July 16, 1940. C. V. HALLENBECK 2,208,127

SCREENING APPARATUS

Filed Aug. 8, 1938 2 Sheets-Sheet 1

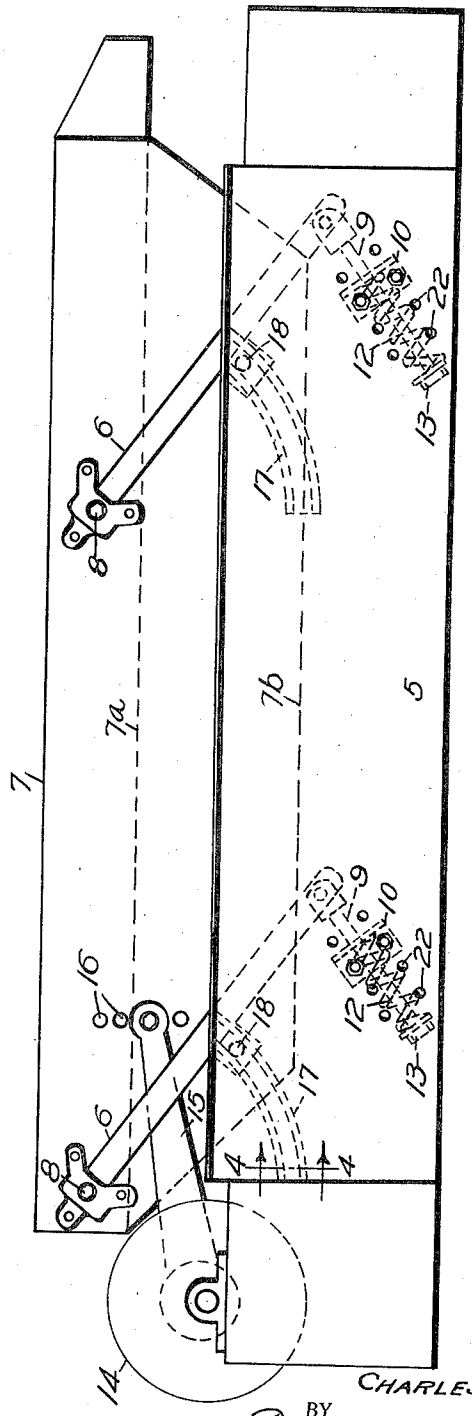


Fig. 1.

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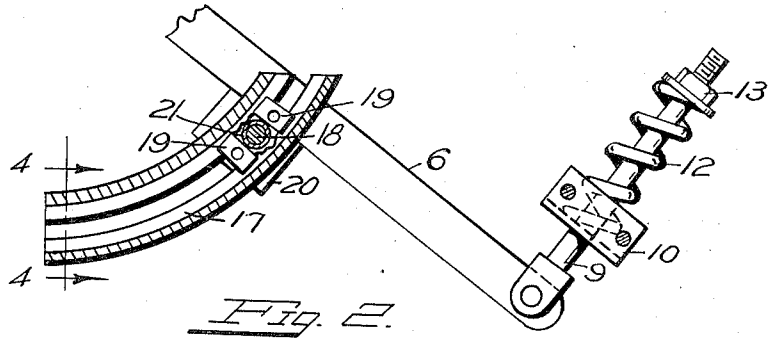


Fig. 2.

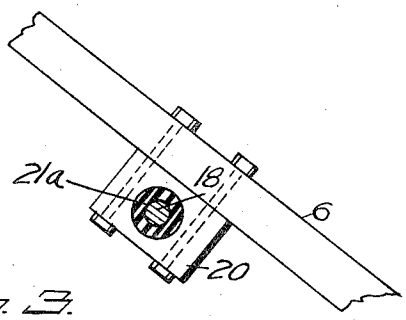


Fig. 3.

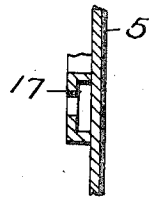


Fig. 4.

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Patented July 16, 1940 2,208,127

# UNITED STATES PATENT OFFICE

2,208,127

## SCREENING APPARATUS

Charles V. Hallenbeck, Denver, Colo.

Application August 8, 1938, Serial No. 223,715

2 Claims. (Cl. 209—329)

This invention relates to improvements in oscillatory sizing screens, particularly of the type disclosed in my Patent No. 1,971,156 issued August 21, 1934 and in my copending application Serial No. 177,245, filed November 30, 1937.

A principal object of the invention is to provide an oscillatory support for such a screen that has means for resiliently resisting such movement in one direction.

Another object is to provide such supports for a sizing screen that can be moved to selective angular positions to vary the oscillatory path of the screen element.

A still further object is to provide screening apparatus of this character that can be moved through oscillatory cycles of varying amplitude.

Other objects and advantages reside in details of design and construction which will be more fully disclosed in the following description and in the drawings wherein like parts have been similarly designated and in which:

Figure 1 is a side elevation of screening apparatus built according to this invention;

Figure 2 is a fragmentary sectional detail of certain novel features shown in Figure 1, and drawn to an enlarged scale;

Figure 3 is a fragmentary sectional detail showing a form of the invention having modified features; and

Figure 4 is a fragmentary sectional view taken along the lines 4—4 of Figures 1 and 2.

In the instant illustration of a typical embodiment of the present invention, reference character 5 denotes a base which may preferably be made of a pair of channel irons or the like. Lever-like arms 6 are pivotally mounted on the base 5 and are also pivoted to a screen element 7 which they support, as shown at 8. Adjacent the other ends of the supports 6 and pivoted thereto are rods 9 which are passed through apertured angle plates 10 that are rigidly fixed to the base 5. Compression springs 12 are on the rods 9 and butt against the angle plates 10 against which they are thrust by means of nuts 13 on the rods.

