

N. G. EK.
FANNING MILL SEPARATOR.
APPLICATION FILED OCT. 2, 1912.

1,065,929.

Patented July 1, 1913.

2 SHEETS—SHEET 1.

Fig. 1

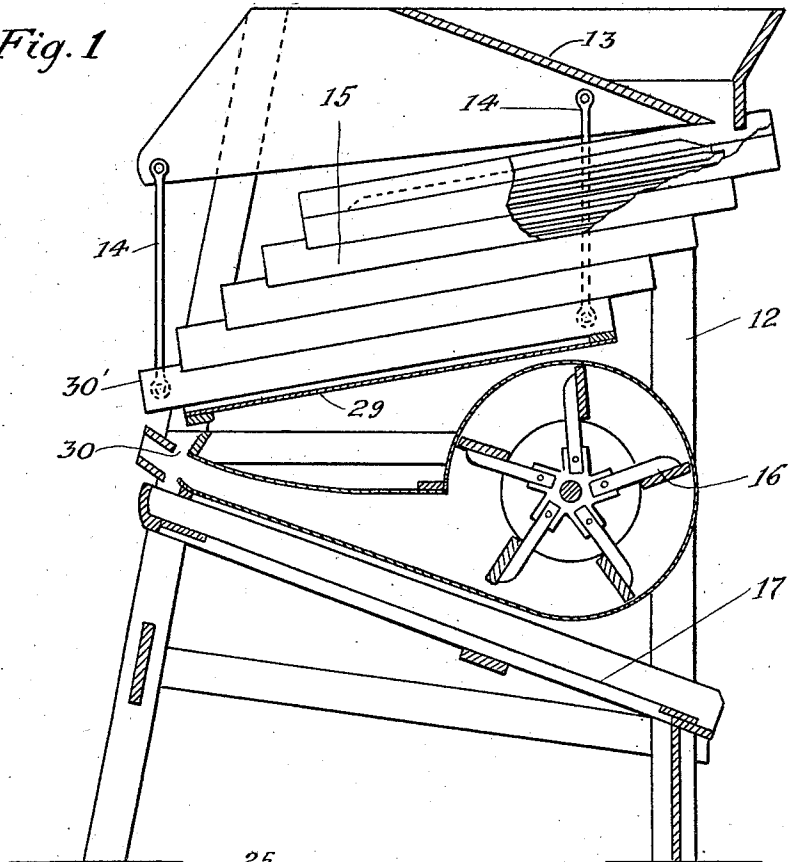
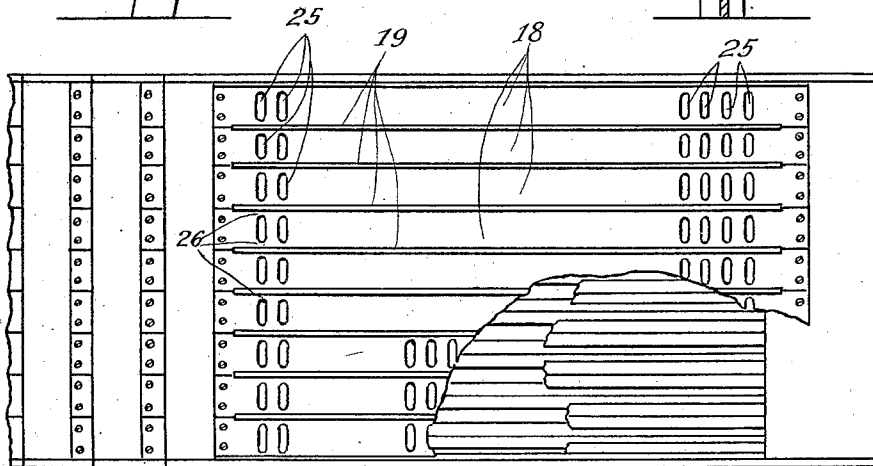


Fig. 2.

