Jan. 26, 1954 J. E. GILES 2,667,197

GRAIN HULLING APPARATUS

Filed May 13, 1950

Fig. 2

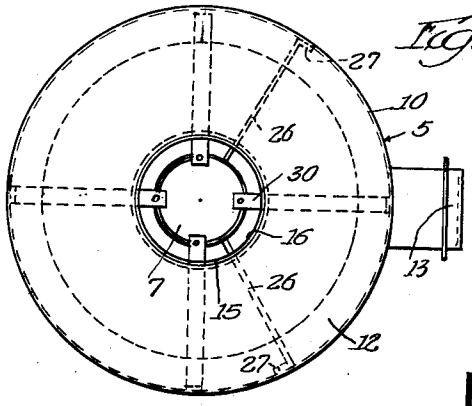


Fig. 3

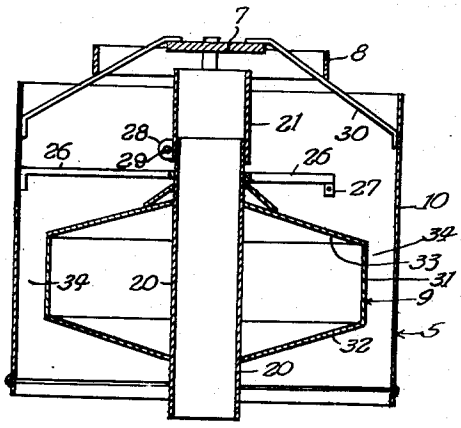


Fig. 1

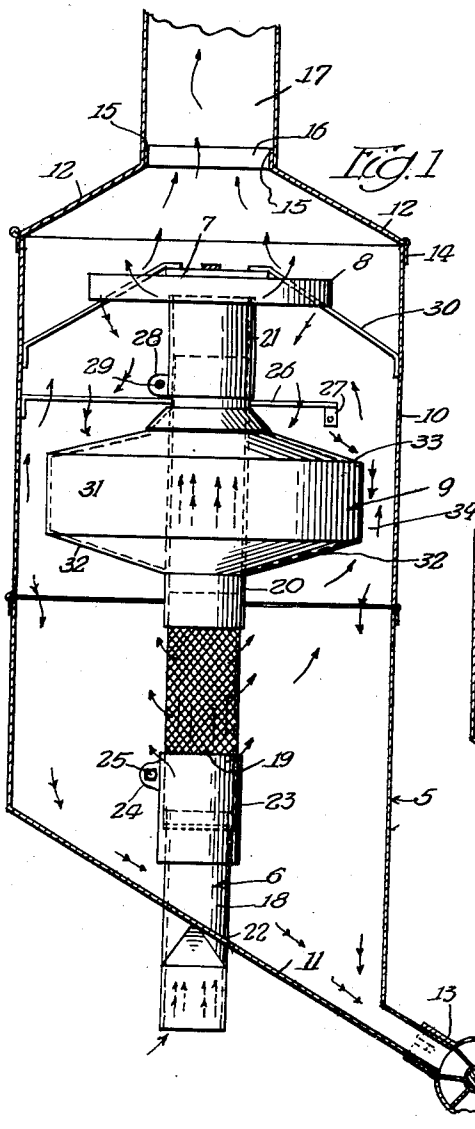
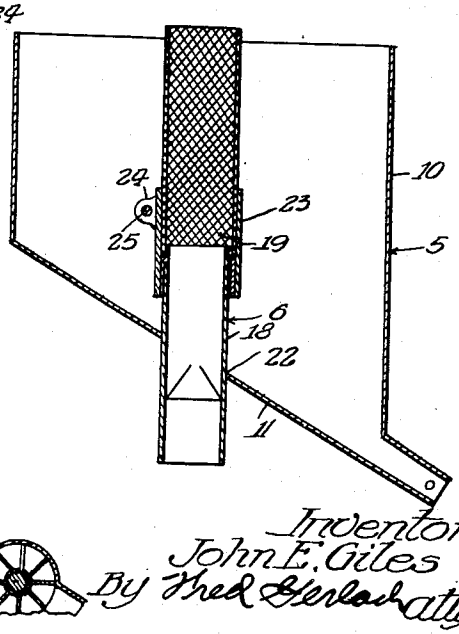


