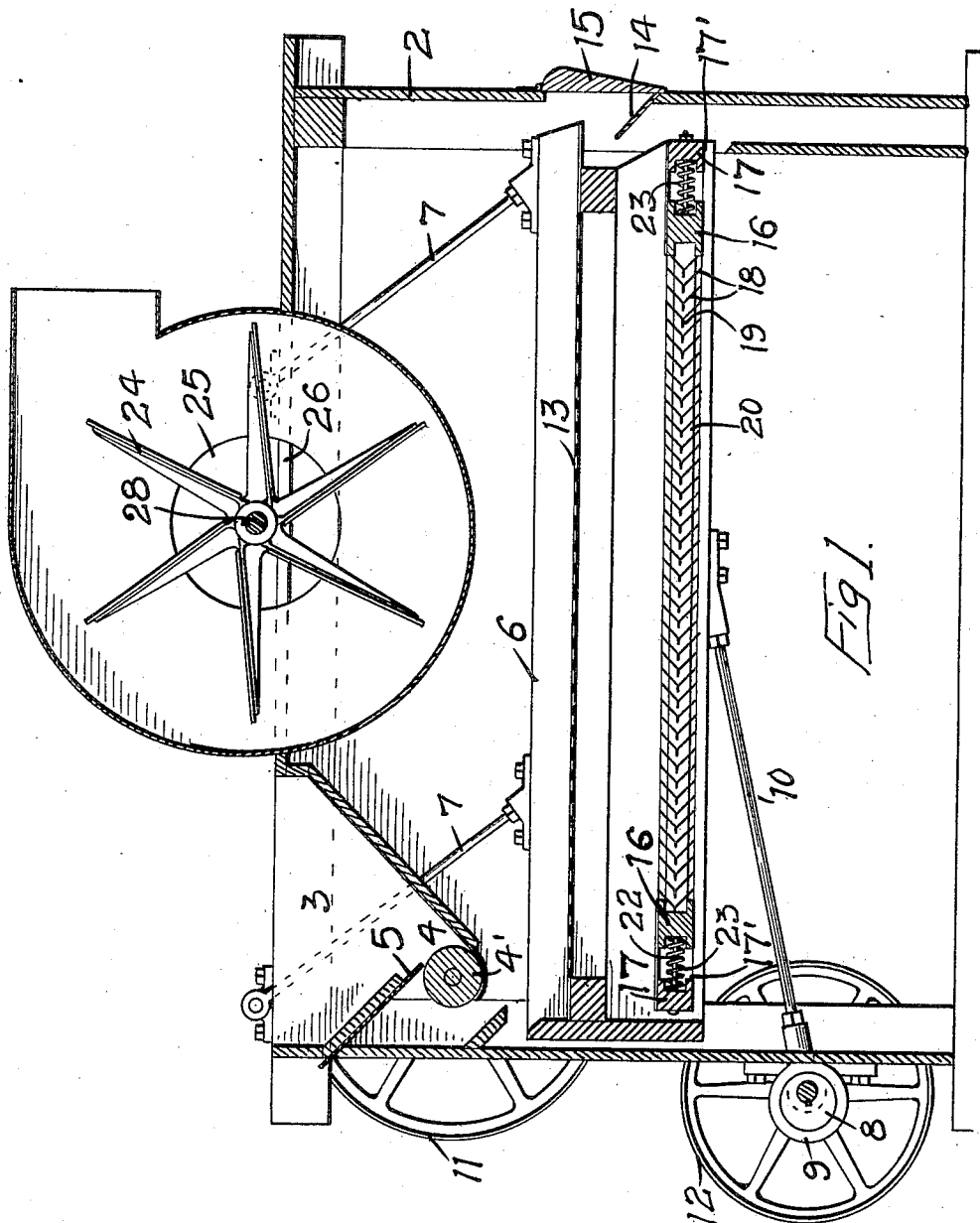


SIEVE.

971,770.

3 SHEETS—SHEET 1.



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SIEVE.

APPLICATION FILED JULY 24, 1909.

971,770.

Patented Oct. 4, 1910.

