

No. 654,610.

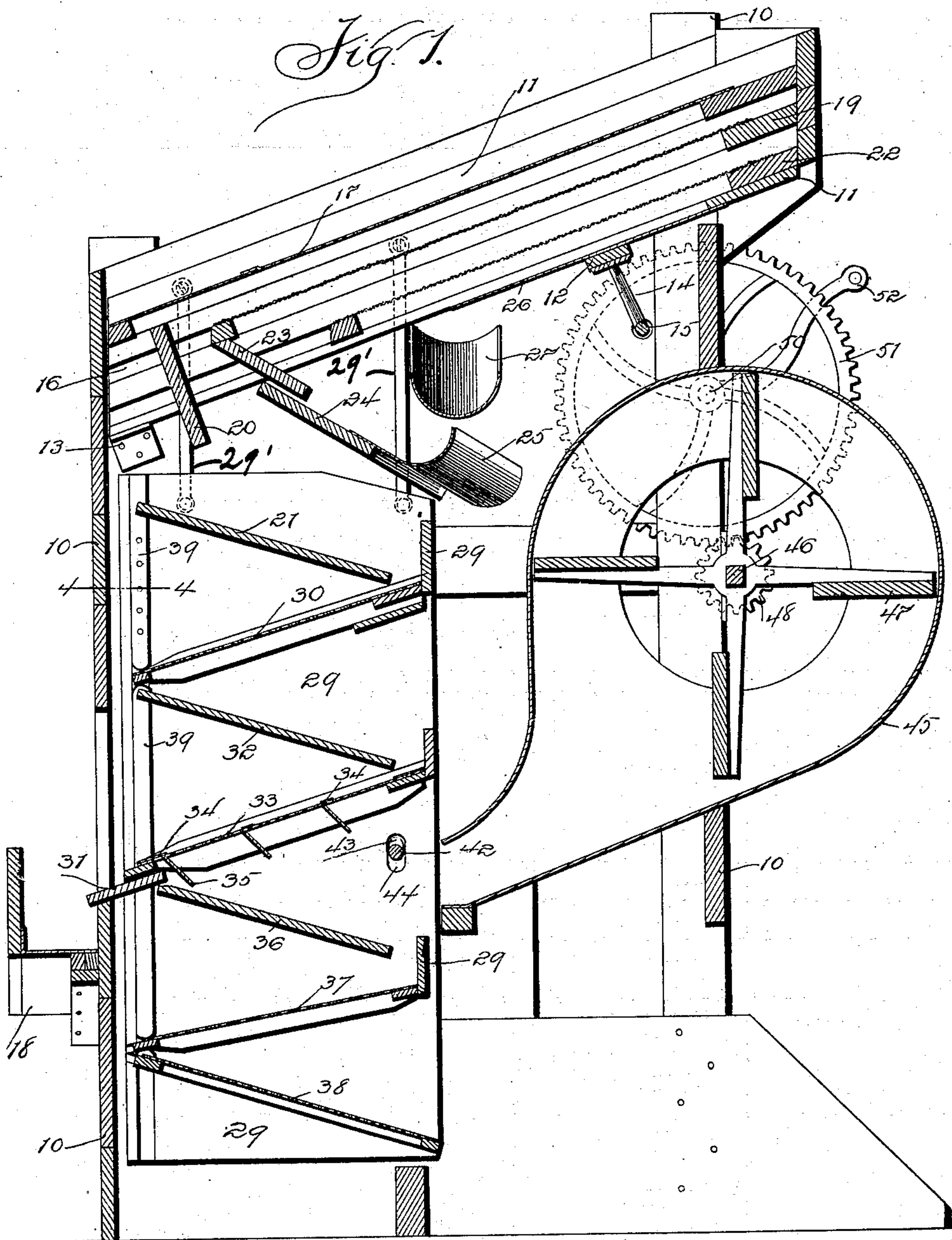
Patented July 31 1900.

S. R. CULP.  
GRAIN CLEANER AND SEPARATOR.

(Application filed June 17, 1897.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses:  
Jas. Brels.  
R. H. Orwig

Inventor: Samuel R. Culp,  
By Thomas G. C. and J. Ralph Orwig,  
Attorneys.