Fig. 4



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GRAIN HULLING APPARATUS

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8 Claims. (Cl. 146—253)

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The present invention relates generally to apparatus for hulling grain. More particularly the invention relates to that type of grain hulling apparatus which effects removal of the hulls from the kernels of grain by impact and as its basic components or parts comprises: (1) a duct which extends vertically, has its lower end connected to receive a continuous stream of grain and air under pressure, and serves to guide the stream upwards; and (2) an anvil which is positioned a small distance above the upper end of the duct and is adapted to have the grain impacted against it with such force as to crack the hulls so that they are capable of being removed from the kernels by the air under pressure.

One object of the invention is to provide a grain hulling apparatus which is an improvement upon, and has certain inherent advantages over, previously designed apparatus for the same purpose and is characterized by high efficiency and low cost of manufacture.

Another object of the invention is to provide a grain hulling apparatus of the aforementioned type in which the anvil and the central and upper end portions of the vertically extending duct are enclosed in a large sized vertically elongated casing which comprises a cylindrical side wall, a flat downwardly inclined bottom wall, and a frusto-conical top wall.

Another object of the invention is to provide a grain hulling apparatus of the last mentioned character in which the flat downwardly inclined bottom wall of the casing serves to direct the hulled kernels which fall by gravity onto it to an outlet device at its lower end and the inner marginal portion of the frusto-conical top wall of the casing defines an outlet for the hull carrying air under pressure.

Another object of the invention is to provide a grain hulling apparatus of the type and character under consideration in which the anvil has a flat bottom surface in order that the kernels of grain after being impacted thereagainst are deflected outwards, and is surrounded by a baffle ring which is spaced outwards from the margin of the anvil and serves so to arrest the outwardly deflected kernels that they fall readily by gravity onto the flat bottom wall of the casing.

Another object of the invention is to provide a grain hulling apparatus of the aforementioned character in which the portion of the vertically extending duct that is directly above the flat downwardly inclined bottom wall of the casing is in the form of a tubular length of screen in order that a portion of the air under pressure

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flows first laterally into the lower portion of the casing interior and then upwards to and through the outlet and entrains with it the removed hulls which are not entrained by the portion of the air under pressure that is discharged from the upper end of the duct against the anvil.

Another object of the invention is to provide in connection with a grain hulling apparatus of the type and character under consideration a sleeve valve which is slidably mounted on the duct and serves to vary or adjust the effective area of the tubular length of screen whereby a portion of the air under pressure is admitted into the casing interior for up-flow therethrough.

Another object of the invention is to provide a grain hulling apparatus in which the upper end of the duct is provided with a sleeve-like member which is mounted for vertical sliding movement and permits of adjustment of the height of the space or gap between the upper end of the duct and the bottom surface of the anvil.

Another object of the invention is to provide a grain hulling apparatus of the aforementioned character in which the portion of the conduit that is between the vertically slidable sleeve-like member and the tubular length of screen is surrounded by a hollow deflecting drum, the side wall of which is spaced inwards a comparatively small distance from the adjacent portion of the casing side wall and forms a restricted throat for increasing the velocity of the portion of the air under pressure that is admitted into the casing interior via the tubular length of screen.

Another object of the invention is to provide a grain hulling apparatus of the last mentioned type and character in which the top wall of the deflecting drum is downwardly flared or inclined in order to direct into the restricted throat the hulled kernels that drop by gravity onto it.

A still further object of the invention is to provide a grain hulling apparatus which is generally of new and improved construction and involves a novel arrangement of parts and also a novel mode of operation.

Other objects of the invention and the various advantages and characteristics of the present hulling apparatus will be apparent from a consideration of the following detailed description.

