

No. 622,070.

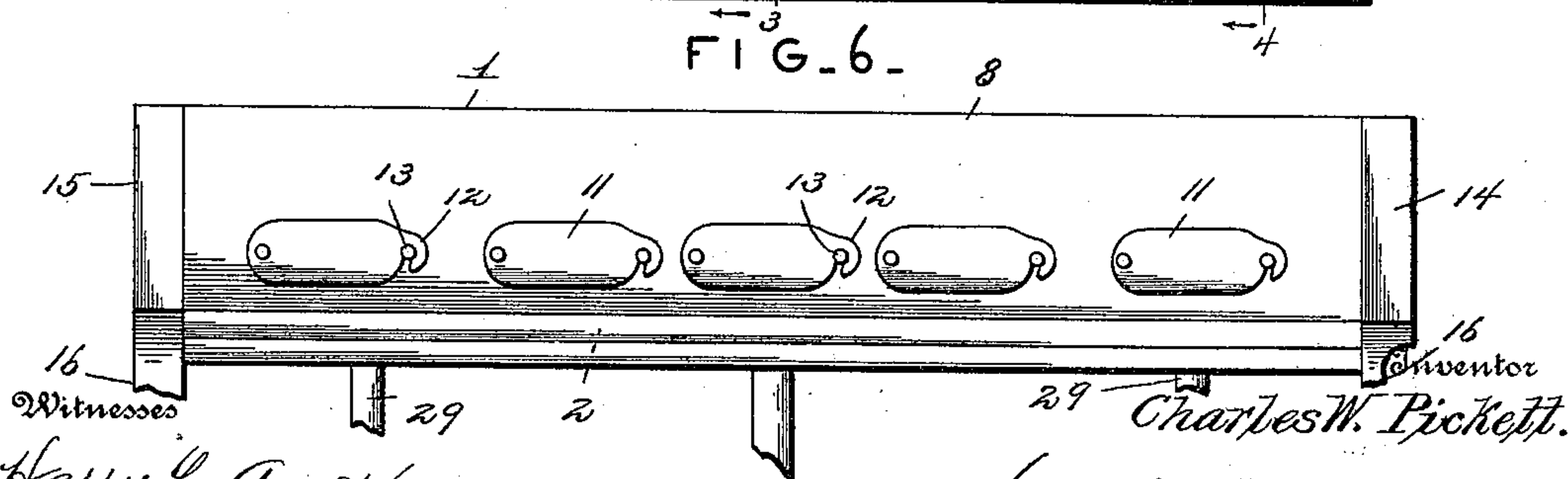
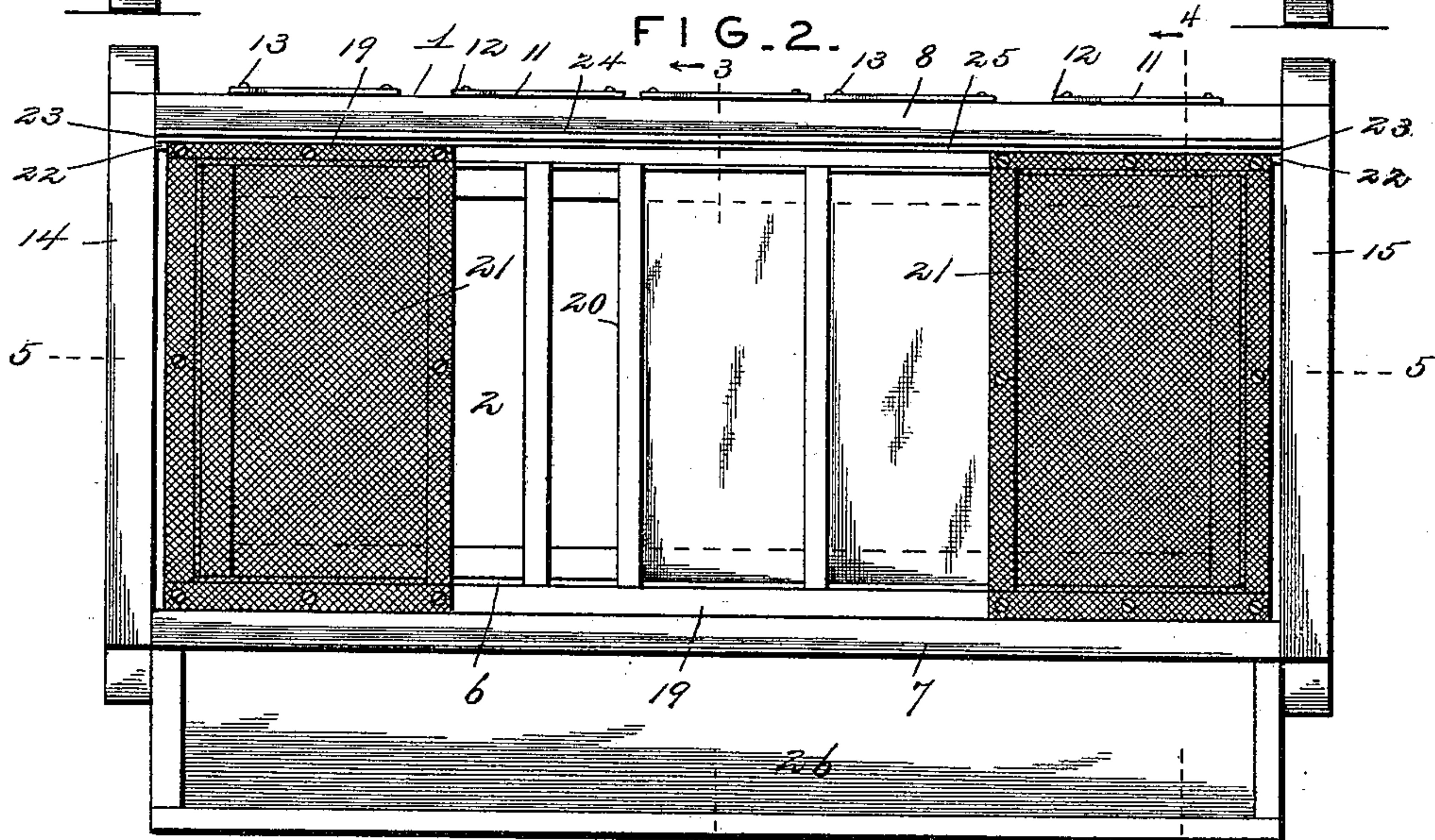
