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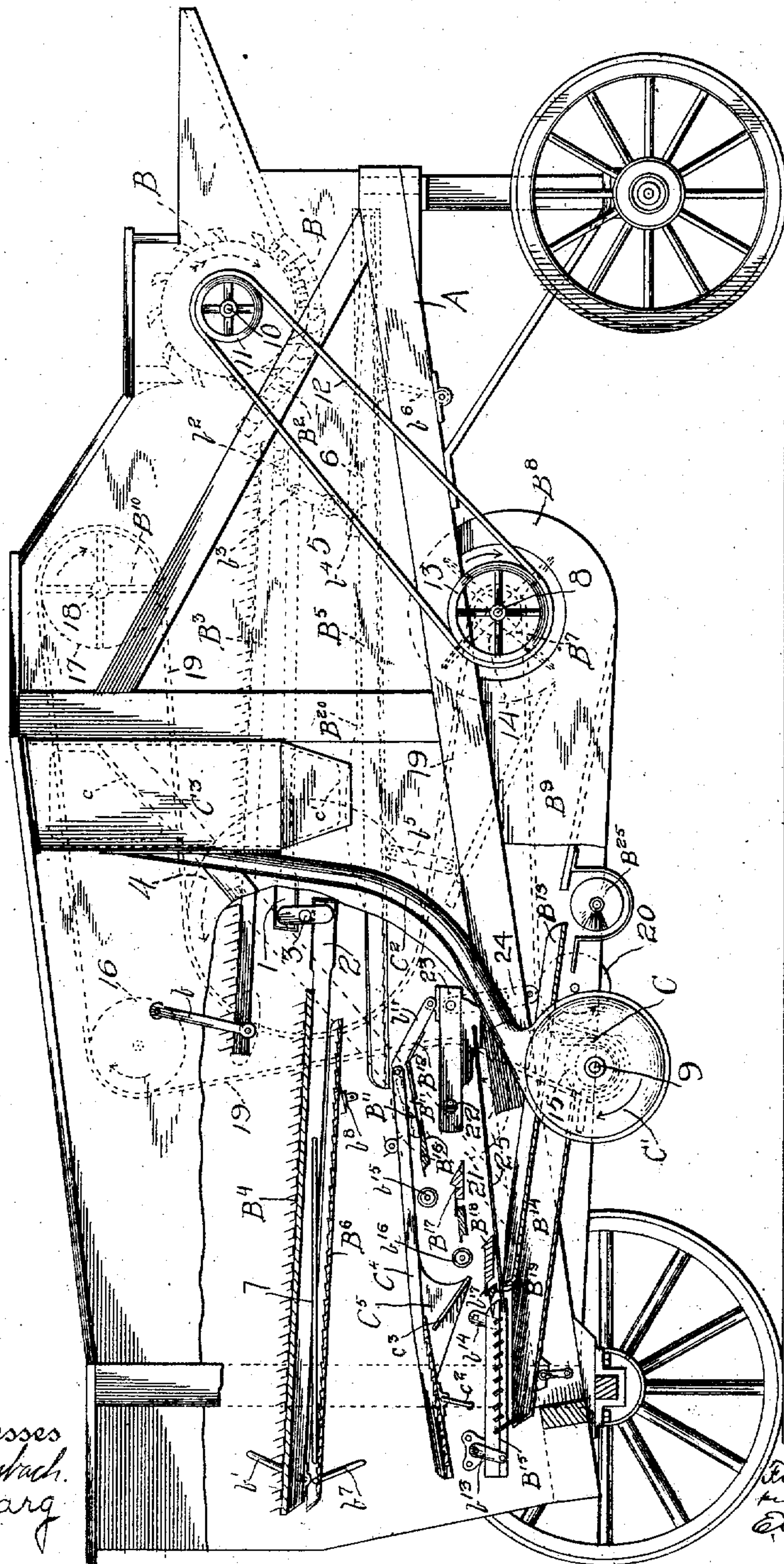
PATENTED MAY 5, 1908.

F. F. LANDIS.
THRESHING MACHINE.

APPLICATION FILED MAY 3, 1906.

2 SHEETS—SHEET 1.

Fig. I.