The invention consists in the several novel features which are hereinafter set forth and are more particularly defined by claims at the conclusion hereof.

In the drawing which accompanies and forms a part of this specification or disclosure and in

which like numerals of reference denote corresponding parts throughout the several views:

Figure 1 is a view partly in vertical section and partly in side elevation of a grain hulling apparatus embodying the invention;

Figure 2 is a plan view; and

Figures 3 and 4 are respectively vertical sections of the upper and lower parts of the apparatus.

The apparatus which is shown in the drawing constitutes the preferred form or embodiment of the invention. It serves as a medium or instrumentality for hulling grain, such, for example, as oats, rye and barley, and as its principal parts comprises a casing 5, a duct 6, an anvil 7, a baffle ring 8 and a deflecting drum 9.

The casing 5 is vertically elongated and consists of a cylindrical side wall 10, a bottom wall 11 and a top wall 12. Such walls are preferably formed of sheet metal. The side wall 10 is circular in cross section. It preferably consists of upper and lower sections which are telescopically connected together in order to facilitate assembly of the apparatus as a whole. The bottom wall 11 is flat and downwardly inclined and is suitably secured to the lower margin of the lower section of the casing side wall 10. It is adapted, as hereinafter described, to have the hulled grain drop onto it and serves to direct or guide the hulled kernels to an outlet device 13 at its lower end. Such device includes a rotary damper and is like that which is disclosed in, and forms the subject matter of United States patent application Serial No. 122,406 filed by me on October 20, 1949. The top wall 12 of the casing 5 is frusto-conical and embodies at the outer margin thereof a depending annular flange 14 which fits around the upper margin of the upper section of the casing side wall and serves to connect the top wall of the casing to the side wall. The inner marginal portion of the top wall is provided with an upwardly extending annular flange 15 and this defines an outlet 16 for hull carrying air under pressure. A conduit 17 is connected at one end thereof to the annular flange 15 and serves to guide or direct the hull carrying air under pressure to any desired location.

The duct 6 extends vertically and is disposed for the most part in the casing 10. It is of sectional construction and consists of a tubular inlet member 18, a first intermediate tubular member 19, a second intermediate tubular member 20, and a tubular outlet member 21. The inlet member 18 extends vertically through an opening 22 in the central portion of the casing bottom wall 11 and is preferably formed of sheet metal. The central portion of the tubular inlet member 18 is welded, soldered or otherwise fixedly secured to the portion of the casing bottom wall that forms or defines the opening 22. The lower end of the tubular inlet member is adapted to receive a continuous stream of unhulled grain and air under pressure. It is contemplated that the lower end of the tubular inlet member will be connected by a conduit (not shown) to a motor driven rotary blower to which air and the grain to be hulled are fed. When the blower is in operation it produces a continuous stream of unhulled grain and air under pressure and such a stream is delivered to, and flows upwards in, the tubular inlet member 18. The first intermediate tubular member 19 extends vertically and has the lower end thereof connected telescopically to the upper end of the tubular inlet member 18. It is formed of wire screen to the end that it has numerous openings or holes therein for permitting a portion of the air under pressure to flow outwards into the lower portion of the interior of the casing 5. As described more in detail hereafter, the portion of the air which flows through the various openings in the tubular member 19 flows upwards through the casing and is discharged via the outlet 16 and the conduit 17. A sleeve valve 23 extends around, and is mounted for vertical sliding movement on, the tubular member 19 and serves to regulate or control the amount or proportion of air under pressure that flows outwards through the tubular member 19 into the lower portion of the casing interior. As shown in Figures 1 and 4, the upper end of the sleeve valve surrounds the lower end of the first intermediate member 19 and the lower end of the valve extends around the upper end of the tubular inlet member 18. If it is desired to decrease the amount of air under pressure that flows outwards into the bottom portion of the interior of the casing the sleeve valve is raised and if it is desired to increase the amount of such air the sleeve valve is slid downwards. The upper end of the sleeve valve is slit longitudinally and embodies two spaced apart outwardly extending ears 24 on its slit defining portions. A bolt 25 extends through holes in the ears and when tightened contracts the upper end of the sleeve valve around the tubular member in order that the valve as a whole remains in the position in which it is slid or adjusted. The second intermediate tubular member is disposed above the first intermediate tubular member 19 and, like the tubular inlet member 18, is formed of imperforate sheet metal. The lower end of the member 20 is telescopically connected to the upper end of the member 19 as shown in Figure 1. Three radially extending equidistantly spaced braces 26 extend between the upper end of the second intermediate tubular member 20 and the upper section of the casing side wall 10 and serve to center the duct 6 with respect to the casing and also hold it against lateral displacement. The outer ends of the braces are bent downwards to form legs 27 and these are riveted, welded or otherwise fixedly secured to the upper section of the casing side wall. The inner ends of the braces 26 are suitably connected to the upper end of the tubular member 20. The tubular outlet member 21 of the duct 6 is disposed above the second intermediate tubular member 20 and serves to direct the stream of unhulled grain and air under pressure upwards against the bottom surface of the anvil 7. The lower end of the member 21 extends around and is mounted slidably on the upper end of the second intermediate tubular member 20. It is slit longitudinally and has two spaced apart outwardly extending ears 28 on its slit defining portions. A nut equipped bolt 29 extends through holes in the central portions of the ears 28 and serves when tightened to contract the lower end of the tubular outlet member 21 around the upper end of the tubular member 20. When the nut on the bolt 29 is loosened the tubular outlet member 21 may be slid upwards or downwards in order to adjust the height of the space between the upper end of the member 21 and the bottom surface of the anvil 7. The tubular outlet member 21, like the inlet member 18 and the second intermediate member 20, is preferably formed of sheet metal. When the apparatus is in opera-