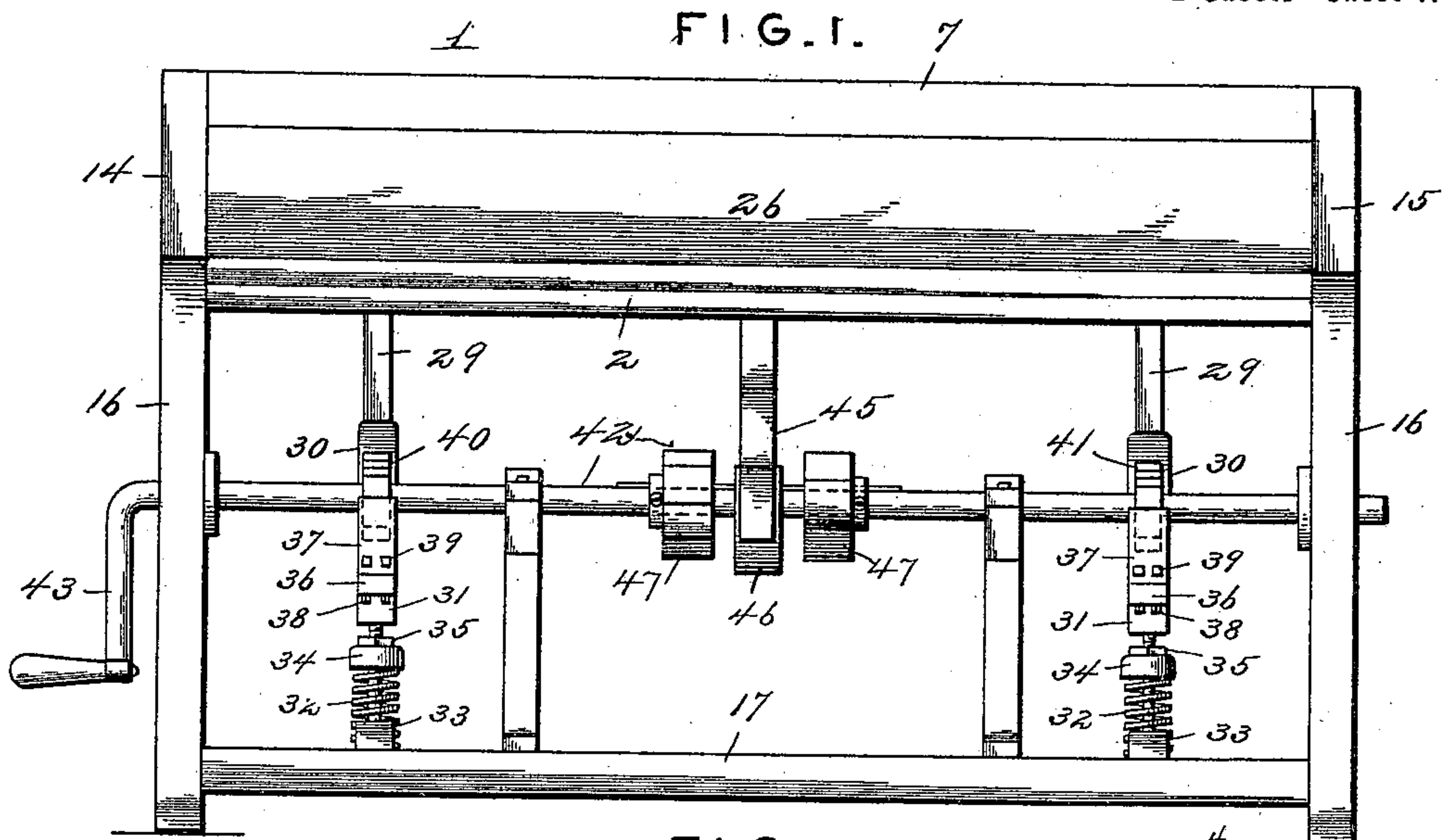
Patented Mar. 28, 1899.

