Nov. 10, 1942. G. C. BREWSTER 2,301,514

SCREEN PLATE

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Fig. 1.

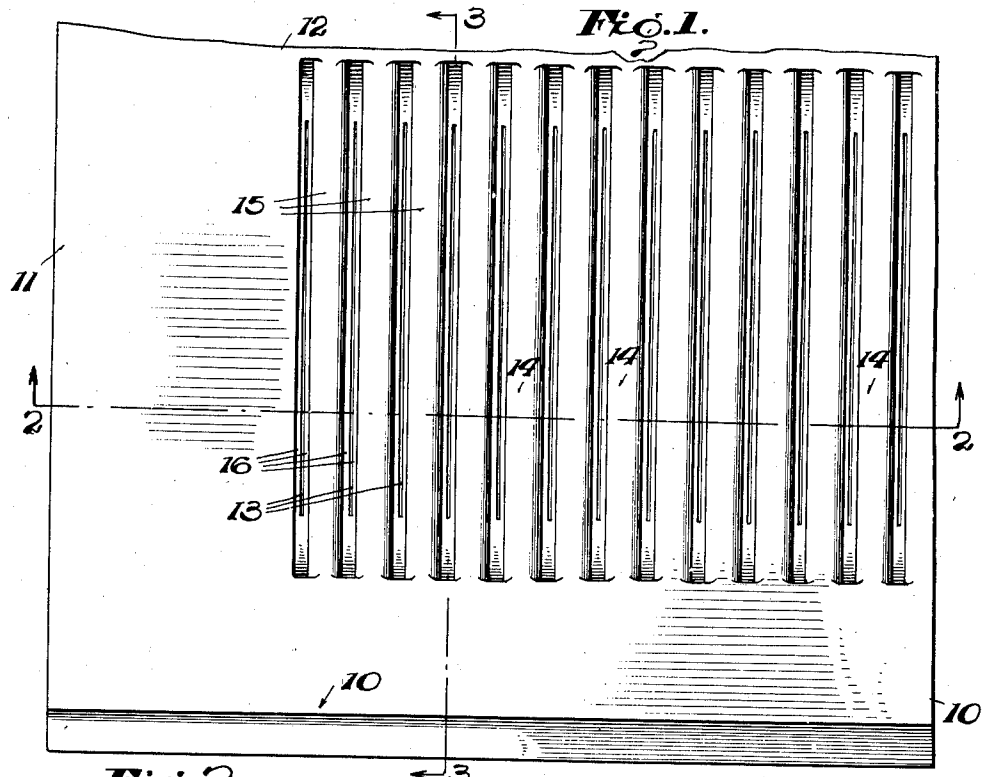


Fig. 2.

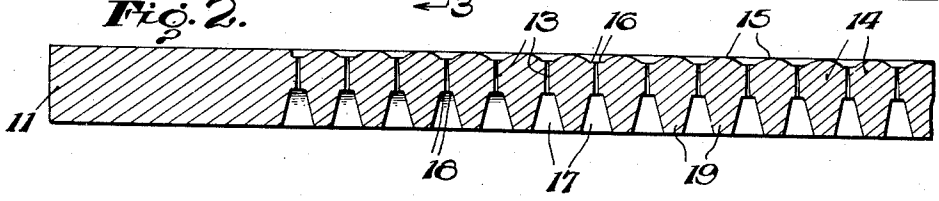


Fig. 3.