tion the stream of grain and air under pressure flows upwards through the duct 6.

The anvil 7 is in the form of a disc and is disposed a small distance above, and in centered relation with, the upper end of the tubular outlet member 20 of the duct. It is slightly greater in diameter than the tubular outlet member and has a truly flat bottom surface against which the grain emanating from the tubular outlet member 21 impinges or strikes. It is contemplated that the air under pressure which serves to carry the grain upwards will have such velocity that the grain is impacted against the anvil with such force to cause the hulls to crack and break loose from the kernels. The kernels, after being impacted against the bottom surface of the anvil, are deflected outwards and the hulls which are in suspension are entrained by the upwardly moving air under pressure and exhausted or discharged via the outlet 16 in the frusto-conical top wall 12 of the casing 5. Four radially extending equidistantly spaced upwardly and inwardly extending braces 30 serve to support the anvil 7 in fixed relation with the casing. The outer ends of the braces are riveted, welded or otherwise fixedly secured to the upper marginal portion of the upper section of the casing side wall 10 and the inner ends of the braces overlie, and are suitably secured to, the marginal portion of the anvil. As shown in Figure 1, the anvil is spaced a small distance beneath the outlet 16 in order that the hull carrying air under pressure may flow upwards into the outlet.

The baffle ring 8 is disposed between the anvil 7 and the upper end of the tubular outlet member 21 and is truly circular in cross section. It is imperforate, rests on the central portions of the braces 30 and serves to arrest the outwardly deflected hulled kernels of grain in order that they fall by gravity onto the flat downwardly inclined bottom wall of the casing. As shown in Figures 1 and 3, the diameter of the baffle ring is approximately twice the diameter of the anvil and the ring is of uniform diameter from end to end and is positioned concentrically with respect to the anvil. The upper end of the ring surrounds, but is spaced from, the anvil and the lower end of the ring surrounds, but is spaced from, the upper end of the tubular outlet member 21.

Also, as shown in Figures 1 and 3, the space between the bottom surface of the anvil and the upper end of the baffle ring is free or unobstructed in order that the air under pressure after impinging against and being deflected by the bottom surface of the anvil is permitted to flow directly upwards therethrough with the entrained hulls.