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Inventor

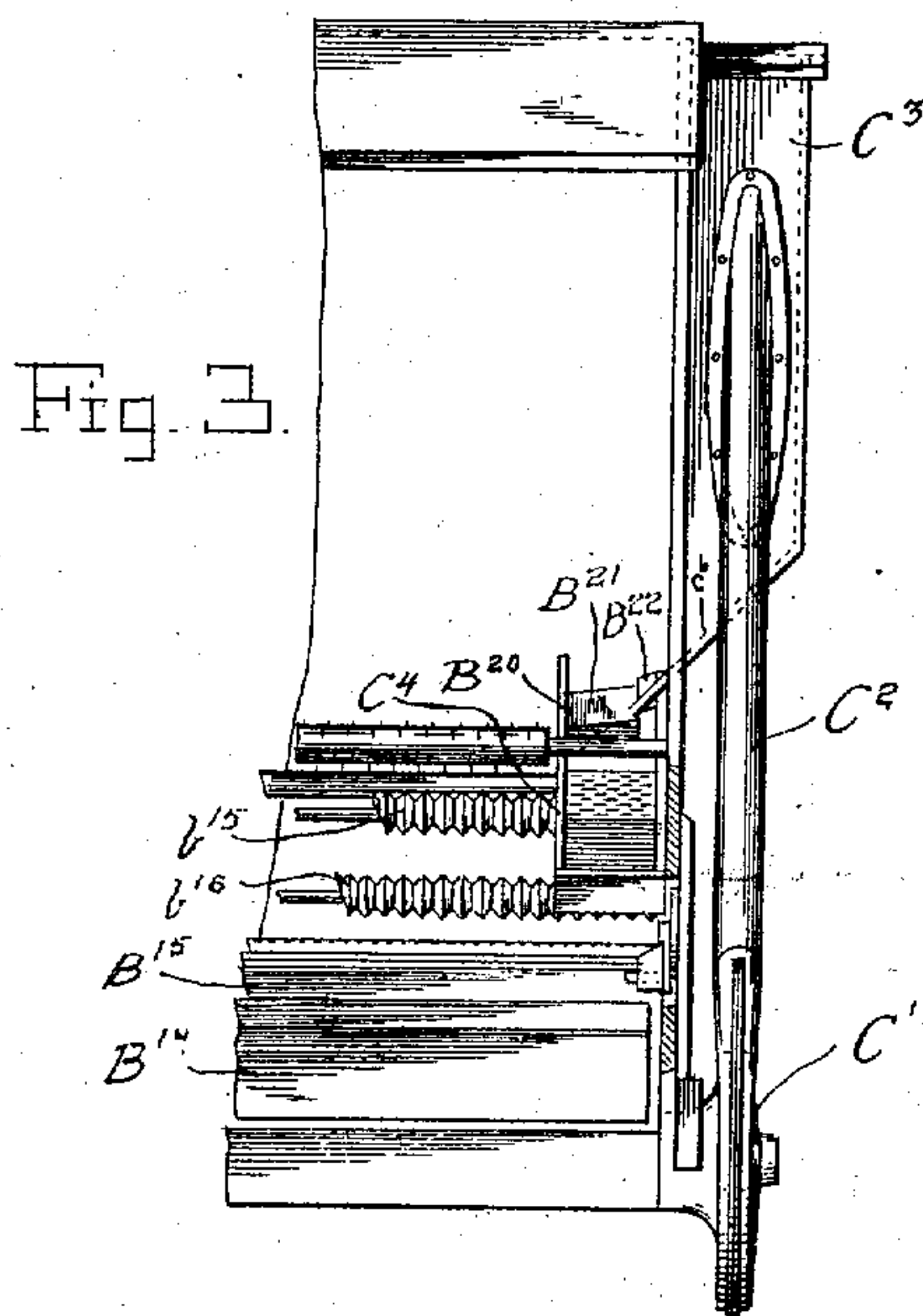
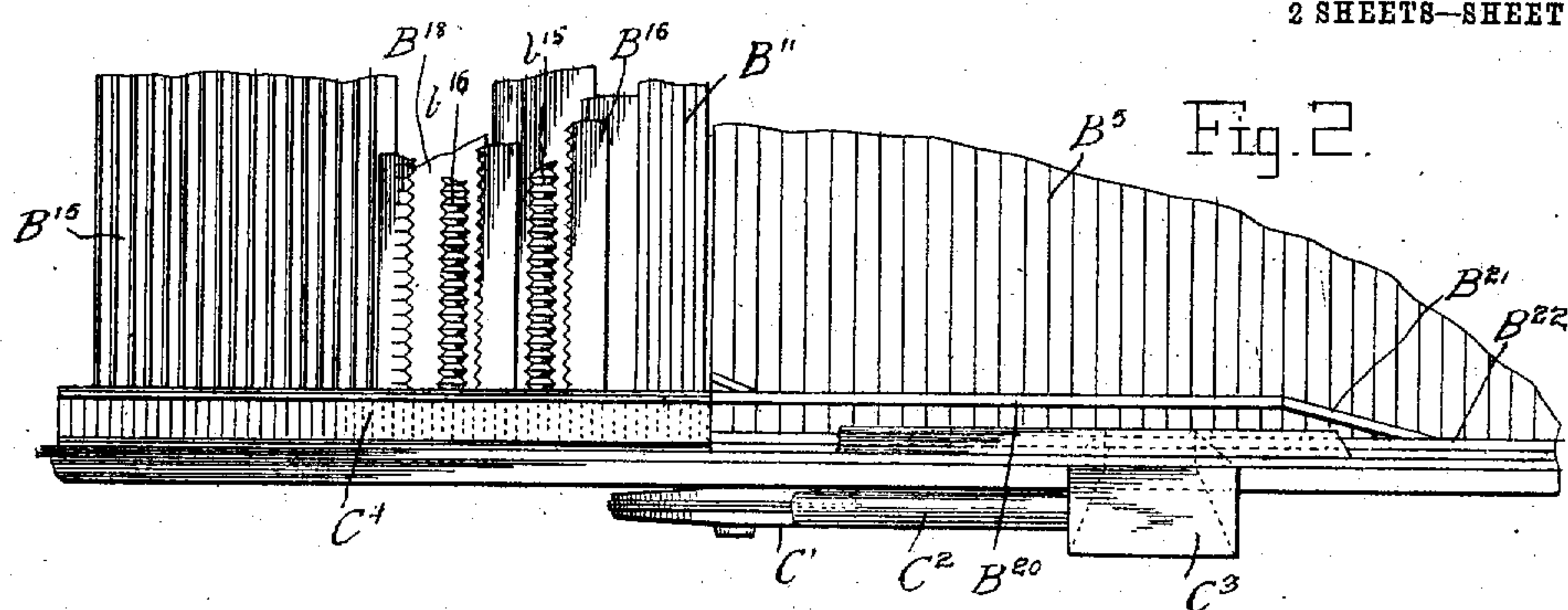
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Attorney

