May 22, 1928. 1,670,473

S. MILNE

MECHANICAL SCREEN, STRAINER, AND THE LIKE

Filed Sept. 3, 1925 2 Sheets-Sheet 1

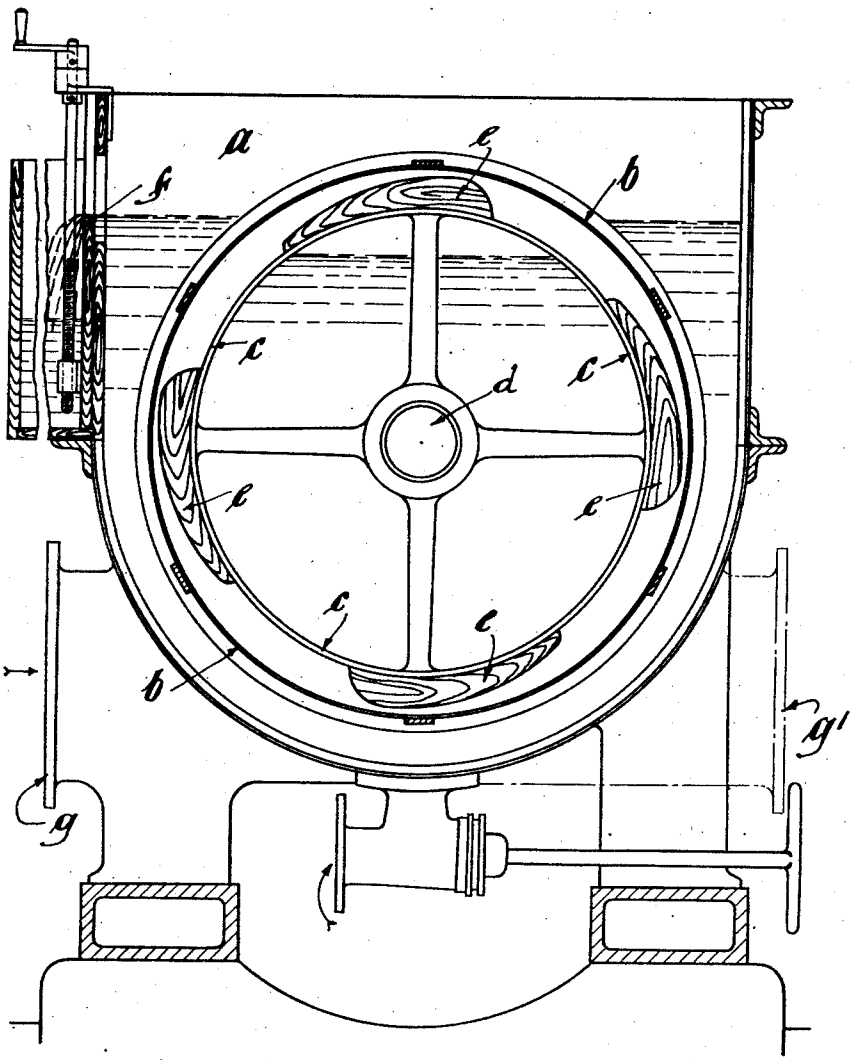


Fig. 1.

Inventor:
Samuel Milne.
By his Attorney: Walter Gunn

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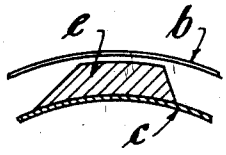


Fig. 2.

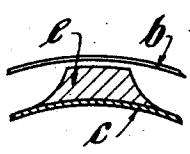


Fig. 3

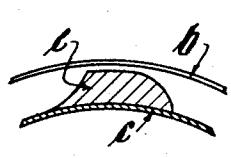


Fig. 4.

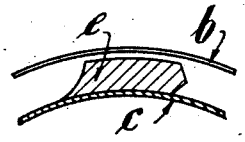


Fig. 5.

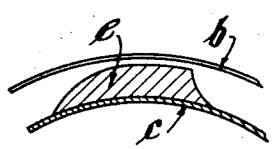


Fig. 6.

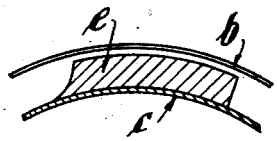


Fig. 7.

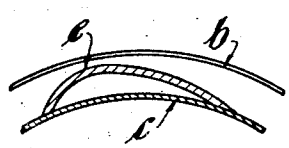


Fig. 8.

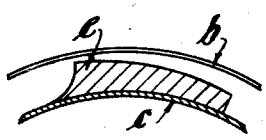


Fig. 9.



Fig. 10.

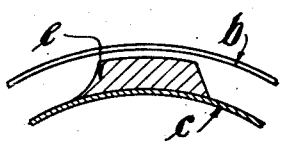


Fig. 11.

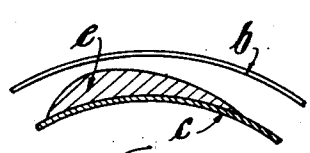


Fig. 12.

Inventor:
Samuel Milne.
By his Attorney: Walter Gunn

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UNITED STATES PATENT OFFICE.

SAMUEL MILNE, OF EDINBURGH, SCOTLAND.

MECHANICAL SCREEN, STRAINER, AND THE LIKE.