The deflecting drum 9 is located in the lower portion of the upper section of the casing side wall 10 and surrounds the second intermediate tubular member 20 of the duct 6. It is preferably formed of sheet metal and consists of a cylindrical side wall 31, an inverted frusto-conical bottom wall 32, and a frusto-conical top wall 33. The side wall 31 of the deflecting drum is concentrically positioned within the casing 5 and is spaced such a small distance from the casing side wall as to form a restricted annular throat 34 between the lower and upper portions of the casing interior. The principal purpose of the throat is to increase the velocity of the portion of the air under pressure that is introduced into the casing via the holes or openings in the first intermediate tubular member 19 of the duct. By increasing the velocity of such air the latter effectively entrains with it all free hulls which are not entrained by the portion of the air under pressure that emanates from the tubular outlet member 21 of the duct and consequently no hulls are permitted to flow into or accumulate in the lower portion of the casing interior. The inverted frusto-conical bottom wall 32 of the deflecting drum is imperforate and has the outer margin thereof suitably joined to the lower margin of the side wall 31. The inner marginal portion of the bottom wall 32 is welded or otherwise fixedly secured to the lower end of the second intermediate tubular member 20. The frusto-conical top wall 33 is imperforate and has its outer margin joined to the upper margin of the side wall 31. It serves to deflect the hulled kernels outwards towards the restricted annular throat 34 and has its inner marginal portion suitably connected to the upper end of the tubular member 20.

In use or operation of the apparatus a continuous stream of grain and air under pressure flows upwards through the duct 6, the grain component of the stream being illustrated in the drawing by double headed arrows and the air component of the stream being indicated by single headed arrows. Directly after the stream emerges from the upper end of the duct the kernels of grain strike forcibly against the bottom surface of the anvil 7 with the result that the hulls are broken or cracked and free themselves from the kernels. The hulls, due to their lightness, are entrained by the air under pressure and are carried by the latter to and upwards through the outlet 16. The hulled kernels of grain, after being deflected radially outwards by the bottom surface of the anvil, are arrested as the result of coming into contact with the inner periphery or surface of the baffle ring 8. After being arrested by the baffle ring the hulled kernels flow by gravity onto the frusto-conical top wall 33 of the deflecting drum 9 and are directed or guided by the latter outwards towards the restricted annular throat 34. After passing through the throat all hulled kernels fall by gravity onto the flat downwardly inclined bottom wall 11 of the casing 5. As heretofore pointed out, such bottom wall guides the hulled kernels to the outlet device 13 where they are discharged. The portion of the air under pressure that flows outwards via the holes or openings in the first intermediate tubular member 19 of the duct 6 flows upwards through the restricted throat 34 and then joins or merges with the portion of the air under pressure that is discharged from the upper end of the duct. In connection with upward passage of the portion of the air that is discharged into the casing through the tubular member 19 any free hulls which are in suspension in the upper portion of the casing are entrained and then forcibly ejected via the outlet 16 in the frusto-conical top wall 12 of the casing 5.

The herein described grain hulling apparatus effectively and efficiently fulfills its intended purpose and in connection with use or operation results in quick and ready removal of the hulls from the kernels of grain. It is essential simple in design and hence may be fabricated or constructed at a reasonable cost.

The invention is not to be understood as restricted to the details set forth since these may be modified within the scope of the appended

claims without departing from the spirit and scope of the invention.

