below the screens.

It is to be understood that the application of my invention is not in any sense limited to
40 the construction and arrangement shown; but, on the contrary, it is generally applicable to pulp-screening machines of this general class, the details of construction being modified to conform to the necessary require-
45 ments in each instance. Accordingly I do not limit myself to the details of construction and arrangement herein shown except in so far as they are made the subject of specific claims.

I claim as my invention—

1. In a pulp-screening machine, the combination of a vat, a screen-plate, provided
50 with restricted screen-openings arranged to extend across and partition said vat below the normal liquid-level line thereof, the flow-space of said vat below said screen-plate being
55 devoid of obstructions on which pulp could lodge during its onward flow there-through, and a fluid-injector mechanism arranged to communicate with said flow-space of the vat below the screen-plate and whereby
60 fluid under pressure may be injected into said space.

2. In combination, a pulp-screening-machine vat, a slotted screen-plate arranged within said vat and dividing the interior
65 thereof below the normal liquid-level therein, a slot-like opening leading in through the side wall of said vat and communicating with the space below the screen-plate, a header-box communicating with said slot, a supply-pipe
70 connected with said header-box, and a source of fluid-supply under pressure communicating with said supply-pipe.

3. In combination with a pulp-screening machine comprising a vat, a series of compartments in said vat, and screen-plates arranged within the respective compartments and dividing the interior thereof at points below the normal liquid-level therein, a series of
75 header-boxes mounted in the side wall of the vat, one opposite each compartment therein and forming parts of said side wall, slot-shaped passages leading from the respective header-boxes through the side wall of the vat and discharging into the spaces below the
80 respective screens and in a plane approximately parallel therewith, a series of supply-pipes connected with the several header-boxes, each provided with a controlling-cock, and a main header-pipe communicating with the several
85 supply-pipes and with a source of fluid under pressure.

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