An eccentric mechanism designated as a whole by reference character 14 reciprocates a connecting rod 15 that connects the mechanism 14 with the screen element 7 as illustrated in Figure 1, the connection with the screen element being selectively located in one of the several apertures 16 provided for the purpose.

Under some circumstances it is desirable to change the oscillatory path of the screen element, which may be done by rotating the lever-like support arms 6 about their pivotal connections with the screen element. This may be done independently of the position of said screen element in any one of several ways. To illustrate typical means for changing the angular position of the supports 6 with reference to the screen element 7, reference is had to Figures 1, 2 and 4 wherein an arcuate undercut channel 17 is provided on the base 5 to which is movably attached a pivot pin 18 by means of lugs 19.

It will thus be seen that the pivot pin can be selectively moved and held at various positions along the arcuate channel 17, the arms 6 permitting such movement by pivoting about their respective connections 8 with the screen element 7. The lever-supports 6 are journalled on the respective pivot pins 18 in any convenient manner such as by means of a side-block or extension 20 in which is a bushing 21 which may be made of a metal such as bearing bronze. Or a similar bushing 21*a*, Figure 3, may be made of rubber or similar material. Obviously, the pivot pins 18 could pass directly through the material of which the lever supports 6 are made. Or the pins could be rigidly attached to the respective lever arms 6, and be journalled in bearings selectively held on the respective arcuate channels 17.

In order to permit the above explained movement of the pivotal axis of the lever-supports 6, the position of the angle plates 10 must also be changed and for this purpose a series of bolt holes 22 is provided so that the plates 10 may be selectively located on the base 5 as desired. Obviously, the series of bolt holes could be used for selectively holding the pivot pins 18, if desired; and conversely the arcuate undercut channel 17 could be used to position and hold the thrust plates 10 if preferred.

In the enlarged fragmentary detailed view shown in Figure 2, the spring element 12 is shown on the opposite side of a lever-arm 6 and it will readily be seen that the spring or other resilient element can be successfully used on either side of the lever-arm, the object being to maintain a resilient resistance to the oscillatory movement of the arms and the screen element, in one direction. Thus the eccentric mechanism 14 has a constant resistance or pressure against its movement at all times in one direction, which greatly prolongs the life of said mechanism and other parts of the screening apparatus, since it eliminates any possible backlash or hammer effect therein. The tension on the spring elements 12 can be manually adjusted by means of their retaining nuts 13, and various

forms of thrust plates 10 can be used, the one illustrated merely being typical of any element suitable for the purpose.

Certain advantages are gained in the present construction by positioning the springs 12 or their equivalents to be connected with the arms 6 on opposite sides of the pivotal axes 18 of said arms from their respective connections with the screen element. These advantages include that by so positioning the springs 12, almost unlimited variations in leverage ratios may be effected between the lengths of the effective lever arms on opposite sides of the pivotal axes 18. Furthermore, space is available adjacent the lower ends of the levers 6 for accommodating the springs 12 and their associated mechanisms, thus giving ample room for mounting and facilitating accessibility for servicing and adjusting. Obviously, the further away from the pivotal axes 18 that the springs 12 are connected with the lower ends of the arm 6, the greater will be the spring-opposed movement of the lower ends of said arms. Thus, a coordination of amplitude of movement with the size and strength of the spring elements 12 may selectively be had.

Wear on the pivot pin and its journalling bushing may be reduced to a minimum by the use of a rubber or similar mounting as shown at 21*a*, and the general operation of the screen may be improved thereby.

*Operation*

The operation of the improved screen apparatus appears obvious. Material to be sized by screening is placed in the screen element 7 in the usual manner, which element may be provided with a plurality of screening desks 7*a* and 7*b*. The eccentric mechanism 14 imparts oscillatory movement to the screen element as a whole through the intermediary of the connecting rod 15, and the amplitude of the oscillatory movement of the screen element may be varied by moving the location of the connection of said connecting rod with the screen element. The quality and path of the oscillatory movement of said screen element may be varied by changing the angular position of the lever-like supports 6 as hereinabove set forth, because the relative horizontal and vertical components of motion are changed when the mean angular position of the supports 6 is changed. By resiliently resisting all oscillatory movement in one direction, a smoothly operating mechanism is provided and all wearing parts are free from back-lash or hammer.

It will be understood that the present disclosure is an improvement in my screening apparatus for the same purpose, as disclosed in my patent and copending application hereinabove referred to, and while this specification discloses preferred means for reducing the present invention to practice and a preferred embodiment of the invention, changes may occur to those skilled in the art and may be made within the scope of the appended claims, without departing from the spirit of the invention.

What I claim and desire to secure by Letters Patent is:

1. Screening apparatus comprising a base, a screen, nonflexible oscillatory supports for the screen connected therewith adjacent opposite ends thereof, means on the base for selectively positioning the pivotal axes of said supports about their respective connections with said screen as centers, means for reciprocating the screen on said supports, and resilient means positioned on the base and connected with the respective pivotal supports on the opposite side of their respective axes from their connections with the screen to oppose such reciprocative movement in one direction.

2. In screening apparatus of the character described inclusive of a screen and a base, the improvement which comprises oscillatory lever supports connected with the screen, resilient means on the base connected with the opposite ends of the respective lever supports to oppose their movement in one direction, pivots on the base for the respective lever supports intermediate the ends of the levers, and means on said base for selectively positioning the pivotal axes of said lever supports about their respective connections with the screen as centers.

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