(No Model.)

C. PINDER & W. A. HARDY.

Screen Plate for Paper Making Machines.

No. 234,719. **Patented Nov. 23, 1880.**

Fig. 1.

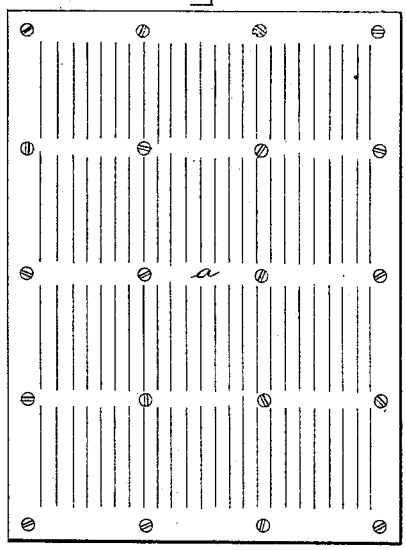


Fig. 2.

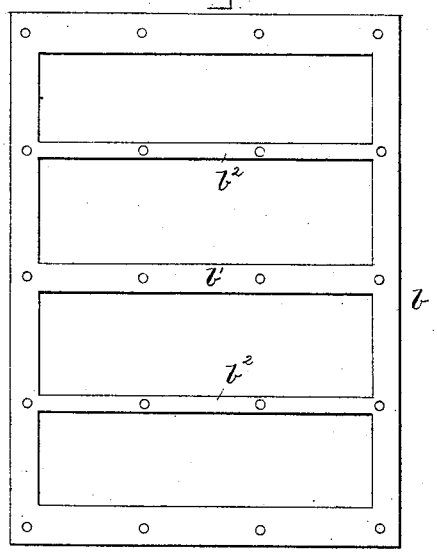


Fig. 3.

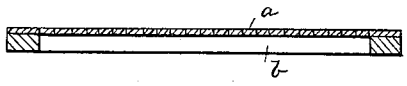


Fig. 4.

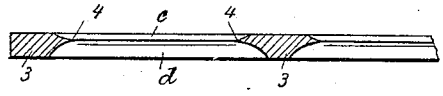
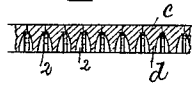


Fig. 5.



Witnesses

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UNITED STATES PATENT OFFICE.

CHARLES PINDER AND WILLIAM A. HARDY, OF FITCHBURG, MASS.

SCREEN-PLATE FOR PAPER-MAKING MACHINES.

SPECIFICATION forming part of Letters Patent No. 234,719, dated November 23, 1880.

Application filed September 25, 1880. (No model.)

To all whom it may concern:

Be it known that we, CHARLES PINDER and WILLIAM A. HARDY, of Fitchburg, county of Worcester, and State of Massachusetts, have invented a new and useful Improvement in Screen-Plates for Paper-Making Machines, of which the following description, in connection with the accompanying drawings, is a specification.

Our invention relates to screen-plates for paper-making machinery, and has for its object to simplify and cheapen the construction thereof, at the same time improving their operation.

In paper manufacture the pulp is caused to flow over a metal screen-plate provided with several series of parallel slits, through which the pulp is made to pass. As heretofore constructed these plates have been of considerable thickness—about three-eights of an inch—in order to give them the requisite strength, and they are then milled out at the under side very nearly to the upper surface of the plate, the milling-tool making a series of channels or grooves in the plate of considerable width at its under surface, and tapering or decreasing in width as they extend up into the plate. The plate has then been cut through from the upper surface into these channels by a saw, making the fine slits through which the pulp passes, which are the effective screening agent, the function of the metal of the lower portion of the plate between the milled channels being merely to strengthen or sustain the upper slitted screening-surface.

The said milled channels are made tapering and broadest at the lower surface of the plate, in order that the pulp, after having passed through the narrow sawed slits, may fall freely into the receptacle placed below to receive it; but in practice it is found that the pulp often collects and clogs in these channels, necessitating the removal and cleaning of the plates, thus involving a considerable loss of time.

Another objection to plates of this form, which has been partially overcome by a prior invention patented by us April 13, 1880, No. 226,545, is that when any of the slits become pitted, worn, or chemically eaten away, so that they no longer operate properly, the whole of the plate in which the said worn slits are found has to be removed, and its value as a screen-plate is entirely destroyed, it being worthless except as old metal.