C. W. PICKETT.
SCREEN.

(Application filed Feb. 18, 1898.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses
Harry L. Amer.
T. L. Mockabee

Inventor
Charles W. Pickett.
by V. S. Stockbridge
his Attorney

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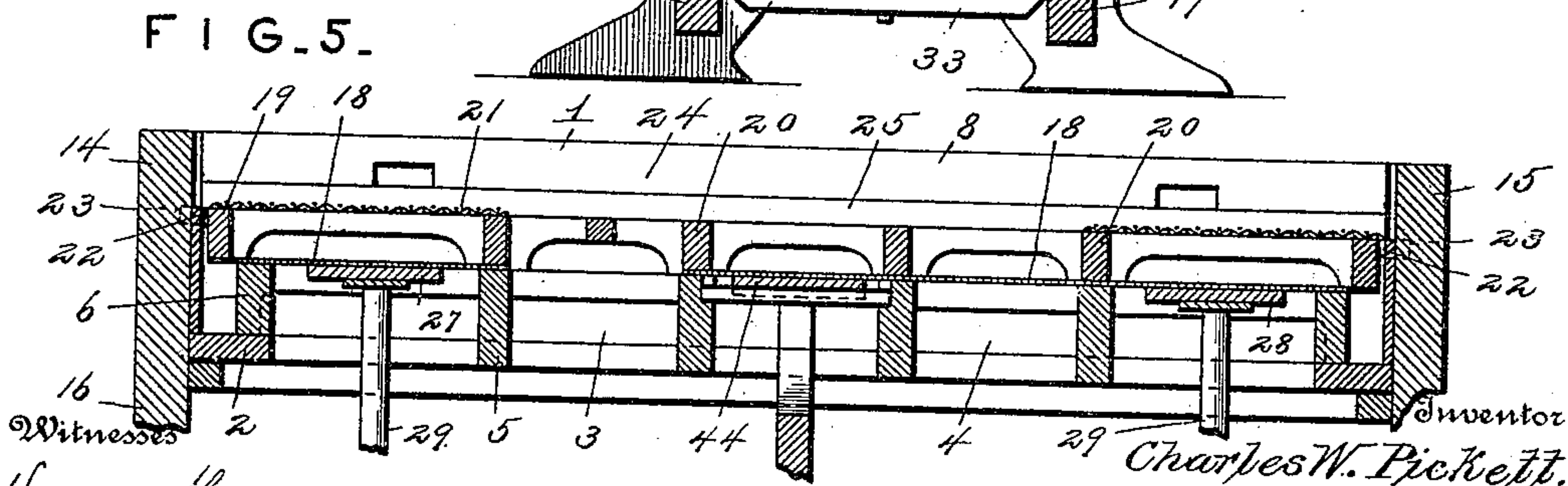