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UNITED STATES PATENT OFFICE.

FRANK F. LANDIS, OF WAYNESBORO, PENNSYLVANIA.

THRESHING-MACHINE.

No. 886,707.

Specification of Letters Patent.

Patented May 5, 1908.

Application filed May 3, 1905. Serial No. 258,685.

To all whom it may concern:

Be it known that I, FRANK F. LANDIS, a citizen of the United States, residing at Waynesboro, in the county of Franklin and State of Pennsylvania, have invented certain new and useful Improvements in Threshing-Machines, of which the following is a specification.

In the use of threshing machines the problem of properly handling the tailings to save all of the grain, that can be saved, without unduly interfering with the normal operation of the separating and cleaning mechanism, is one which has caused much thought and experiment, and, heretofore, without satisfactory results. It is common to run the tailings to a re-thresher where they are subjected to the action of a specially constructed beater and then returned by a suitable elevator to the separator and again run through the separating and cleaning mechanism to separate the grain from the chaff, heads and filth. In such machines a certain per cent. of the re-threshed tailings will continuously go with the other tailings, which are on their initial passage through the machine, back to the re-thresher, and thus the quantity of the tailings in the machine is constantly increasing until the re-thresher becomes over-taxed and the operation of the separating and cleaning apparatus is seriously impaired. This result is caused by part of the foreign matter in the grain, or green and tough heads being of such specific gravity that they will not be removed by the blast with the straw, chaff and light filth, and such substance thus continues in the stream of tailings, going through the machine over and over again until reduced to the size of the grain when it will go with said grain and deteriorate its quality. A blast strong enough to remove such substance would also remove much of the lighter grain and cause undue waste, while if allowed to accumulate the quantity in a short time becomes greater than the capacity of the cleaning devices to handle and all of the bulk above the capacity of said cleaning devices and the tailings riddle is carried out over the rear of said riddle with unthreshed heads and often much good grain, causing waste and making the tailings mechanism as now employed in threshing machines of little or no value.