3 SHEETS—SHEET 2.

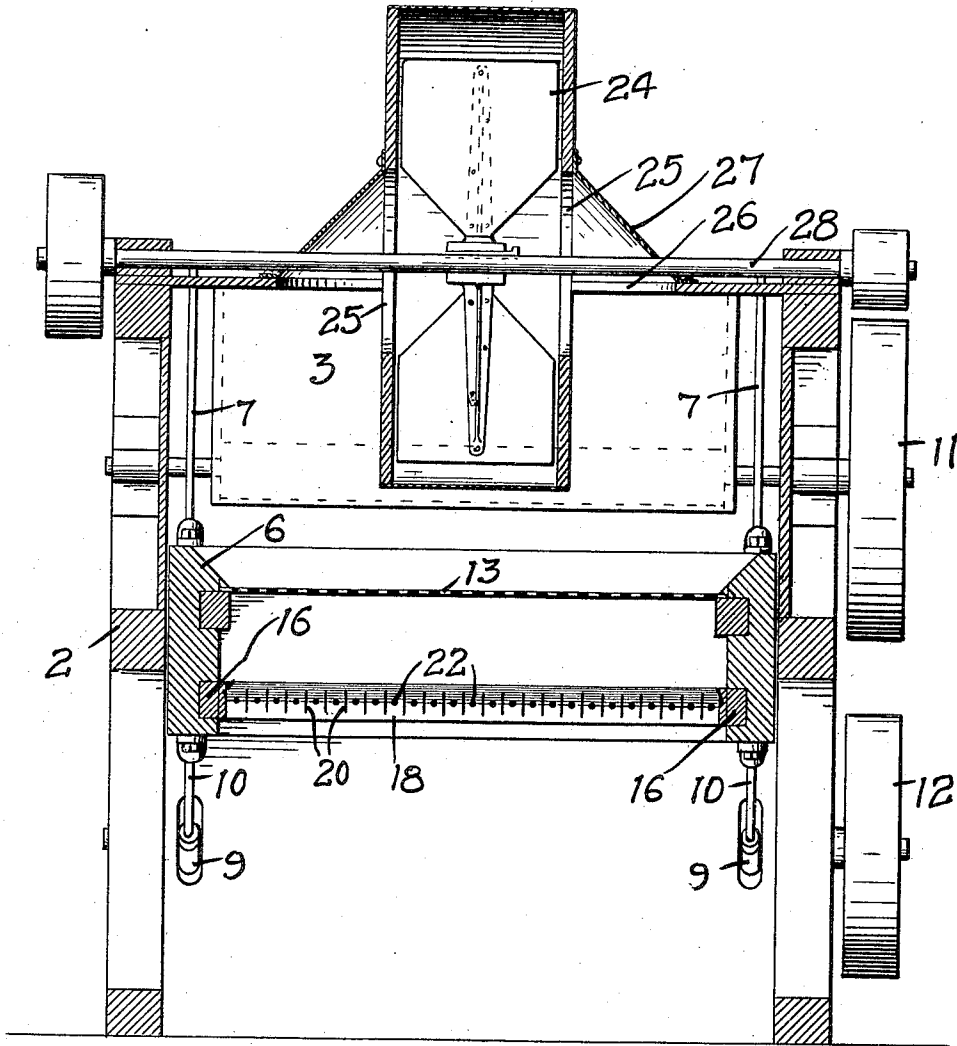


Fig 2.