Witnesses:
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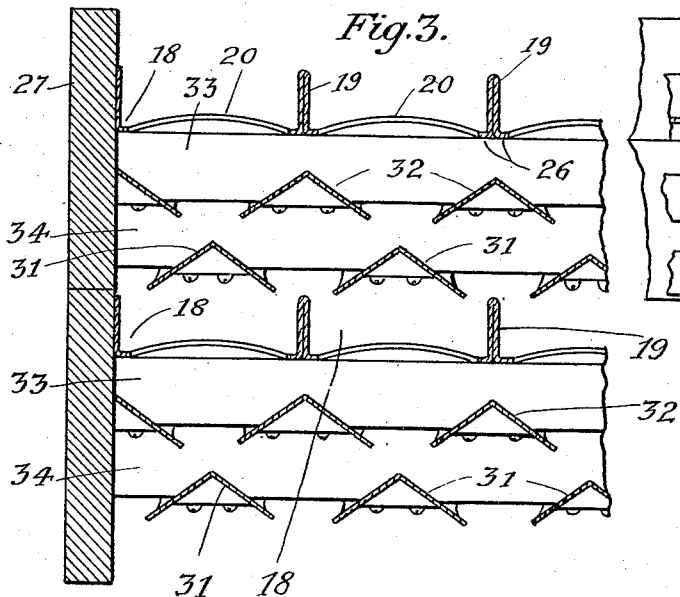
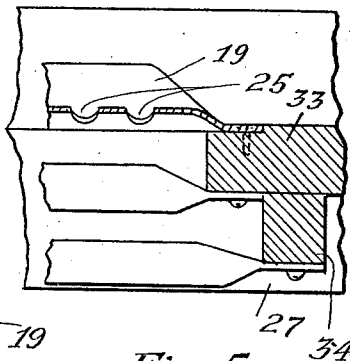
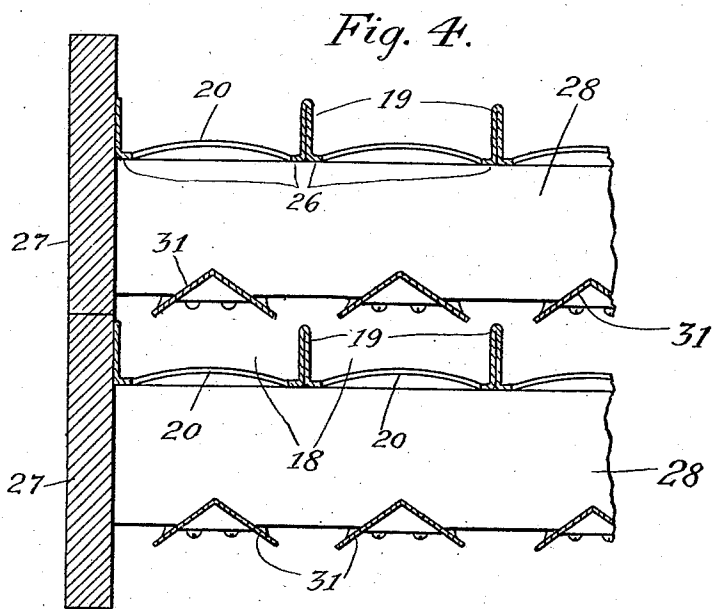
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

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FANNING-MILL SEPARATOR.

1,065,929.

Specification of Letters Patent.

Patented July 1, 1913.

Application filed October 2, 1912. Serial No. 723,523.

To all whom it may concern:

Be it known that I, NELS G. EK, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Fanning-Mill Separators, of which the following is a specification.

My invention relates to fanning mill separators and has in view particularly to provide a novel form of screen for use in such separators.

The full objects and advantages of my invention will appear in connection with the detailed description thereof and are particularly pointed out in the claims.

In the drawings, illustrating the application of my invention in one form,—Figure 1 is a side elevation partly in section of a separator employing a hurdle of screens embodying my invention. Fig. 2 is a top plan view of such a hurdle with certain parts broken away. Figs. 3 and 4 are enlarged sectional views of a portion of two screens superposed, Fig. 3 showing a plurality of sets of deflectors. Fig. 5 is an enlarged fragmentary view showing the manner of securing the deflectors in position.