Having thus described the invention what I claim as new and desire to secure by Letters Patent is:

1. A grain hulling apparatus comprising a vertically elongated casing consisting of a continuous side wall, a bottom wall, and a top wall with an outlet in the central portion thereof, a horizontally extending disc-like anvil positioned in the casing a small distance beneath the outlet and having a flat bottom surface, a vertical duct of circular cross section extending upwards through the bottom wall of the casing, having the lower end thereof connected to receive a stream of grain to be hulled and air under pressure and its upper end positioned concentrically with respect to the anvil but terminating a small distance beneath said bottom surface thereof, and adapted to guide the stream upwards so that the kernels of grain are impacted against the bottom surface of the anvil for hull releasing purposes and then deflected outwards by said bottom surface and the air under pressure impinges against and is outwardly deflected by the bottom surface of the anvil and then entrains the removed hulls and flows upwards with the latter through the outlet, and an imperforate horizontally extending baffle ring of materially greater diameter than the anvil and of uniform diameter from end to end positioned concentrically with respect to the anvil and the duct, extending completely around the space between the anvil and the upper end of said duct, having the upper end thereof surrounding but spaced from the anvil and its lower end surrounding but spaced from said upper end of the duct, and adapted to arrest the outwardly deflected hulled kernels so that they gravitate onto the casing bottom wall, the space between the bottom surface of the anvil and the upper end of the baffle ring being free or unobstructed in order that the air under pressure after impinging against and being deflected by said bottom surface is permitted to flow directly upwards therethrough with the entrained hulls.

2. A grain hulling apparatus comprising a vertically elongated casing consisting of a continuous side wall, a bottom wall, and a top wall with an outlet in the central portion thereof, a horizontally extending disc-like anvil positioned in the casing a small distance beneath the outlet and having a flat bottom surface a plurality of spaced apart, anvil supporting braces connected to, and extending inwards and upwards from, the casing side wall and having the inner ends thereof connected to the anvil, a vertical duct of circular cross section extending upwards through the bottom wall of the casing, having the lower end thereof connected to receive a stream of grain to be hulled and air under pressure and its upper end positioned concentrically with respect to the anvil but terminating a small distance beneath said bottom surface thereof, and adapted to guide the stream upwards so that the kernels of grain are impacted against the bottom surface of the anvil for hull releasing purposes and then deflected outwards by said surface and the air under pressure impinges against and is outwardly deflected by the bottom surface of the anvil and then entrains the removed hulls and flows upwards with the latter through the outlet, and an imperforate horizontally extending baffle ring of materially greater diameter than the anvil and of uniform diameter from end to end positioned concentrically with respect to the anvil and the duct, mounted on and supported by the central portions of the braces, extending completely around the space between the anvil and the upper end of said duct, having the upper end thereof surrounding, but spaced from, the anvil and the lower end surrounding, but spaced from, the upper end of the duct, and adapted to arrest the outwardly deflected hulled kernels so that they gravitate onto the casing bottom wall, the space between the bottom surface of the anvil and the upper end of the baffle ring being free or unobstructed in order that the air under pressure after impinging against and being deflected by said bottom surface is permitted to flow directly upwards therethrough with the entrained hulls.

3. A grain hulling apparatus comprising a vertically elongated casing consisting of a continuous side wall, a bottom wall, and a top wall with an outlet therein, an anvil positioned in the casing beneath the outlet, a vertical duct of sectional construction extending upwards through the bottom wall of the casing, having the lower end thereof connected to receive a stream of grain to be hulled and air under pressure and its upper end terminating a small distance above the bottom surface of the anvil, embodying above the casing bottom wall a perforated member whereby a portion of the air under pressure is caused to enter the casing interior for up-flow therein, and adapted to guide the stream upwards so that the kernels of grain are impacted against the bottom surface of the anvil for hull releasing purposes and then deflected outwards by said surface for gravitation onto the bottom wall of said casing and the remainder of the air under pressure impinges against, and is outwardly deflected by, the bottom surface of the anvil and then mixes with said portion and together with the latter entrains the released hulls and flows upwards through the outlet, and a deflecting drum mounted on, and extending around, the duct at a point above said perforated member and embodying a continuous side wall which is spaced inwards a small distance from the adjacent portion of the casing side wall and forms therewith a continuous restricted throat whereby the portion of air that is introduced into the casing interior via said perforated member is increased in velocity as it flows upwards in the casing prior to mixing with said remainder of air under pressure.