The object of my said invention is, therefore, to provide a tailings thresher, separator and cleaning mechanism adapted for use

with any approved form or construction of threshing machine, which will operate without undue interference with the normal operation of the other parts of the machine and will save the grain contained in the tailings, obviating the difficulties above enumerated, all as will be hereinafter more fully described and claimed.

Referring to the accompanying drawings, which are made a part hereof, and on which similar reference characters indicate similar parts, Figure 1 is a side elevation of a threshing machine having my improved tailings thresher, separator and cleaner thereon, a part of the side of the casing being broken away to show the interior construction more clearly, Fig. 2 a top or plan view of one side of the grain bottom and that portion of the cleaning mechanism with which my invention is connected and operates, and Fig. 3 a rear elevation of the side of the separator to which my invention is attached with the end of said separator casing removed.

In said drawings the portions marked A represent the frame work or casing of the threshing machine, B the threshing cylinder and C the tailings thresher.

There are two types of threshing machine separators in common use which are well understood, viz. the sieve or riddle with a blast, and the gravity separator or cleaner wherein the grain falls from one shelf or support to another, arranged in a series, each somewhat behind and below the one adjacent to its front side, with a blast provided to operate through said grain as it falls between said shelves. While as above stated, my invention is adapted to operate with any type, I have shown it in connection with the gravity type. The general construction and operation of such machine is well understood, but I will describe them briefly in order that the operation of my invention in combination therewith may be more clearly understood.

The cylinder B and concave B' are of any approved form and arrangement. A curved separating grate B² is mounted at the rear of said concave. A straw-rack B³ is mounted on pivoted hangers b at its rear end and extends rearwardly from said separating grate. A second straw-rack B⁴ is mounted at the rear of straw-rack B³ and is supported at its rear end by pivoted hangers b'. Said straw-racks are connected by rods 1 and 2 respectively with oppositely extending cranks

of a two-crank shaft 3, which has a pulley 4 by which it is driven. The rod 1 is connected to the front end of straw-rack B³ by a pivot b² and is also connected at an adjacent point by a pivot b³ to the upper end of a rocker-arm 5, the lower end of which is connected at its front end to the front end of the grain bottom B⁵. Said grain bottom B⁵ is supported upon two pairs of pivoted under hangers b⁵ and b⁶, respectively. A second grain bottom B⁶ is mounted under the straw-rack B⁴, being supported at its rear end by the pivoted under hangers b⁷ and at its front end by inclined tracks or brackets b⁸. A rod 7 connects said bottom with the rod 2 and thus provides for the reciprocation thereof. A blast fan B⁷ is mounted on a shaft 8 with the casing B⁸ in the approved position on the underside of the machine. Said fan extends the width of the inside of the separator. Said air-duct is also of the same width as the machine and the top thereof slants upwardly at an angle to permit the air to expand and fill every part of the separator containing the cleaning mechanism. The re-thresher C is mounted on a shaft 9 within a casing C' and is of any approved construction.

The cylinder shaft 10 is provided with a pulley 11 which is connected by a belt 12 with a pulley 13 on the shaft 8 of fan B⁷. On the opposite end of shaft 8 is a pulley 14, near the top of the separator is an idler pulley 16 and a pulley 17 is provided on the shaft 18 of beater B¹⁰. A belt 19 runs from pulley 14 over a tightener pulley 20, under pulley 15 on re-thresher shaft 9, under a pulley 21 on shaft of eccentric 22, over idler 16, pulley 17, around pulley 4 on crank shaft 3 and back to the point of beginning on pulley 13. The entire mechanism of the machine is thus driven by one belt from the fan shaft, which is driven from the threshing cylinder shaft by belt 12. The direction of motion of the several shafts and pulleys is indicated by arrows.