The frame 12, hopper 13, suspending rods 14, for the hurdle 15, fan 16 and also discharge screen 17 are parts of usual construction in a separator of the general character with which my improved screens are adapted to be used. The top plate of my improved screen comprises a series of channels 18 formed between upstanding flanges 19. As shown in Fig. 2, the channeled portions may each be formed of an independent strip of metal, the flanges 19 consisting of adjacent walls of such channels. A preferred form of construction, however, is shown in Figs. 3 and 4 in which the channels 18 are formed by corrugating a single sheet of metal, the flanges 19 being formed by the doubled over portions of such sheet. Other methods of forming the screen plate may be employed, as desired. Whatever method of providing the channels may be used the floor between the channels will be upwardly arched, as indicated at 20 in Figs. 3 and 4. Across this arched portion 20 will be formed a series of oblong apertures 25 each extending to a point a little short of the upstanding flanges 19 so as to leave a small continuous ledge 26 along the base of each side of said flanges, as best shown in Figs.

3 and 4. The screen plate will be secured in the screen frame composed of side pieces 27 and end pieces 28.

The grain to be separated consists of sets of grains of different characters as to shape and size, for example, wheat, and oats or wild oats. In the operation of such a separator it is the purpose to cause the wheat to pass through the screens of the hurdle as rapidly as possible dropping upon the board 29 and through the space of air at 30 onto the discharge screen 17, while the wild oats, sticks, etc., will pass off the ends of the screens forming the hurdle finally being discharged at the point 30'. In the operation of my screen plate all of the grain will tend to roll to the sides of the arched portions 24 within the channels 18. Elongated grains like wild oats will become straightened so as to lie upon the ledges 26. These ledges will be sufficiently wide to support the long narrow bodies, such as oats, bits of straw, sticks, etc., but will not form a support for wheat kernels, which will promptly roll off the ledges and go through the openings 25, thus quickly finding a way through all of the screens to the board 29. The hurdle of screens is of course oscillated in the usual way and the oats or other long bodies on the ledges 26 will travel lengthwise down the same to the point of discharge at the end of the screen. To further aid in positioning the grain upon the ledges at the sides of the flanges 19 and to prevent dropping of grain from one screen directly upon the perforation of another screen, I provide one or more series of deflectors 31. These deflectors consist of strips of metal bent into apex or V-shaped cross sectional form, where but one series of deflectors are used, secured at their ends directly to frame pieces 28 so that the apices thereof will fall directly beneath the centers of arched portions 20, as clearly shown in Fig. 4. In Fig. 3 an extra set of deflectors 32 is shown exactly like deflectors 31 in form. Deflectors 32, are secured to end pieces 33 which will be somewhat narrower than the normal end pieces 28, and the apices of deflectors 32 will fall directly beneath the flanges 19, the sets of deflectors 31 in such case being secured to additional end pieces 34 so as to be properly spaced from the set of deflectors 32. The deflectors 31, as shown in Fig. 3, occupy the same relative position with respect to arched portions 20 as in Fig. 3.

When the screens are positioned one above another, as shown in Figs. 3 and 4, the deflectors 31 of one screen come directly above the arched portions 20 of the screen below so that grain dropping through a perforation from a screen above will, if it falls toward the center of channels 18, strike a deflector 31 and be directed upon a ledge 26 at the side of a flange 19. The effect of this will also be to tend to cause the long bodies such as oat grains to tend to occupy a position parallel with the flanges 19 so that said long bodies will quickly find a resting place upon a ledge 26 from which position it will not be likely to pass through a perforation 20. In the cases where two sets of deflectors are employed, as illustrated in Fig. 3, it will be impossible for grain to fall through a perforation of a screen above directly upon a perforation of a screen below, and the straightening of the oat grains and any elongated bodies will be still more completely accomplished.