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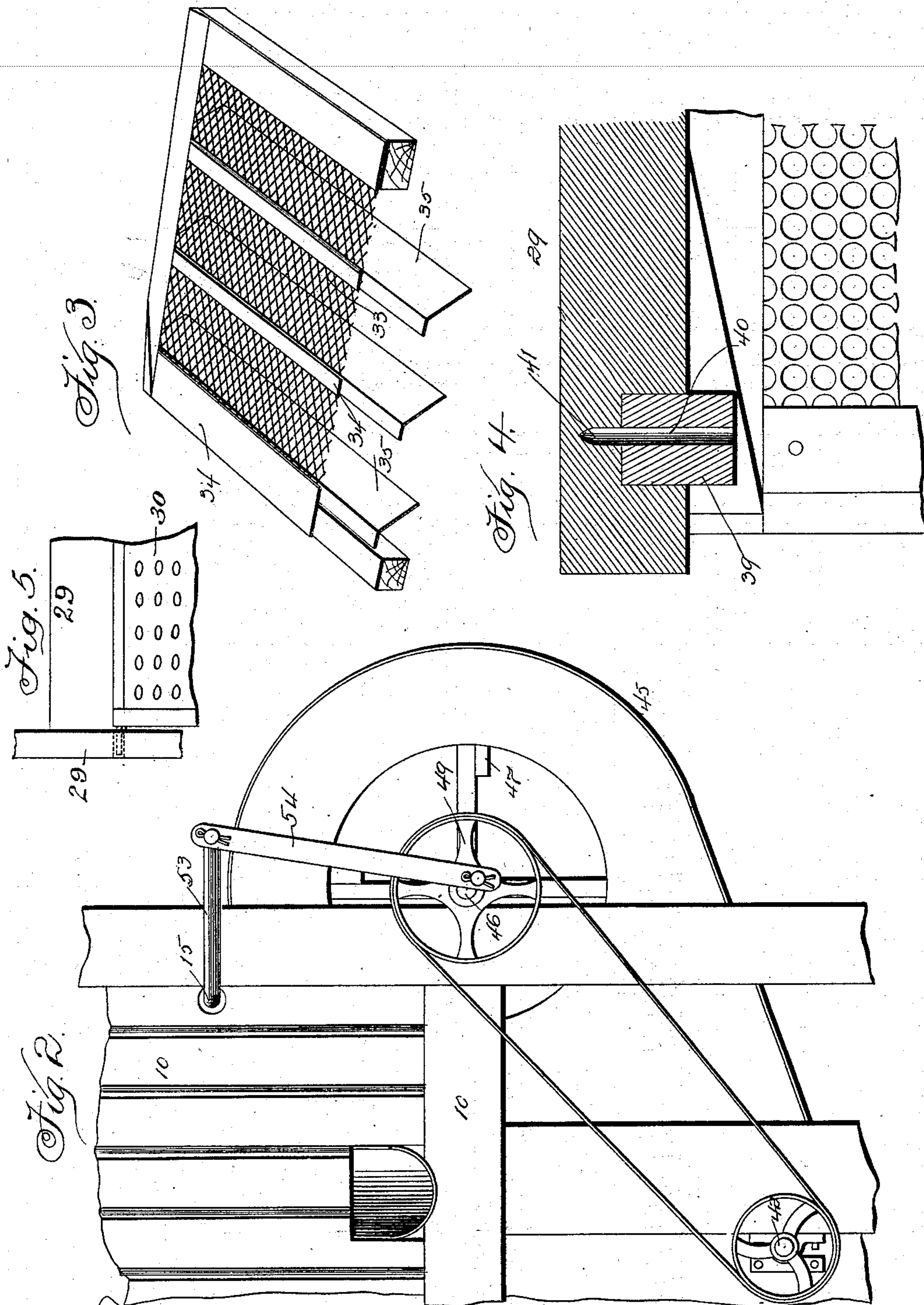
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Witnesses  
Jas. Parels.  
R. S. Orwig

Inventor: Samuel R. Culp,  
By Thomas G. & J. Ralph Orwig, Attorneys



# UNITED STATES PATENT OFFICE.

SAMUEL R. CULP, OF WEBSTER CITY, IOWA.

## GRAIN CLEANER AND SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 654,610, dated July 31, 1900.

Application filed June 17, 1897. Serial No. 641,188. (No model.)

*To all whom it may concern:*

Be it known that I, SAMUEL R. CULP, a citizen of the United States, residing at Webster City, in the county of Hamilton and State of Iowa, have invented a new and useful Grain Cleaner and Separator, of which the following is a specification.