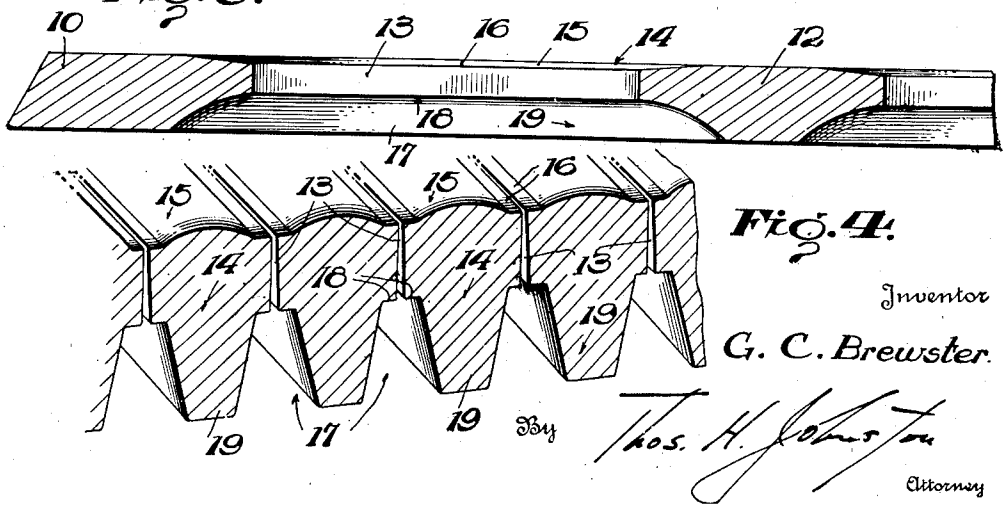


Fig. 4.

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Fig. 7.

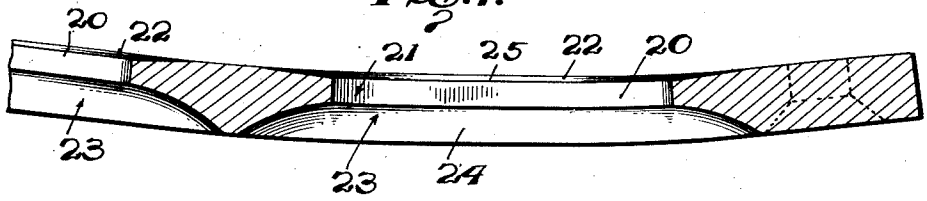



Fig. 6.

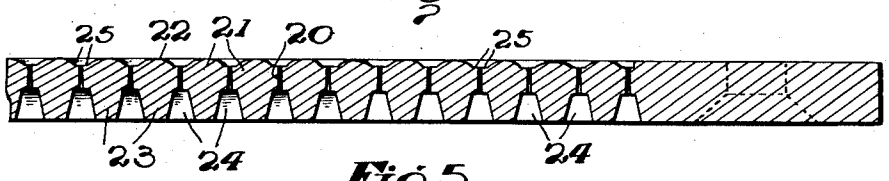
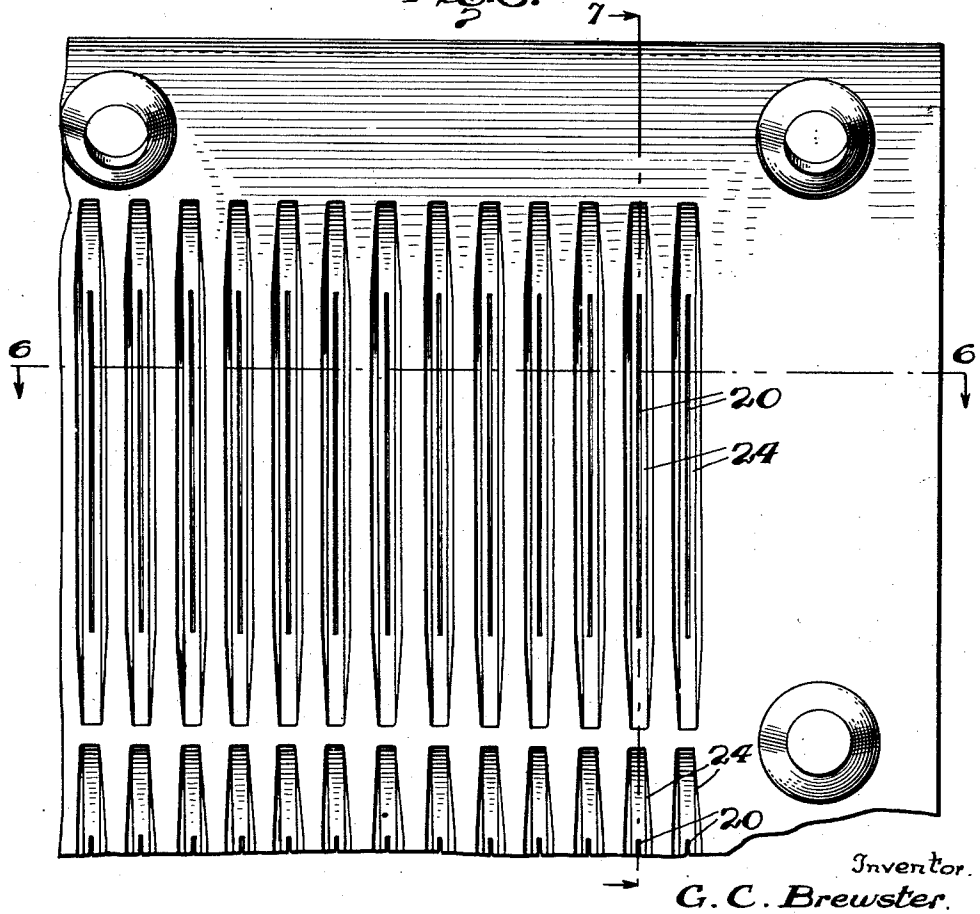