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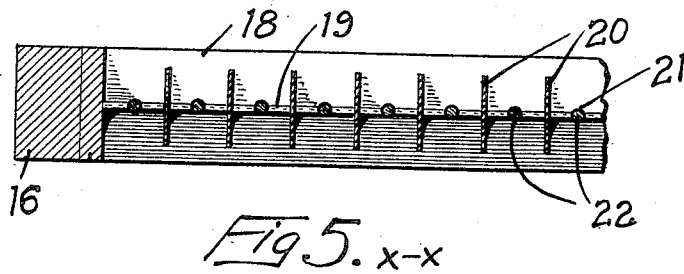
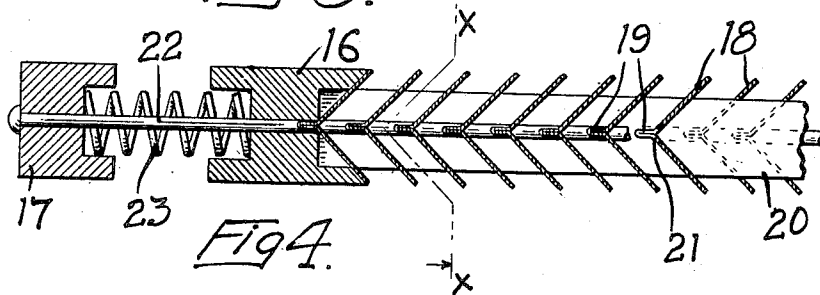
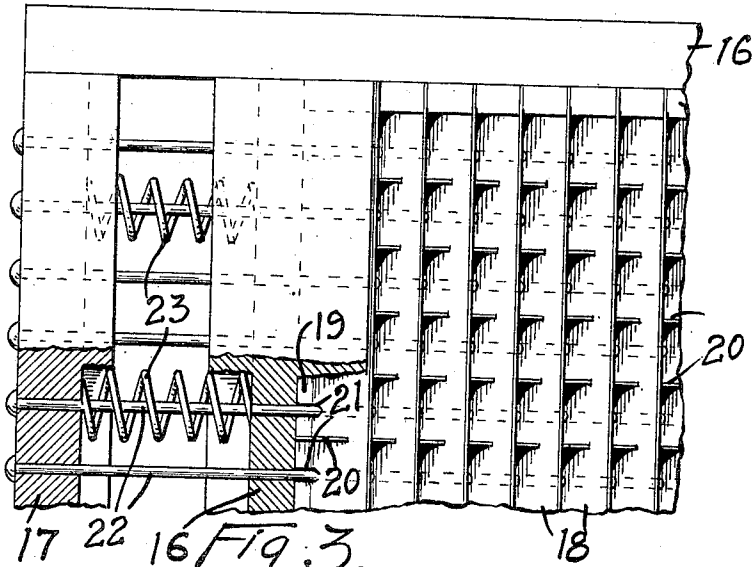
SIEVE.

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3 SHEETS-SHEET 3.



WITNESSES
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UNITED STATES PATENT OFFICE.

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SIEVE.

971,770.

Specification of Letters Patent.

Patented Oct. 4, 1910.

Application filed July 24, 1909. Serial No. 509,454.

To all whom it may concern:

Be it known that I, JAMES McDANIEL, of Seattle, King county, Washington, have invented certain new and useful Improvements in Sieves, of which the following is a specification.

My invention relates to sieves and particularly to that type used for separating oats from wheat. Various machines and sieves have been devised for this purpose, but they have all proved more or less objectionable, owing to the comparatively small capacity and the danger of clogging when the feed is considerable or carried on continuously for any length of time. The old fashioned fanning mill with the sieve having angle plates therein answers the purpose for a farmer's use, but has been found to be totally inadequate as a milling separator where a large capacity is necessary and the feed is carried on continuously night and day. The angle ports would soon clog up with gravel and other foreign material, necessitating the stopping of the machine and the picking out of the clogging material with a hook or other suitable instrument.

The primary object therefore, of my present invention is to provide a sieve of large capacity, and one which cannot possibly clog.

A further object is to provide a sieve of simple, but durable construction and one by which a very thorough separation of the wheat and oats can be obtained.

My invention consists generally in a sieve having angle plates mounted therein, and lips formed at the angle of said plates and extending partially across the space between the plates.

Further, the invention consists in providing a series of vibrating wire rods passing through the angles of the plates.

Further, the invention consists in various constructions and combinations, all as hereinafter described and particularly pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a longitudinal sectional view of a separator with my invention applied thereto, Fig. 2 is a transverse, vertical sectional view of the same, Fig. 3 is a detail view of a portion of the sieve frame, showing the manner of mounting the sieve therein, Fig. 4 is a detail sectional view of the sieve, showing the con-

struction of the sieve plates and the manner of supporting the ends of the vibrating wire rods, Fig. 5 is a sectional view on the line $x-x$ of Fig. 4.

In the drawing, 2 represents a frame, 3 a hopper having a throat 4, a feed roll 4' and a feed plate 5.

6 is a sieve shoe supported by hangers 7 and having a reciprocating movement through the medium of eccentrics 8, straps 9 and connecting rods 10. Pulleys 11 and 12 are provided for the feed roll and eccentric shafts. In the upper part of the shoe 6 I arrange a sieve 13 of the ordinary perforated plate type. The tail of this sieve overhangs a plate 14 mounted on the frame of the machine beneath a flap 15. Grain will be delivered at the head of the sieve 13 and will flow down through the perforations therein, while large foreign substances, such as stones, straws or gravel, which would tend to clog the separating sieve beneath, will be removed by this upper sieve and discharged over the tail thereof out of the machine.