In certain localities it is customary to grow different sorts of grain, usually wheat and oats, together; and my invention has for its object the provision of a machine which will clean and at the same time separate the various grains one from the other. I accomplish this by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 shows a vertical central section of the complete machine. Fig. 2 shows a side elevation of a part of the machine to illustrate the means for gearing the two agitator-shafts together. Fig. 3 shows a perspective view of a part of the sieve in which the wheat and oats are separated according to weight. Fig. 4 shows an enlarged horizontal sectional view taken through the line 4 4 of Fig. 1. Fig. 5 shows an enlarged view in perspective of the head end of one of the adjustable sieves and a means for supporting the same.

Referring to the accompanying drawings, the reference-numeral 10 is used to indicate the frame of the machine, which may be constructed in any suitable way to adapt it for the uses contemplated. For this reason the details of the construction of this frame will not be specifically described.

Seated in the top of the main frame is a rectangular frame 11, arranged at a suitable angle and open at its top and bottom. At the bottom of this frame 11 is a cross-piece 12, upon which the upper end of the frame 11 is supported, and the reference numeral 13 indicates a bracket fixed to the main frame 10 to slidably support the lower end of the frame 11. This frame 11 is agitated during the operation of the machine by means of an arm 14, having its upper end inserted in a small opening in the cross-piece 12 and fixed at its lower end to a shaft 15, which shaft is rocked during the operation of the machine by mechanism hereinafter described. In this frame 11 is a series of grooves 16, in which sieves are placed. The first or upper sieve (indicated by the reference-numeral 17) has a mesh of such a size that wheat-grains will readily

pass through and grains of oats will be prevented from passing over the sieve and discharged from its lower end beyond the rear end of the machine-trough 18, which is secured to the rear lower end portion of the main frame 10. Hence by means of this first sieve we have a separation of the large or perfect oats from the remainder of the mixture. The reference-numeral 19 indicates a second sieve mounted in the slot 16 of the frame 11, immediately below the sieve 17. The mesh of this sieve 19 is considerably smaller than 17, being of such a size that the perfect seeds, whether of wheat or oats, will not pass through it, but that all weed-seeds, small and imperfect grain-seeds, and dust will pass through. At the rear or lower end of the sieve 19 is a short partition 20, which is fixed in the frame 11 and arranged to direct the tailings or grain that passes over the sieve 19, so that it will fall upon an inclined platform 21, which will be hereinafter described. The reference-numeral 22 indicates the third one of the series of sieves mounted in the frame 11. This sieve is shorter than the ones above it, and an inclined partition 23 is fixed to the frame 11 some distance in the rear of the sieve 22 to direct the seeds of grain that pass over the sieve 22 to an inclined platform 24, which connects with a chute 25, that is passed through an opening in the side of the frame 10 to a point of discharge. The mesh of the sieve 22 is of such a size that weed-seeds and dust alone will pass through it, and the grain of small and imperfect size that has passed through the sieve 19 will pass over it and be discharged through the chute 25, as described. An inclined platform 26 is fixed to the under surface of the frame 11 to guide the substances passing through the sieve 22 and direct them to enter a chute 27, which will direct them to a point of discharge at the side of the machine. Hence the worthless matter, such as weed-seeds and dust, will pass through the chute 27 to the exterior of the machine.

It is obvious that with the combination of elements just described a quantity of grain having both wheat and oats therein cannot be thoroughly separated, for the reason that a great quantity of the oat-seeds are of substantially the same size as the wheat-seeds, and for this reason I have combined with this set of sieves the following device, the function



of which is particularly to separate the wheat and oat seeds, which are substantially the same size, but which necessarily are of different weight.