The advantages of my improved screen will be apparent. There are no independent riders or separating devices. The screen surface, owing to the flanges 19, and especially where such flanges are formed by pressing and folding a single sheet of metal, is and will remain absolutely free from sag and is so strongly reinforced that it will undergo almost unlimited service without damage. This is a matter of great importance as the flat screens ordinarily employed sag more or less as they come from the factory and this sagging increases with use until the screen entirely loses its serviceability. Moreover, the flat screens are fragile and easily damaged. The deflectors which I employ are a part of the screen itself and are protected by the top screen and the screen frame. Owing to the fact that there are no riders or retarding devices and that the openings through which wheat may fall are relatively large my screens are extremely rapid in separating action—so much so that, for the same amount of screen surface as that employed in connection with riders and retarding devices, several times the amount of grain can be separated by my screens in a given time.

I claim:

1. A separator comprising a screen formed with a series of upstanding flanges dividing the screen surface into a plurality of longitudinal channels, the floors of said channels being uniformly arched upwardly between the flanges and having a series of perforations extending across the arches to points near the flanges but so as to leave narrow imperforate ledges at the bases of the flanges.

2. A separator comprising a screen formed with a series of upstanding flanges dividing the screen surface into a plurality of longitudinal channels, the floors of said channels

being uniformly arched upwardly between the flanges and having a series of elongated parallel perforations extending across the arched portions to points near the said flanges but so as to leave narrow imperforate ledges along the bases of the flanges.

3. A separator comprising a screen formed with a series of upstanding flanges dividing the screen surface into a plurality of longitudinal channels, the floors of said channels sloping toward the flanges and being provided with perforations, and a deflector extending parallel with the flanges and beneath the perforations.

4. A separator comprising a screen formed with a series of upstanding flanges dividing the screen surface into a plurality of longitudinal channels, the floors of said channels sloping toward the flanges and being provided with perforations, and V-shaped deflectors having the apices thereof extending centrally beneath the rows of perforations and the edges parallel with the flanges.

5. A separator comprising a screen formed with a series of upstanding flanges dividing the screen surface into a plurality of longitudinal channels, the floors of said channels sloping toward the flanges and being provided with perforations, and a plurality of sets of V-shaped deflectors the apices of one set extending beneath the flanges and the apices of the other set extending centrally beneath the rows of perforations.

6. A separator comprising a hurdle of screens each formed with a series of upstanding flanges dividing the screen surface into a plurality of longitudinal channels, the floors of said channels sloping toward the flanges and being provided with perforations and having a narrow imperforate portion extending alongside of the flanges, the corresponding parts of all of these screens falling in common vertical planes.

7. A separator comprising a hurdle of screens each screen formed with a series of upstanding flanges dividing the screen surface into a plurality of longitudinal channels, the floors of said channels being provided with rows of perforations, and V-shaped deflectors on each screen beneath said rows of perforations for directing the grain from a screen above toward the flanges of a screen below.

8. A separator comprising a hurdle of screens each screen formed with a series of upstanding flanges dividing the screen surface into a plurality of longitudinal channels, the floors of said channels being upwardly arched between the flanges and having rows of elongated perforations extending across the arched portions to points near the flanges but so as to leave narrow imperforate ledges along the bases of the flanges, each screen being provided with

V-shaped deflectors having the apices thereof falling below the centers of said rows of perforations so as to direct grain falling from a screen above against the flanges and ledges of a screen below.

9. A separator comprising a hurdle of screens each screen formed with a series of upstanding flanges dividing the screen surface into a plurality of longitudinal channels, the floors of said channels having rows of elongated perforations therein, and a plurality of sets of V-shaped deflectors extending in parallel relation to the channels and in overlapped relation to one another so that grain falling from a screen above cannot fall directly upon a screen below.

10. A separator comprising a hurdle of screens each screen formed with a series of

upstanding flanges dividing the screen surface into a plurality of longitudinal channels, the floors of said channels sloping toward the flanges and being provided with perforations extending across the same into proximity with the flanges but so as to leave narrow imperforate ledges along the bases of the flanges, and means between the successive screens for directing grain toward the flanges and ledges and tending to bring elongated grains into parallel relation with the flanges.

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

NELS G. EK.

Witnesses:

F. A. WHITELEY,
H. A. BOWMAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."