The eccentric 22 has a rod 23 mounted thereon which is given a reciprocating movement by the operation of said shaft. A corrugated feeding or push board B¹¹ is mounted just beneath the rear end of the grain bottom B⁵ and is connected by arms b¹¹ with the upper side of said rod 23. An air deflecting board B¹² is joined to the front edge of said feed board B¹¹ extending downwardly at an angle as shown. The rod 23 is also pivoted to the upper end of rocker-arm 24, the lower end of which is pivoted to the side of the grain bottom B¹³. To the underside of said grain bottom B¹³ is attached the tailings bottom B¹⁴ and both receive a reciprocating motion for the eccentric 22 through said rod 23 and rocker-arm 24. The tailings riddle B¹⁵ is mounted upon pivoted hangers b¹³ and b¹⁴ and connected by rod 25 with the underside of bar 23 and receives its reciprocating

motion therefrom. Immediately beneath the rear edge of the feeding board B¹¹ is mounted a grain board or shelf B¹⁶. Just behind and a distance below said board B¹⁶ is mounted an angle board B¹⁷ and in the rear of said board B¹⁷ is mounted another B¹⁸. The rear edges of boards B¹⁶ and B¹⁷ are formed corrugated and corrugated rollers b¹⁵ and b¹⁶ are mounted adjacent to their respective edges. The rear top of board b¹⁸ is provided with a comb with rearwardly projecting fingers b¹⁷ and a dividing board B¹⁹ is mounted with its angle beneath the rear ends of the teeth of said comb with its rear edge extending to the front edge of the tailings riddle B¹⁵.

The grain and tailings coming from the rear end of grain bottom B⁵ drops upon the reciprocating feed board B¹² and from thence to the board B¹⁶ and from thence to the board B¹⁷ and from thence to the board B¹⁸ being met at each passage from one point to the next by a blast of air coming from the air duct B⁹ which serves to remove the chaff, dust and light particles, while the grain drops to the grain bottom B¹³ and is carried to the grain conveyer B²⁵, while the unthreshed heads and heavy substances, constituting the tailings, pass to the tailings riddle B¹⁵ and falls through to the tailings bottom B¹⁴ and is conducted to the tailings thresher C.

Thus far the construction and operation of the machine is not widely different from the construction of machines which are in common use and well understood.

To the top of the tailings thresher casing C' is connected a pneumatic pipe C² arranged to discharge at an acute angle into the upper end of the air chamber C³ on one side of the separator casing. Said air chamber is of sufficient area to allow the blast to expand and reduce its force or motion and permit its escape through opening c into the upper portion of the separator, carrying with it the dust and light particles of material, while the heavy particles and grain contained therein are permitted to drop by gravity to the bottom c⁶ of said air chamber, which is formed inclined and communicates with the interior of the separator through the opening c' at a point just above the side board of the grain bottom B⁵. On this side of the said grain bottom is formed a narrow trough by a longitudinal partition board B²⁰ extending from a point a distance in front of the air chamber C³ to the rear end of said grain bottom. The front end of said trough is closed by an inclined partition board B²¹ extending at a long angle from the side board B²² of said grain bottom to the partition board B²⁰, the angle being long so that the free passage of the chaff and grain received from the separating grate will not be interfered with.

A narrow trough C⁴ is mounted at its rear end upon pivoted hangers c² and at its front

end is pivoted to the arm b^{11} which connects the feed board with the reciprocating bar 23, thereby providing a reciprocating motion for said trough C^4 . The front end of said trough is arranged immediately beneath the rear end of grain bottom B^5 and is adapted to receive the rethreshed tailings from the trough on the side thereof. The bottom of its front end is formed as a fine lip riddle c^7 which will allow nothing larger than the size of the grain to be cleaned to pass through while the rear portion of its bottom is a corrugated board c^8 and is formed to have a greater inclination than that of the riddle end. Downwardly extending wings are provided on the sides of said trough at the angle between the riddle and corrugated bottom portions and an air deflecting board c^3 is mounted between said wings in position to direct a strong blast of air through this portion of said riddle.