5 The reference-numeral 29 indicates a frame composed of flat side pieces and cross-pieces at the front end thereof, which frame is suspended upon the hangers 29', which are pivoted to the main frame, near its upper end, and  
10 also to the upper end portion of the frame 29. The platform hereinbefore mentioned (indicated by the reference-numeral 21) is mounted in the top of this frame 29 and inclines downwardly at its forward end. A sieve 30 is  
15 mounted in this frame immediately beneath the platform 21, and hence the wheat-seeds, together with the smaller grains of oats, will all be passed to the upper end of this sieve 30, which sieve has a mesh smaller than the sieve  
20 17, but larger than 19, being of such a size as to still further graduate the seeds as to size, so that some of the remaining oat-seeds will not pass therethrough, but be discharged from the rear end of the sieve 30 to a platform 31,  
25 which leads to the trough 18, where the oat-seeds that cannot pass over the first sieve 17 are discharged. The wheat and small oat seeds that pass through the sieve 30 are of substantially the same size, the sieves 17 and  
30 19 having produced a grade of mixed berries free from extremely-large oat-seeds and all small and imperfect seeds, dust, and impurities, while the last screening through openings of a size intermediate between those just  
35 mentioned still more delicately assorts the berries. This latter grade of comparatively-coarse mixed particles of almost equal size is directed by means of an inclined platform 32 to a sieve where the seeds are separated ac-  
40 cording to weight. This sieve 33 has a mesh of such a size that both the wheat and oat seeds may pass therethrough, and on its top surface is a series of transverse projections or shoulders 34, and on the under surface of  
45 the sieve is a series of deflectors 35, which are located directly beneath the aforesaid shoulders 34. Certain of the grains in the mixture will not pass through this sieve for reasons hereinafter made clear, and these grains are  
50 directed to the trough 18. Below this sieve 33 is an inclined platform 36, which will direct the seeds to a sieve 37, and a sieve 38 is located immediately beneath the sieve 37. These sieves 37 and 38 are merely for the pur-  
55 pose of graduating the perfect seeds that have passed through the above process as to size and they might be omitted without changing the other features of the process.

I have provided means whereby all the  
60 sieves in the frame 29 may be adjusted as to their incline to satisfy certain conditions of the grain with comparative ease. This means comprises two uprights 39, which are slidingly mounted in grooves in the frame 29. A se-  
65 ries of openings 40 are formed in these slides 39 to coincide with similar openings 41 in the frame 29, so that a pin may be passed through

the slide 39 and into the frame and the slide be secured relative to the frame. It is obvious that by raising and lowering these slides  
70 the pitch or incline of each of the sieves contained in the frame 29 may be adjusted. The opposite ends of the sieve may be pivotally supported by pins turning in holes in the casing, as is clearly shown in Fig. 5.

I have provided means for agitating the frame 29, together with all of its sieves, during the operation of the machine, as follows: 42 indicates a crank-shaft rotatably mounted in  
80 suitable bearings in the frame 29 and having crank-arms 43 thereon to pass through the slots 44, formed in the side pieces of the frame 29, and this crank-shaft 42 is rotated during the operation of the machine by mechanism hereinafter described.

The reference-numeral 45 indicates a fan-casing fixed in the machine-frame and discharging at a point below the sieve 33. 46 indicates a shaft rotatably mounted in suitable bearings in the machine-frame and hav-  
90 ing a fan 47 thereon, and also a pinion 48 and a pulley 49. 50 indicates a shaft rotatably mounted in suitable bearings in the machine-frame and having fixed thereto a cog-wheel 51, meshed with the pinion 48, and also a crank  
95 52, whereby the machine may be driven. 53 indicates a crank-arm formed on the shaft 15, and 54 indicates a pitman pivoted eccentrically to the pulley 49 and also pivoted to the end of the crank-shaft 53. These parts are  
100 so arranged that as the belt-wheel 49 is rotated the crank-shaft 15 will be rocked.

In practical use it is obvious that the seeds will be separated before they are passed to the screen 33 sufficiently so that only such  
105 seeds as are of a substantially-uniform size will pass to the said screen. It is well known that the hull on the oat-seeds makes the seeds lighter in proportion to their size than the wheat-seeds, and this difference in specific  
110 gravity is taken advantage of in this step of the separating process. During the operation of the machine there is a blast of air from the fan discharged through the sieve 33, and as the seeds are passed over this sieve the  
115 blast of air will operate to force the lighter oat-seeds over the sieve, while the blast is so proportioned that wheat-seeds may drop through the sieve. This process of separation by weight is made doubly accurate by  
120 means of the shoulders 34 and the deflectors 35. A quantity of wheat and oat seeds will become lodged upon the sieve 33 directly above the shoulders 34, and as the air-pressure is greatest at these points, on account of  
125 the deflectors 35 concentrating the current, both the wheat and oats will be forced over the shoulder. The oat-seeds being the lightest will be forced farther and made to pass to the trough 18, while the wheat-seeds being  
130 heavier will merely roll over the said shoulders and pass upon the sieve below the shoulder, where they will be permitted to pass through the sieve.