Beneath the sieve 13, I provide a separating sieve, which forms the subject matter of my present invention. This separating sieve comprises a stationary frame 16, supported in the lower portion of the shoe 6. End bars 17 are loosely supported in slots 17' in the shoe. The sieve has a series of angle cross plates 18 arranged transversely of the sieve and spaced apart. At the angle formed in these plates, I provide a lip 19 extending lengthwise of each plate and partially bridging the space between one plate and the angle of the adjoining plate. These lips permit the formation of large ports, but retain the short turn or bend and prevent the oats from tipping up and passing through. The angle plates are formed of sheet metal preferably, and the lips are pressed therefrom when the bends are made in the plates to form the angles. By increasing or decreasing the width of these lips, I am able to increase or decrease the width of the ports through the sieve.

The angle plates are connected lengthwise of the sieve by a series of longitudinal plates 20, which pass through transverse slots in the angle plates and are movable with the sieve, but stationary with respect to the plates. Between these longitudinal plates I provide holes 21 in the angle plates and in

the lips formed therein and through these holes I loosely pass wire rods 22, which are secured at their ends in the bars 17 and on these rods between the frame 16 and the bars 17, I provide coil springs 23, the tension of which serves to keep the wire rods taut and allow them to vibrate lengthwise of the sieve. The spaces between the longitudinal plates are fully twice as wide as those employed in an ordinary sieve of this type. The vibrating rods form an edge for each port or hole on its long side and permit me to make the port wider, so that the broken stones, gravel, sticks and other refuse material may wedge between the vibrating rod and the fixed opposite wall of the port, and the vibrating of the rod will surely loosen the wedged material and the motion of the sieve will pitch this material toward the tail of the sieve. Should a fragment of rock lodge between a vibrating rod and the opposite stationary wall, the whole weight of the bar, springs and rod comprising the sieve would be concentrated on this point and would be sufficient to crush the rock fragment, or if the obstruction be a fragment of iron, it would bend or break the vibrating rod or drive it through the sheet metal composing the angle plate. In any event, the foreign material could not remain in the port to obstruct the passage. The rods 22 also serve as a means to prevent the long kernels of grain from tipping up sidewise and dropping through the spaces, while permitting the short kernels, such as wheat, to flow freely therethrough. An oat kernel is usually twice as long as a kernel of wheat and cannot possibly turn the plate formed between the lip of one angle plate and the adjoining plate, and the movement of the rods back and forth through the angle plates will prevent any foreign material from clogging in the ports or becoming wedged therein and bridging the openings. Any refuse material that would tend to lodge or bind between the rods and the longitudinal plates would either be compelled to pass through the ports or be loosened by the vibrating rods and thrown back by the movement of the sieve, out of the ports and toward the tail of the machine. The motion of the sieve shoe, as will be noted from the arrangement of the eccentrics and hangers, is a forward, backward and upward movement, which has the effect of dislodging the material that cannot pass through the ports, and working it toward the tail of the sieve. The sieve, located above the angle sieve, cannot be successfully used with a separator of this type, as ordinarily made, owing to the fact that the angle ports must be necessarily small and any sieve above the angle sieve with perforations sufficiently small to keep out material, which would lodge in the ports of the angle sieve, would

have so small a capacity, that the purpose of the machine would be entirely defeated. With my apparatus however, the upper sieve may have large perforations, owing to the increased size of the angle ports, and the capacity of the machine may be greatly increased, without danger of foreign substances passing through large enough to clog the ports in the angle sieve.

Occasionally small or short kernels of oats will turn the angle ports and pass through with the wheat. To avoid this, and remove the dust and chaff from the wheat, I employ a fan 24, which creates a strong current of air up through the angle ports and through the perforations of the upper sieve, and can be regulated to provide the proper current and prevent the light, short kernels of oats from remaining with the wheat and passing through the ports of the angle plate. The casing of the fan has openings 25 on each side communicating with openings 26 in the top of the machine casing, over which openings the hood 27 is arranged. The fan has the usual operating shaft 28 provided with suitable pulleys.