The operation of the tailings separator and cleaner is as follows: The tailings being rethreshed in the tailings thresher C' are carried through an elevator pipe C^2 by pneumatic pressure into the air chamber C^3 where the air is allowed to expand and escape with the dust and light particles carried thereby through the opening c into the separating chamber, while the grain and heavy particles drop on to the inclined bottom c^6 and are directed into the trough formed on the side of the grain bottom B^5 . The tailings and grain therein are then discharged from the rear end of said trough into the front end of trough C^4 where they are thoroughly screened by passing over the riddle c^7 . As said tailings fall from the end of grain bottom B^5 they are met by a blast from the air duct B^9 and the light stuff is removed while the grain falls through said riddle to the grain cleaning mechanism beneath and passes, with the grain coming from the main part of the grain bottom B^5 , over the grain bottom B^{13} to the grain conveyer B^{25} and the tailings pass over said riddle and the corrugated bottom c^8 of said trough C^4 and are discharged beyond the end of tailings riddle B^{15} . The deflecting board c^3 is positioned to direct a strong current of air through the rear end of the riddle c^7 of trough C^4 and thus prevent any light particles from falling through. The tailings are thus cleaned separate from the main body of grain and prevented from again passing through the machine. Therefore the quantity of tailings going through the machine is never increased beyond what is produced by the normal work being handled by the machine. By the use of this invention the tailings are re-threshed and cleaned in a manner which in no way interferes with the normal work of the other parts of the machine. Tailings are coarse and bulky when first coming from the cylinder and are easily handled the first time they pass through the cleaner and are easy to separate from the

grain, but when, as in the methods heretofore employed, they are continuously rethreshed and thereby reduced to the size of the grain they are difficult to handle and defeat all cleaners, especially in threshing filthy grain. The value of my invention, which prevents all such repeated re-threshing and reduction thus becomes apparent.

As before stated this tailings separator and cleaner is equally well adapted to be attached to a sieve or riddle cleaner, as to the gravity cleaner in connection with which it is illustrated, as will be readily understood by those familiar with the art. It will also be understood that many modifications in the construction and arrangements of details may be made without departing from my invention, which consists broadly in the arrangement of mechanism whereby the tailings after being rethreshed may be separated from the grain without being returned to the main separating and cleaning mechanism and mixed again with the main body going through the machine.

Having thus fully described my said invention what I claim as new and desire to secure by Letters Patent, is:—

1. A threshing machine comprising a tailings rethresher, a conveyer extending from said rethresher to the separator casing and adapted to discharge into said casing into one side of the main grain bottom, said main grain bottom provided with a longitudinal partition in its side receiving said tailings to keep said tailings separate from the main body of the grain passing over said grain bottom, and a separate trough or shoe arranged to receive said tailings from said grain bottom, the forward end of which is formed as a riddle and the rear end of which is imperforate and extends rearwardly to discharge beyond the separating mechanism, substantially as set forth.

2. In a threshing machine the combination of a separating and cleaning mechanism, a tailings thresher arranged to receive the tailings from the tailings delivery bottom, a conveyer extending from the tailings thresher, the separator, the grain cleaner formed with a section separated or isolated from the main portion comprising a cleaning riddle arranged to receive the tailings and extending to a point that will deliver the tailings passing over its rear end to beyond the rear end of the main tailings riddle, substantially as set forth.

3. In a threshing machine the combination of the separating and cleaning mechanism, the main grain bottom formed with a trough at one side, a tailings thresher, a conveyer pipe extending from the casing of said thresher to an air chamber on the side of the machine, said air chamber communicating with the separator casing by means of openings one at the top to permit the escape of

the air and dust and another at the bottom to deliver the grain and tailings into the trough of the main grain bottom, a separate riddle mounted to reciprocate and arranged
 5 beneath the rear end of said trough on the grain bottom to receive the tailings, the front end of said separate riddle being formed as a grain riddle and its rear end as a corrugated bottom, said rear end extending to a
 10 point which will deliver the tailings to beyond the grain cleaning devices, substantially as set forth.

4. In a threshing machine, the combination, of the cleaning and separating mechanism, a tailings thresher arranged to receive the tailings from said cleaning mechanism, a
 15 conveyer for conveying the tailings from said casing to a receiving chamber, said chamber having openings communicating with the separator above the side of the grain bottom, said grain bottom formed with a trough at
 20 this side, a separate trough mounted beneath the rear end of said grain bottom adapted to receive the tailings therefrom and extending to deliver beyond the rear end of the cleaning
 25 devices, the bottom of said second trough being formed as a grain riddle at its front end and with a corrugated bottom at its rear end, and means for imparting a reciprocating motion to said trough, substantially as set forth.

5. In a threshing machine, the combination, of the separator, the tailings thresher, the conveyer for conveying the tailings from said thresher back to the separator and deliver
 35 them to the grain bottom, said grain bottom formed with a compartment to receive said tailings separated from the main portion, and separating devices arranged to receive the tailings from said grain bottom and deliver
 40 the grain to the main grain cleaning devices and conduct the tailings to beyond the rear of said cleaning devices, substantially as set forth.