Fig. 5.

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2,301,514

# UNITED STATES PATENT OFFICE

2,301,514

## SCREEN PLATE

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Application October 5, 1939, Serial No. 298,122

1 Claim. (Cl. 92—30)

This invention relates to an improved screen plate for paper making machines.

As is well known, the slots, in plates of this character, are subject to wear and corrosion which, under present practice, usually results in discarding the entire plate, even though only a few slots may be affected, as the efficiency of the plate, as a whole, is dependent upon the preciseness and uniformity of the slots.

An object of the present invention, therefore, is to provide a plate which, in original construction, will embody sufficient reserve metal, at the proper points, available to permit closing of the slots, as by a process of rolling to which the plate may be subjected, and re-cutting of the slots, thus to restore the plate to its initial efficiency.

A further object of the invention is to provide a plate wherein the reserve metal will be bulked to form convex crowns on the bars of the plate between the slots.

Still another object is to provide a plate wherein flats will be provided at opposite sides of the mouth of each slot throughout the length thereof, a pair of flats thus lying at opposite sides of each slot between an adjacent pair of crowns.

A further object of the invention is to gain a double advantage through the provision of reserve metal for closing the slots, namely, first, to initially shape this reserve metal into crowns on the bars capable of diverting the stock and water toward the slots for thus increasing the capacity of the plate and, second, to delimit the crowns sharply by flats at the ends of the transverse curve of each crown so as to prevent or at least retard clogging when the stock is thick.

Still another object of the invention is to provide a plate embodying the present characteristics and suitable for use on a rotary screen unit.

Other and incidental objects of the invention will appear during the course of the following description and in the drawings:

Figure 1 is a fragmentary top plan view of a screen plate constructed in accordance with the present invention.

Figure 2 is a fragmentary longitudinal section on the line 2—2 of Figure 1.

Figure 3 is a fragmentary transverse section on the line 3—3 of Figure 1.

Figure 4 is a detail sectional perspective view, greatly enlarged to better show structural detail.

Figure 5 is an inverted fragmentary plan view showing a so-called "Bird" or rotary plate.

Figure 6 is a fragmentary section on the line 6—6 of Figure 5.

Figure 7 is a fragmentary section on the line 7—7 of Figure 5, bringing out the curvature.

As will be appreciated, screen plates are rectangular in over-all shape and flat plates usually embody two or more longitudinal stripes of transverse slots while curved plates may embody four or more such stripes of slots. It has been deemed sufficient, in the present instance, to show a typical portion of each plate, as a further showing would be unnecessary to an understanding of the invention for those skilled in the art.

Figures 1, 2, 3 and 4 of the drawings show a flat plate. The plate includes side panels 10, end panels 11 and a center panel 12. At each side of the center panel is a longitudinal stripe of transverse slots, a typical few of which are shown and will be described. The drawings are on an exaggerated scale to better show structure. Preferably, the major thickness of the plate is close to five sixteenths of an inch, length, say for a typical instance, forty-three inches, and width, ten and three quarter inches. These dimensions may be unnecessary, but are given as illustrative although, of course, I do not wish to be limited thereto.

The slots mentioned are indicated at 13 and, as best brought out in Figure 4 of the drawings, are wedge shaped or widened toward their discharge limits. These slots define a series of bars 14 separated by the slots. At one side of the plate, the metal is bulked to provide a convex crown 15 for each bar and sharply defining these crowns are flats or lips 16 which extend from end to end of the slots. As will be perceived, a pair of flats is disposed at opposite sides of each slot, the combined surface of each pair of flats providing a drainage area contiguous to the mouth of each slot. One of the purposes of this construction is to feed the stock and water, by the convexity of the crowns, to the slots, thus increasing the capacity of the plate. Another purpose is to provide for relatively still drainage areas between the crowns so as to prevent clogging or at least retard clogging when the stock is thick.