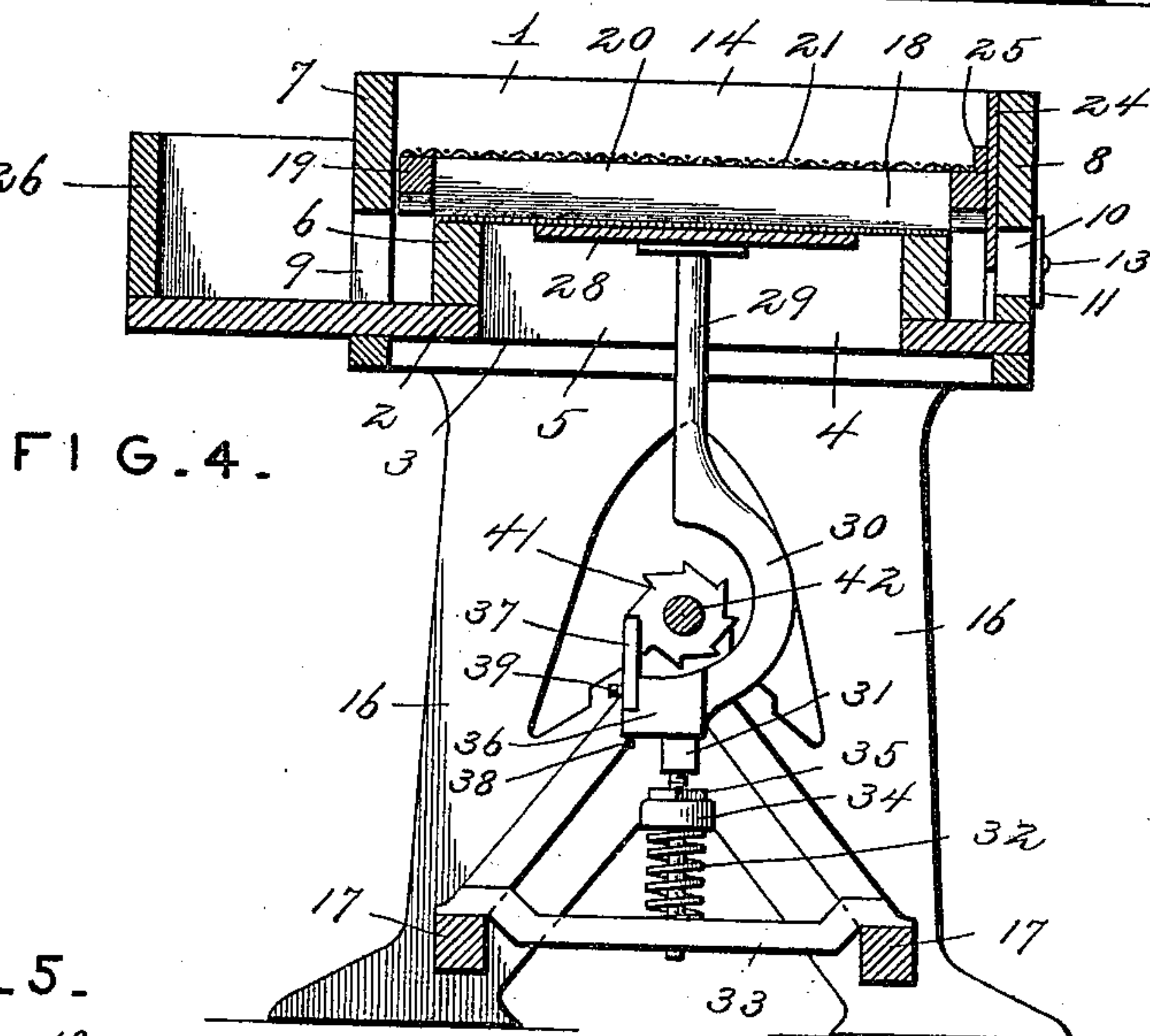
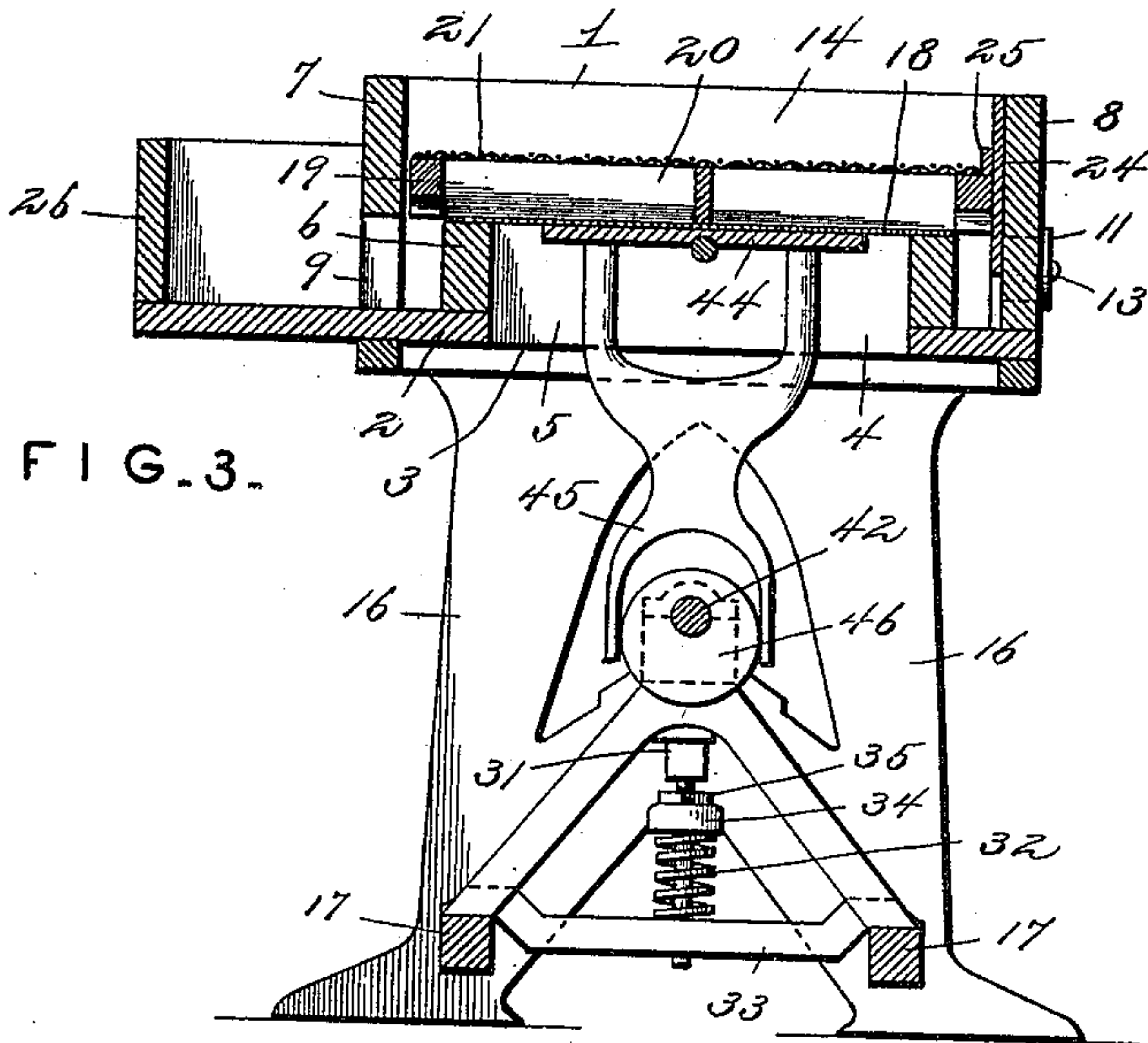
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Harry L. Amer.
T. L. Mockabee