It will be seen that if it were desired to clean and grade a single variety of grain it could be done without the air-current through the lower sieve, and therefore without the application of power to the machine.

Having thus described the construction, arrangement, and function of each of the various parts of the machine, what I claim as my invention, and desire to secure by Letters Patent of the United States therefor, is—

1. In a machine for separating mixtures of wheat and oats, the combination of three sieves upon which the mixture is successively treated, the third having openings intermediate in size between the first and second whereby a grade of mixed grains of substantially-uniform size is produced, a fourth sieve to which this grade is delivered, and a device for causing an air-current therethrough, substantially as described.

2. In a machine for separating mixtures of wheat and oats, the combination of three sieves upon which the mixture is successively treated, the third having openings intermediate in size between the first and second whereby a grade of mixed grains of substantially-uniform size is produced, a fourth sieve to which this grade is delivered, a device for causing an air-current therethrough, and means for agitating the sieves, substantially as described.

3. In a machine for separating mixtures of wheat and oats, the combination of three sieves upon which the mixture is successively treated, the third having openings intermediate in size between the first and second whereby a grade of mixed grains of substantially-uniform size is produced, a fourth sieve to which this grade is delivered, a device for causing an air-current therethrough, and means for adjusting the inclination of the last-named sieve, substantially as described.

4. In a machine for separating mixtures of wheat and oats, the combination of three sieves upon which the mixture is successively treated, the third having openings intermediate in size between the first and second whereby a grade of mixed grains of substantially-uniform size is produced, a fourth sieve to which this grade is delivered, a device for causing an air-current therethrough, and one or more transverse projections upon the upper surface of the last-named sieve, substantially as described.

5. In a machine for separating mixtures of wheat and oats, the combination of three sieves upon which the mixture is successively treated, the third having openings intermediate in size between the first and second whereby a grade of the mixed grains of substantially-uniform size is produced, a fourth sieve to which this grade is delivered, a device for causing an air-current therethrough, one or more transverse projections upon the upper surface of the last-named sieve, and deflectors below said projections, substantially as described.

6. In a grain-separator, the combination of a sieve delivering its tailings outside the machine, a second sieve receiving the material passing through the first, a third sieve having smaller openings than the first and larger than the second receiving the tailings from the latter, a fourth sieve to which the material passing through the third is delivered and a device for causing an air-current through this fourth sieve, substantially as described.

7. In a grain-separator, the combination of a sieve delivering its tailings outside the machine, a second receiving the material passing through the first, a third sieve having smaller openings than the first and larger than the second receiving the tailings from the latter, a fourth sieve to which the material passing through the third is delivered, a device for causing an air-current through this fourth sieve, and means for adjusting the inclination of the third and fourth sieves, substantially as described.

8. In a grain-separator, the combination of a sieve delivering its tailings outside the machine, a second sieve receiving the material passing through the first, a third sieve having smaller openings than the first and larger than the second receiving the tailings from the latter, and a fourth sieve to which the material passing through the second is delivered, which in turn discharges both grades produced outside the machine, substantially as described.

9. In a machine for separating mixtures of wheat and oats, the combination of a sieve over which the larger oat-berries pass while the remainder of the mixture falls through, a second sieve to which the latter portion is delivered which separates perfect grains from imperfect grains and impurities, the former taling over upon a third sieve which removes a second grade of oats while the wheat and the smaller oats fall through upon a fourth sieve by which, in connection with a device for causing an air-current therethrough, the wheat and oats are separated one from the other, substantially as described.

10. A machine for separating wheat and oats, comprising in combination, a machine-frame, a shaft rotatably mounted therein, means for applying power to rotate said shaft, one or more sieves slidably mounted in the top of the machine-frame, and having a mesh of a size to prevent the passage of perfect oats and permit grains of wheat to pass through, means for agitating said sieve or sieves from said shaft, one or more sieves mounted in the machine-frame beneath the point in the upper sieve where the wheat and small oats are discharged, a fan, means for operating it from said shaft to send a blast of air through said lower sieve or sieves to thereby separate the wheat and oats according to weight, substantially as set forth.

SAMUEL R. CULP.

Witnesses:

A. R. GARDINER,  
KATE ANDREWS.