The foregoing may perhaps be made a little more clear. It will be assumed that stock and water are flowing over the plate in its usual inclined position. As will be grasped, the curvature of the crowns 15 will act to create a rush of the liquid pulp tending to cause said pulp to flow over and past the mouth of each slot. In the present construction, this tendency is counteracted by the presence of the flats 16. For instance, assume a pair of crowns 15 and an intervening pair of flats 16. The crowns provide

dams and the flats provide relatively still pools for the stock so that, independently of the gravitational flow of the bulk of stock passing over the screen, each pool, as outlined, provides a relatively still volume tending to arrest the surface flow and cause the material to flow into and through the slots.

The dimensions involved are necessarily small. For instance, the crowns are preferably about .012" and the slots, including the crowns, about five thirty seconds of an inch. This leaves about five thirty seconds of an inch below the slots. In the present construction, the milling is carried about one quarter inch beyond each end of the mouth of each slot, as shown. Flat screen plates, under different screening conditions, wear at times, more at the ends of the slots than at the middle area and by forming the crowns 15 to extend approximately a quarter inch beyond the ends of the slots, metal is provided at these vital points to permit re-closing of the slots and re-cutting, as shall presently appear.

Formed in the lower side of the plate to communicate with the slots 13 are inverted, truncated V-shaped channels 17 each defining a pair of lateral flats or shoulders 18 at the discharge slit of each slot. Clearance is thus provided so as to retard fouling of the stock at the discharge slits and, due to the downward widening of the slots 13, in conjunction with the clearance provided by said flats, it has been found that the capacity of the plate is materially increased. The channels 17 define ribs 19 at the lower edges of the bars 14, these ribs being of inverted truncated pyramidal shape in cross section. The bars are thus strengthened and reinforced by said ribs so that the accurate parallelism of the bars will be preserved intact.

Assuming now that it is desired to recover the plate, when worn, the plate is suitably rolled transversely or, in other words, in a direction longitudinally of the bars 14. The crowns 15 will thus be flattened and the reserve metal therein utilized to spread the bars and close the slots 13. The slots may then be re-cut to accurate definition. The number of slots 13 and bars 14 per longitudinal inch of the plate will, of course, be determined by the exact transverse dimensions of the bars.

It has been found that by providing the bars 14 with the crowns 15 of say .012", more or less, as previously noted, the "life" of the plate is practically doubled. On the average, not more than half of the reserve metal of the several crowns will be required for a usual re-closing and re-cutting job and the plate will maintain its width at all times while, also, the bars will remain straight with no tension such as might spring them out of place.

In Figures 5, 6 and 7 of the drawings, I have shown a curved screen plate embodying the present improvements. It would appear superfluous to describe the panels and body structure of the curved plate.

Coming now to detail structure, the plate includes stripes of V-slots 20 defining intervening bars 21 having convex crowns 22, truncated pyramidal ribs 23, truncated V-channels 24, and flats 25, as described in connection with the prior embodiment of the invention. Reserve metal is thus present in the crowns 22 to permit recovery of the plate, when worn, as previously described.

Having thus described my invention, I claim:

A unitary metallic screen plate of uniform thickness and having integral structural parts fashioned from the thickness of the plate and embodying a plurality of parallel bars each including a convex crown at the upper surface of the bar, flat lateral lips at the upper margins of the bar delimiting the crown, flat sides slightly converging downwardly, flat lateral shoulders opposite said lips and parallel thereto at the lower limits of said sides, and truncated V-shaped ribs tapering downwardly from the inner angles of said shoulders, the sides being defined by downwardly widened parallel slots of uniform depth separating the bars whereby each slot is flanked at its mouth by a pair of said lips to provide a flat-bottomed catch basin between each pair of crowns for arresting the current of material flowing over the plate and is flanked at its exit with a pair of said shoulders to provide lateral clearance for said material, the major height of each crown being disposed within the lines of the plate and appreciably less than the depth of each slot and the height of any one crown combined with the depth of any one slot being substantially half the thickness of said plate, the bars being of unitary integral construction integral with the plate and the crowns being longer than said slots whereby the plate may be rolled to flatten said crowns and crowd the metal of the bars to laterally enlarge said bars and close said slots from end to end for recutting.

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