Inventor
Charles W. Pickett.
by V. S. Shockbridge
his Attorney

UNITED STATES PATENT OFFICE.

CHARLES W. PICKETT, OF WATERTOWN, NEW YORK.

SCREEN.

SPECIFICATION forming part of Letters Patent No. 622,070, dated March 28, 1899.

Application filed February 18, 1898. Serial No. 670,823. (No model.)

To all whom it may concern:

Be it known that I, CHARLES W. PICKETT, a citizen of the United States, residing at Watertown, in the county of Jefferson and State of New York, have invented certain new and useful Improvements in Screens; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a novel screening apparatus designed particularly for the screening of ground wood-pulp, sulfite pulp, and paper or other fiber in a wet condition.

The object of the invention is to produce a simple and efficient apparatus of the character described which will produce a successive blast and suction immediately below one or more screen-plates upon which the pulp or fiber is deposited in order to loosen the same by the alternate blast and suction, to cause the pulp and water in a finely-divided condition to pass through the screen, and to prevent clogging of the screen by the coarse particles, which would result from the suction if it were not for the alternation therewith of the blast.

To the accomplishment of these and other objects subordinate thereto the invention consists, essentially, in the employment of one or more screen-plates mounted above one or more diaphragms, which are vibrated to produce the blast and suction by means of novel vibrating mechanism, all of which will be hereinafter fully described, and succinctly pointed out in the appended claims.

Referring to the drawings, Figure 1 is a side elevation of my device complete. Fig. 2 is a top plan view thereof. Fig. 3 is a transverse section on the line 3 3 of Fig. 2. Fig. 4 is a similar view on the line 4 4 of Fig. 2. Fig. 5 is a central longitudinal section through the upper portion of my apparatus on the line 5 5 of Fig. 2, and Fig. 6 is a view of the rear side of the screen-box.

Referring to the numerals on the drawings, 1 indicates what may be termed the "screen-box," consisting of the bottom 2, provided with a longitudinal opening 3, subdivided into the desired number of compartments 4 by transverse partitions 5, which extend up-

wardly from the under surface of the bottom a considerable distance into the box.

6 indicates an oblong frame located upon the bottom and surrounding the opening, a space of several inches being left between the frame 6 and the walls of the screen-box, and said frame, which I shall designate the "diaphragm-frame," being flush with the upper edges of the several partitions.

7 and 8 indicate the front and rear sides of the screen-box, the former being provided with an elongated opening 9, adjacent to its lower edge, and the latter with a series of openings 10, designed to be protected by hinged cover-plates 11, provided with terminal hooks 12, engaging pins 13.

14 and 15 indicate the ends of the box, which are preferably formed integral with standards 16, having their lower ends connected by a pair of parallel brace-rods 17.

18 18 indicate a series of diaphragms of any suitable sensitive material, stretched over each of the compartments of the diaphragm-frame and secured to said frame and to the partitions 5.

19 indicates what may be termed the "screen-frame," fitting within the screen-box above the diaphragm-frame and composed of an oblong frame subdivided by transverse partitions 20, preferably located above the partitions 4. Screen-plates 21 of any desired character are secured, as by bolt-screws or the like, upon the screen-frame directly above each of the diaphragms carried by the diaphragm-frame, and the side pieces of the screen-frame are recessed on their under sides to permit the debris which passes through the screens to the diaphragms to be discharged from the screen-box through the longitudinal opening in its front wall or through the several openings in its rear wall.

The screen-frame is provided adjacent to its rear side with trunnions 22, which are received in bearing-notches 23 in the box, and the frame is held in place by a dam 24, which lies against the inner face of the rear side of the box and between it and the hinged side of the screen-frame, a securing-strip 25 being secured to the face of the dam-plate and resting upon the edge of the screen-plate in order to retain the latter firmly in position, but to

permit of its being elevated when the dam-plate is removed for the purpose of permitting access to the diaphragms. The primary purpose of this dam-plate, however, is to control the discharge from the diaphragms through the rear side of the screen-box, as this discharge will not take place ordinarily except when the device is washed out, at which times the cover-plates 11 are thrown back and the dam-plate is slightly elevated in order to permit the water to flow freely through the screen-box. If desired, a screening-box 26 may be attached to the front side of the screen-box to receive the screenings as they pass from the diaphragm through the longitudinal opening in the front side.