The operation of the machine is as follows:—The material, being delivered on the head of the upper or perforated sieve, the coarse foreign material, which would tend to clog the ports of the separating sieve beneath, will be sifted out and discharged at the tail of the sieve. The grain and fine material will shower through upon the separating sieve and the wheat will pass through the ports, while the oats will be held back by the short turn in the angle and everything that does not pass through the ports will be pitched out toward the tail of the sieve with each revolution of the eccentrics, and I have found that this movement should be positive and regular to insure the best results. All clogging of the throat of the ports of the angle sieve will be prevented by the continuous vibration of the rods bridging the spaces between the angle plates and agitating the refuse material that tends to lodge at this point.

I have shown the feature of the vibrating rods applied to the plates of the angle sieve, but it may be adapted for use with a flat sieve and while I prefer to employ the wire rods shown, I do not limit myself to this construction, as a rod triangular or polygonal in cross section could also be utilized, and it is my purpose to adapt this invention for all kinds of grain separators. The apparatus may also be used for separating fine from a coarser material. I do not wish to be confined, therefore, to the use herein set forth.

I claim as my invention:—

1. A separator, comprising a sieve and means included between the upper and under surfaces of said sieve and relatively mov-

able with respect thereto, said means preventing the lodging of foreign matter in said sieve.

2. A sieve comprising a series of angle plates arranged in substantially parallel relation with one another and spaced apart, plates passing through said angle plates and forming therewith a series of angle ports or pockets, and vibrating wire rods passing through said angle plates.

3. In a grain separator, a sieve or screen composed of angle plates having openings for the grain to pass through, and means in said openings which vibrates with respect to the remainder of the sieve, preventing foreign matter from lodging in said openings.

4. A sieve comprising a series of angle plates spaced apart and in parallel relation with one another and having a series of lips formed at the angles therein and bridging partially the spaces between said plates, plates connecting said angle plates with one another, and vibrating wire rods passing through holes in said lips and in the angles of said angle plates.

5. The combination, with a sieve frame, of angle plates having spaces between them, wire rods fitting loosely in the holes in the angles of said plates and dividing the spaces between said plates in said ports or pockets, said plates and rods being relatively movable for the purpose specified.

6. A separating sieve comprising plates spaced apart, wire rods passing through holes in said plates, said rods and plates being relatively movable, a frame inclosing said plates and tension springs for said rods.

7. A separating sieve including angle plates spaced apart, and vibrating rods passing through the holes in the angles of said sieves, for the purpose specified.

8. The combination, with a sieve shoe and means for imparting a reciprocating movement thereto, of a sieve mounted in the upper part of said shoe, a separating sieve arranged in the lower part of said shoe and comprising a series of angle plates having spaces between them, and vibrating wire rods passing through holes in said angle plates and forming therewith a series of angle pockets or ports, said rods and plates

being relatively movable, and the movement of said shoe tending to pitch the material checked by said rods out of said pockets.

9. A grain separating sieve comprising a frame, plates mounted therein and spaced apart, rods passing lengthwise of said sieve through holes in said plates, tension springs for said rods, and an oscillating shoe wherein said sieve frame is mounted.

10. In a grain separator, a sieve or screen having holes or perforations therein, an oscillating shoe, a sieve mounted in said shoe and including a series of plates spaced apart, and vibrating rods passing through said plates and bridging the spaces between said plates, substantially as described.

11. In a grain separator, an oscillating shoe, a sieve frame mounted therein, angle plates mounted in said frame and spaced apart, bars loosely mounted in said shoe at the ends of said frame, rods connected at their ends to said bars and passing through the holes in the angles of said plates, and tension springs for said rods interposed between said sieve frame and said bars.

12. In a separator, a sieve and means extending through said sieve and bridging the holes therein, said means and said sieve being relatively movable, whereby lodging of foreign matter in said sieve is prevented.

13. In a separator, a sieve, and means bridging the holes or perforations therein, and said bridging means being capable of agitating or loosening the refuse foreign material and preventing it from lodging in the holes in said sieve.

14. In a separator a sieve and vibrating rods extending therethrough between the upper and under surfaces of the sieve and bridging the holes or openings in said sieve, for the purpose specified.

15. In a separator, a sieve and spring pressed rods extending therethrough and bridging the holes or openings therein, substantially as described.

In witness whereof, I have hereunto set my hand this 17th day of July 1909.

JAMES McDANIEL.

Witnesses:

EDWARD BRADY,
ALLIE J. POOLE.