6. A threshing machine comprising a tailings thresher and a conveyer leading therefrom to the tailings separating and cleaning mechanism, said tailings separating and
 45 cleaning mechanism comprising a trough or shoe separate from the main grain bottom and cleaning devices and arranged with its rear end to discharge beyond the main grain cleaning mechanism, substantially as set forth.

7. In combination with a threshing machine and separator, a tailings thresher, tailings separating and cleaning devices arranged to receive the tailings from said thresher, said cleaning devices comprising a riddle
 55 through which the clean grain may drop into the main grain cleaning device and extending to deliver the tailings to a point beyond said main cleaning devices, substantially as set forth.

8. In a threshing machine, the combination with the separator, of a tailings thresher

mounted in a casing and arranged to receive the tailings from the main cleaning mechanism, a conveyer for conducting said tailings from said thresher casing and an air chamber
 70 mounted on the side of the machine and connected with said conveyer, said air chamber being of a size to permit the air to expand and having an opening in its upper end leading into the separator through which the air and light particles carried thereby may escape
 75 into said separator and another opening at its lower end leading into the separator above the side of the grain bottom, said main bottom having a separate compartment to receive said tailings, a second
 80 trough mounted beneath the rear end of said compartment to receive the tailings therefrom and connected with mechanism to impart a reciprocating motion thereto, the front end of the bottom of said trough being
 85 formed as a grain riddle and arranged in the path of the blast from the blast fan and above the main cleaning devices and the rear end of said trough being formed as a corrugated bottom and arranged to discharge
 90 beyond the main end of the tailings riddle, substantially as set forth.

9. In a threshing machine, the combination with the separator of the tailings thresher, a conveyer extending therefrom to
 95 a chamber on said separator, said chamber having openings leading into said separator, the lower one being arranged to deliver the tailings to isolated cleaning mechanism at one side of the grain bottom, a separate narrow
 100 riddle mounted to reciprocate and arranged to receive the tailings from said grain bottom, the front end whereof is formed as a grain riddle and the rear end as a conveyer bottom, an inclined air deflector being
 105 mounted on the underside of said separator and arranged to deflect a current through the rear end of the grain riddle, substantially as set forth.

10. A threshing machine comprising an
 110 independent tailings thresher, separator and cleaner arranged to thresh and deliver the tailings into a small isolated portion of the cleaning mechanism located in the path of the air-blast, which operates to separate
 115 and clean the grain from the tailings, and deliver the refuse from said tailings to a point beyond all parts of the main grain cleaner.

11. A threshing machine comprising a separate tailings thresher arranged to deliver
 120 to an isolated portion of the grain separating and cleaning mechanism, said portion becoming an independent separator and cleaner mounted in the path of the air-blast and arranged to receive the tailings, separate and
 125 clean the grain therefrom, and deliver the tailings beyond the main cleaning mechanism.

12. In combination with a grain threshing, separating and cleaning machine, a tailings re-thresher separator and cleaner arranged
 130

to deliver the re-threshed tailings upon a small section of the regular grain cleaning mechanism, said section being in the path of the air-blast and isolated and adapted to
5 separate the grain from the re-threshed tailings and deliver the tailings beyond all the main cleaning mechanism.

13. In combination with a grain threshing machine, separator and cleaner, a tailings re-
10 thresher arranged to receive the tailings from the main cleaning mechanism, a conveyer for conducting said tailings from said re-thresher, an air chamber located at the discharge end of said conveyer, said air cham-
15 ber being of a size to permit the air discharged with the rethreshed tailings into said chamber to expand and stop the stream

of tailings without interrupting the flow from said conveyer and provided with an opening leading into the body of main ma- 20 chine through which the air and light particles escape, and another through which the re-threshed tailings with the grain they contain are delivered into separate and independent devices for separating the grain from 25 re-threshed tailings, etc.

In witness whereof, I have hereunto set my hand and seal at Waynesboro, Pa., this 18th day of April, A. D. nineteen hundred and five.

FRANK F. LANDIS. [L. S.]

Witnesses:

CLARENCE E. MENTZER,
ALF. N. RUSSELL.