As has been premised, one of the essential features of the invention is the inducement of a successive blast and suction through the screens from below, and this I accomplish by vibrating the diaphragms, which, being located directly below the screens, will effect the desired result. Any suitable mechanism for vibrating the diaphragms may be provided; but I shall now proceed to a description of the mechanism which I at this time deem preferable for this purpose, and I shall define this mechanism in the appended claims as means for introducing a successive blast and suction and as diaphragm-vibrating mechanism. In the drawings I have only illustrated vibrating mechanism in connection with three of the diaphragms, two of which are identical and the third of which is employed to give the diaphragm a peculiar rocking or undulating movement as distinguished from the vertical vibration which is imparted to the other two. Referring to the latter, 27 and 28 indicate a pair of flat plates imposed against the under faces of the diaphragms and supported upon depending standards 29, provided at their centers with rearwardly-curved portions or yokes 30 and terminating at their lower ends in screw-threaded rods 31, extending downwardly into spiral springs 32, seated upon cross-bars 33 and bearing at their upper ends against spring-caps 34, adjustably mounted upon the threaded rods and designed to be secured in their adjusted positions by clamping-nuts 35. Each of the standards is provided upon one side, immediately below the yoke, with a horizontal flange 36, upon which is seated an adjustable block 37, designed to be adjustable vertically by means of adjustment-screws 38 and to be fixed in its adjusted position by a set-screw 39, passing through the block and into the standard.

40 and 41 indicate a pair of wheels mounted upon a horizontal shaft 42 and provided with ratchet-teeth designed to contact with the block 37 and to impart a rapid reciprocatory movement to the standards. It will be observed that as these wheels rotate the flat sides of the teeth will act upon the blocks and will force the standards downwardly against the resistance of the springs with a compara-

tively gradual movement; but as soon as the tooth has passed the block the spring will throw the standard upwardly with a quick movement. This reciprocation of the standards in opposite directions at different speeds will cause the plates imposed against the under sides of the diaphragms to impart a peculiar vibration to said diaphragms, which will induce a blast when the standards are quickly elevated and will induce a suction when they are gradually depressed. The effect of this operation upon the pulp or fiber upon the screen-plates will be obvious, as it will be seen that the blast will tend to loosen the same and that the suction will draw the pulp and water in a finely-divided condition through the screen and will cause them to be deposited upon the diaphragms, which by reason of their constant vibration will deposit such pulp in the screening-box 26. It is obvious, however, that instead of the wheels provided with ratchet-teeth various forms of cam-wheels might be employed for the purpose of varying the movement of the diaphragms to suit the contingencies of use.

If desired, the ratchet-wheels 40 and 41, with their connected parts, may be inclosed in a suitable casing supporting an oil-cup, whereby the parts may be run in oil or may be protected from dust and debris and oiled by means of the drip from the cup.

The shaft 42 extends longitudinally at the center of the device and about midway between the screen-box and the support and is journaled in suitable bearings carried by the frame and is provided at one end with a crank 43, by means of which the shaft may be rotated to actuate the diaphragm-vibrating mechanism described.

In addition to the reciprocatory diaphragm-vibrating mechanism which I have just described I have illustrated another form of vibrating mechanism designed to impart an undulatory movement to the diaphragm or, in other words, to cause a simultaneous elevation and depression of the opposite ends of the diaphragm, which produces in effect a blast adjacent to one side of the screen-plate and a suction at the opposite side, this peculiar alternation of the blast and suction at opposite sides of the plate serving not only to loosen the pulp or fiber and to draw the fine particles thereof through the screen, but to cause the fiber upon the screen to be given a lateral vibration, which serves to even more effectually detach the screenings and to cause their gravitation to the diaphragm. This mechanism consists of a plate 44, imposed against the under side of one of the diaphragms and mounted upon a shaft located at its center to permit the plate to rock. This motion is imparted by means of an oscillatory arm depending from the plate at its center and provided with a fork 45 at its lower end spanning a cam 46, keyed or otherwise secured upon the shaft 42. It will now be