We have succeeded in devising a plan of construction by which these and some other minor objections, to be hereinafter referred to, are almost entirely obviated; and our plan consists in making a compound plate, one portion performing the function of screening the pulp, and the other or sustaining portion having as its function merely to sustain the screening portion. The supporting or sustaining portion is made as an open frame, having rectangular openings somewhat similar to those of a window-sash, the solid parts of the frame being transverse to the slits of the screening portion and near enough together to maintain the said thin screening portion rigid. The screening portion is made as a thin sheet or plate of metal of about the thickness of the sawed portion of the plates hereinbefore described, and sawed through in the portions which will be above the openings of the sustaining portion when in position thereon. When placed in position on the sustaining portion the screening portion may be attached thereto in any suitable manner, as by screws.

The upper or screening portion of a screen-plate constructed in this manner is the only part subject to deterioration from wear or chemical action, and consequently the only part to be renewed.

By this construction the expensive operation of milling the under portion of the plate is rendered unnecessary and the sustaining portion becomes a fixture, and when necessary to renew a screen, owing to the wearing of the slits, the metal condemned or reduced from the value of manufactured to that of old or junk metal is a very small fraction—about one-eighth—of that wasted or condemned in a worn plate of ordinary construction.

When the pulp has passed through the screening-slits it is free to fall into its receptacle, and the clogging common in plates of ordinary construction is wholly obviated.

Figure 1 is a top view of a complete screen-plate constructed in accordance with our invention; Fig. 2, a top view of the sustaining portion or frame thereof, the upper screening portion being removed; Fig. 3, a transverse

section of the complete plate, and Figs. 4 and 5 sections longitudinal and transverse to the screening-slits of a portion of a screen-plate of the construction heretofore employed.

The upper or screening portion, *a*, is made as a thin plate, adapted to be secured, as by screws, to the lower or sustaining portion, *b*, (shown as a rectangular frame,) having cross-bars b' b^2, arranged transversely to the ends of the slits of the thin screening portion *a*, and sufficiently close together to form a suitable support for the said screening portion *a* and prevent the latter from yielding to the pressure of the superincumbent pulp.

It will be seen, referring to Figs. 4 and 5, that in a portion of a plate constructed on the old plan, of the size of the plate shown in Fig. 1, there would usually be two series of parallel slits, and the portion *c* of the plate between each pair of slits would be supported or strengthened by the rib *d* of the metal of the plate between the milled channels 2. These strengthening-ribs do not exist in our improved plate, and in order to give the requisite strength in their absence secondary cross-bars b^2 are placed midway between the main cross-bar b' and the end bars of the frame *b*, which correspond to the unmilled portion 3 of the old form of plates.

Owing to the circular form of the milling and sawing tools the actual effective length of the screening-slits between the points 4 is much less than the distance between the unmilled portions 3 of the plate, and consequently the effective screening-area is quite small in proportion to the whole area of the plate.

In our improved screen-plate the slits in the upper screening portion, *a*, extend entirely across the portion between the cross-bars, so that for a given size of plate the effective screening-area is larger than in a plate constructed on the old plan, although additional cross-bars b^2 are used.

When the pulp has once passed through the slits it drops freely through the space between the cross-bars, instead of clogging, as in the old form, in the milled spaces 2.

When the screening portion *a* is worn out it may be replaced without disturbing the sustaining portion *b*, which may be either permanently connected with the screen-box, or may be made in sections of suitable size and connected with corresponding sections of the screening portion *a*, to form a sectional screen-plate, as described in our former patent referred to, which may be removed from the screen-box without disturbing the remaining sections.

A screen-plate constructed on our plan affords the largest possible screening-area in proportion to the amount of metal used, and enables the plate to be replaced when worn with the least waste of material.

The amount of labor necessitated for its construction is also reduced to a minimum, as the milling operation is dispensed with.

Only the sawed slits are made, these being of uniform width through the plate from one face to the other thereof.

We are aware that screen-plates have been made in which a thin slitted screening portion is supported on and strengthened by an independent supporting-frame portion; but in such screen-plates, so far as we are aware, the bars of the supporting portion run longitudinally along beneath some of the strips lying between adjacent pairs of slits in the thin plate. Such an arrangement is entirely different from ours in its results, as the unsupported strips will be more depressed by the weight of the pulp than the one supported by the longitudinal bars. The pulp will also in a short time work its way in between the upper surface of the supporting-bar and the under surface of the strip resting thereon, and will thereby bend the said supported strips up above their normal position, thus opening the slits and injuring the effect of the screen-plate.

We claim—

As an improved article of manufacture, a screen-plate consisting of the thin screening portion provided with slits of uniform width from one to the other face of the plate, for the passage of the pulp, combined with the sustaining portion provided with suitable cross-bars extended across the screening portion at the ends of and only transversely to the slits therein, to thus sustain the said thin screening portion, and leave its entire under surface between the slits unobstructed, all substantially as and for the purpose described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

CHARLES PINDER.
WM. A. HARDY.

Witnesses:
JAMES B. SARGENT,
F. A. CURRIER.