Application filed September 3, 1925, Serial No. 54,338, and in Great Britain May 23, 1925.

This invention relates to mechanical screens or strainers as used for straining paper pulp and the like, and of the kind comprising a perforated drum and means for producing a pulsating movement of the pulp through the screen. The object of the invention is to provide improved means for producing the pulsating motion and thereby to obtain a greater output per unit area of straining surface, while preventing the said surface clogging up.

A strainer made in accordance with this invention, comprises a circular straining drum suitably mounted in a vat and preferably adapted to be rotated at a slow speed by means of suitable gearing. Through the centre of the drum passes a shaft, on which is fixed a suitable number of rings made with arms or spokes to allow pulp to pass longitudinally through the drum. On the outer circumference of these rings impellers are fixed consisting of shallow blades arranged parallel to the shaft. These impellers are constructed so that by their motion they produce a wave of increased pressure on their leading edges and a wave of decreased pressure on their trailing edges, the leading and trailing being shaped respectively to give a differential impulse or greater impulse in one direction than in the other direction with a resultant motion of the fluid in that one direction through the drum.

The outer faces of the impellers are arranged so that they form a diameter smaller than the interior of the drum, that is to say, they sweep over the inner surface of the drum without actual contact, the exact distance between impeller blades and drum depending largely on the nature of the pulp.

The impeller blades are arranged with comparatively wide spaces between them for the purpose of allowing pulp to get easily to the drum surface, but the invention is not confined to any particular width or shape of impeller blade or to any definite space between the blades.

The invention will be more particularly described with reference to the accompanying drawings, in which:

Fig. 1 is a sectional elevation of an outward flow strainer representing one form of the invention.

Figs. 2 to 12 are cross sections of suitable impeller blades for use in such a strainer.

The strainer shown on Fig. 1 is arranged for outward flow and comprises a vat *a*, a cylindrical strainer drum *b* rotatably mounted in the vat, an impeller rotatably mounted within the drum and comprising spoked rings *c* secured to the shaft *d* carrying longitudinal impeller blades *e*. The vat is provided with an inlet *g* for the unstrained pulp at one end and an outlet g^1 for the refuse at the other end, and an adjustable weir *f* to control the level of the strained pulp as it is discharged.

The blades *e* may be of various designs in cross section, some of which are shown in Figs. 1 to 12, the proportions and angles of the leading and trailing edges varying with the conditions of use, the kind of pulp being dealt with, and the speed at which the impeller is run. The space between the blades and drum will preferably be about half an inch. Additional blades may be provided within the drum as agitators where found desirable. Fig. 8 shows a blade made of bent sheet metal.

The impeller blades on their leading edges produce a pressure sufficient to force the pulp through the drum against the head of pulp outside, while the slits or perforations are provided from clogging by the vacuum produced by the trailing edges assisted by the head of pulp outside. By suitably adjusting the speed of the impeller and the levels of the pulp outside the drum, practically any required density of pulp can be dealt with in a thoroughly satisfactory manner.

An important point in this trainer is the fact that with an outward flow the discharged or strained pulp is delivered at a higher level than the incoming or unstrained pulp.

A further important point is that an air space between the level of the pulp and the top of the drum inside is necessary, as if the drum is completely filled the action of the impeller ceases. This air space can be adjusted by varying the speed at which the impeller is rotated and the level of the discharged pulp or by a level controlled inlet.

The strainer can also be operated as an inward flow machine and this method of operating is suitable for certain kinds of pulp and is sometimes preferred. In this case the unstrained pulp is fed over the lip of the vat, the refuse being withdrawn from the bottom of the vat. The strained pulp is discharged through *g* or g^1 or both, the level of pulp inside the drum being conveniently

adjusted by an adjustable weir or sluice over which the strained pulp is discharged. The head of pulp outside the drum is increased to cause the pulp to flow inwards, the impeller blades clearing the slits by their leading edges.

The operation of the strainer either for outward or inward flows or to suit the density of the pulp, is controlled by adjusting the speed of the impeller and the level of the discharged pulp.

The details of construction of the strainer, otherwise than these of the impeller may be of any suitable design.

What I claim is:—

1. A mechanical screen or strainer for paper pulp and the like comprising a vat, a horizontal cylindrical perforated drum within the vat, a rotary impeller mounted concentrically within the drum having shallow longitudinal impeller blades with leading and trailing edges shaped to give a differential impulse and arranged to sweep closely over the cylindrical surface of the drum, an inlet to the drum and a level controlled outlet for the pulp from the vat arranged so that an air space is maintained in the drum during operation and so that as an outward flow strainer the strained pulp is discharged at a level above the inlet supply in the drum, as set forth.

2. A mechanical screen or strainer for paper pulp and the like comprising a vat, a horizontal cylindrical perforated drum rotatably mounted within the vat, means for rotating the drum, a rotary impeller mounted concentrically within the drum having shallow longitudinal impeller blades with leading and trailing edges shaped to give a differential impulse and arranged to sweep closely over the cylindrical surface of the drum, an inlet to the drum and an outlet with control weir on the vat, arranged so that an air space is maintained in the drum during operation, and so that as an outward flow strainer the strained pulp in the vat is discharged at a level above the inlet supply to the drum, as set forth.

In testimony whereof I have signed my name to this specification.

SAMUEL MILNE.