seen that when the power-shaft is rotated—
as, for instance, through the medium of the
crank or by the application of any suitable
power-transmitter—the vibrating mechanism
5 just referred to will cause the peculiar vibra-
tion described of the diaphragms and will os-
cillate the arm to rock the plate, and thereby
impart an undulatory vibration to the dia-
phragm in operative relation therewith. In
10 order to vary the vibration of this last-named
diaphragm, I mount a series of cams or ec-
centrics 47 upon the shaft, as by means of a
spline, said cams or eccentrics being capable
of longitudinal movement upon the shaft, so
15 that any one of them may be brought into op-
erative relation with the fork upon the lower
end of the arm before referred to. It will thus
be observed that when the pulp or fiber has
been deposited upon the screen-plates and the
20 power-shaft is rotated the several diaphragms
will be vibrated to cause a successive blast
and suction to be induced through the screen-
plates, which will quickly effect the loosen-
ing of the pulp or fiber and will cause the thin
25 particles thereof to be separated and drawn
below the screen, the vibration of the dia-
phragm serving, in addition to the function
referred to, to cause the screenings to be dis-
charged into a suitable receptacle provided
30 for them; but while the present embodiment
of my invention appears to be preferable I do
not desire to limit myself to the structural
details set out, but reserve the right to change,
modify, or vary them at will within the scope
35 of the protection prayed.

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

1. The combination with a screen, of a dia-
40 phragm located therebelow, a standard in op-
erative relation with the diaphragm, a spring
designed to cushion the movement of the
standard and to retain it in its elevated po-
sition, an adjustable block carried by the
45 standard and a cam-wheel in operative rela-
tion with the block and designed to actuate
the standard in opposition to the spring, sub-
stantially as specified.

2. The combination with a screen, of a dia-
50 phragm located therebelow, a plate imposed
against the under surface of the diaphragm,
a standard dependent from the plate and pro-
vided with an adjustable block, a cam-wheel
in operative relation with said block, a spring
55 designed to substantially urge the standard
in the direction of the diaphragm, and means
for regulating the tension of the spring, sub-
stantially as specified.

3. The combination with a stationary screen,
60 of an imperforate flexible diaphragm secured
along its edges and means for imparting an
undulatory vibration to the diaphragm, sub-
stantially as specified.

4. The combination with a stationary screen,
65 of an imperforate flexible diaphragm located
therebelow and secured along its edges, and
means for imparting opposed vibrations to

the opposite ends of the diaphragm, substan-
tially as specified.

5. The combination with a stationary screen, 70
of a flexible diaphragm secured along its edges,
and a rocking plate imposed against the un-
der surface of the diaphragm, substantially
as specified.

6. The combination with a stationary screen 75
and a flexible diaphragm secured along its
edges, of a rocking plate imposed against the
under surface of the diaphragm, and an os-
cillatory arm designed to impart motion to
the plate, substantially as specified. 80

7. The combination with a screen and dia-
phragm, of a rocking plate imposed against
the under surface of the diaphragm, a vibra-
tory arm extending from said plate and a se-
ries of cam-wheels adjustably mounted in or-
85 der to permit either of said cams to be brought
into operative relation with the arm, substan-
tially as specified.

8. The combination with a screen-box, of a
diaphragm-frame located within the box, and 90
of sufficiently smaller dimensions to leave a
space surrounding the diaphragm-frame, a
hinged screen-frame above the diaphragm-
frame, and provided with screens, a dam-
plate located against the inner face of one side 95
of the screen-box, and designed to control the
openings therein, and a screening-box se-
cured to the screen-box, and designed to re-
ceive the screenings discharged from the
screen-box through an opening in its front 100
side, substantially as specified.

9. The combination with a screen-box, of a
diaphragm-frame located therein, a hinged
screen-frame above the diaphragm-frame,
and a dam-plate located against the inner 105
face of one side of the box, and provided with
a securing-strip designed to retain the screen-
plate in place, substantially as specified.

10. The combination with a screen-box, of
a diaphragm-frame therein and of sufficiently 110
less dimensions to leave a space around its
edge, diaphragms mounted upon the dia-
phragm-frame, a screen-frame hinged at one
edge and supported by the diaphragm-frame,
a dam-plate located against the inner face of 115
one side of the box and provided with a rail
bearing upon the screen-frame, said screen-
box being provided with a series of openings
in its rear wall, and with a longitudinal open-
ing at the bottom of its front wall, cover- 120
plates for said series of openings, and a screen-
ing-box designed to receive screenings dis-
charged through the opening in the front wall,
the side bars of the screen-frame being re-
cessed to permit the discharge of the screen- 125
ings from the diaphragms, substantially as
specified.

In testimony whereof I affix my signature
in presence of two witnesses.

CHARLES W. PICKETT.

Witnesses:

ROSS C. SCOTT,

ALLYN R. SCOTT.