4. A grain hulling apparatus comprising a vertically elongated casing consisting of a cylindrical side wall, a downwardly inclined bottom wall, and a top wall with a central circular outlet, a horizontally extending disc-like anvil positioned in the casing a small distance beneath the outlet and having a flat bottom surface, a vertical duct of circular cross section and sectional construction extending upwards through the bottom wall of the casing, positioned concentrically with respect to the casing side wall, having the lower end thereof connected to receive a stream of grain to be hulled and air under pressure and its upper end terminating a small distance beneath the bottom surface of the anvil, embodying above the casing bottom wall a perforated member whereby a portion of the air under pressure is caused to enter the casing interior for up-flow therein, and adapted to guide the stream upwards so that the kernels of grain are impacted against the bottom surface of the anvil for hull releasing purposes and then deflected outwards by said surface for gravitation onto the bottom wall of the casing and the remainder of air under pressure im-

pinges against, and is outwardly deflected by, the bottom surface of the anvil and then mixes with said portion and together with the latter entrains the released hulls and flows upwards through the outlet, and a deflecting drum mounted on, and extending around, the duct at a point above the perforated member and embodying a cylindrical side wall which is disposed a small distance inwards of, and in concentric relation with, the adjacent portion of the casing side wall and forms therewith an annular restricted throat whereby the portion of air that is introduced into the casing interior via said perforated member is increased in velocity as it flows upwards in the casing prior to mixing with said remainder of air under pressure.

5. A grain hulling apparatus comprising a vertically elongated casing consisting of a cylindrical side wall, a downwardly inclined bottom wall, and a top wall with a central circular outlet, a horizontally extending disc-like anvil positioned in the casing a small distance beneath the outlet and having a flat bottom surface, a vertical duct of circular cross section and sectional construction extending upwards through the bottom wall of the casing, positioned concentrically with respect to the casing side wall, having the lower end thereof connected to receive a stream of grain to be hulled and air under pressure and its upper end terminating a small distance beneath the bottom surface of the anvil, embodying above the casing bottom wall a perforated member whereby a portion of the air under pressure is caused to enter the casing interior for up-flow therein and adapted to guide the stream upwards so that the kernels of grain are impacted against the bottom surface of the anvil for hull releasing purposes and then deflected outwards by said surface for gravitation onto the bottom wall of the casing and the remainder of air under pressure impinges against, and is outwardly deflected by, the bottom surface of the anvil and then mixes with said portion and together with the latter entrains the released hulls and flows upwards through the outlet, and a deflecting drum mounted on, and extending around, the duct at a point above the perforated member and embodying a cylindrical side wall which is disposed a small distance inwards of, and in concentric relation with, the adjacent portion of the casing side wall and forms therewith an annular restricted throat whereby the portion of air that is introduced into the casing interior via said perforated member is increased in velocity as it flows upwards in the casing prior to mixing with said remainder of air under pressure, said deflecting drum embodying in addition to the cylindrical side wall a frusto-conical top wall for deflecting the hulled kernels of grain into the throat in connection with gravitation thereof onto said casing bottom wall.

6. A grain hulling apparatus comprising a vertically elongated casing consisting of a continuous side wall, a bottom wall and a top wall with a central outlet therein, an anvil positioned in the casing a small distance beneath the outlet and having a substantially flat bottom surface, a vertical duct of sectional construction extending upwards through the central portion of the bottom wall of the casing, having the lower end thereof connected to receive a stream of grain to be hulled and air under pressure and its upper end terminating a small distance beneath the bottom surface of the anvil, embodying above the casing bottom wall a tubular screen-formed member whereby a portion of the air under pressure is caused to enter the casing interior for up-flow therein, and adapted to guide the stream upwards so that the kernels of grain are impacted against the bottom surface of the anvil for hull releasing purposes and then deflected outwards by said surface and the remainder of air under pressure impinges against, and is outwardly deflected by, the bottom surface of the anvil and then mixes with said portion and together with the latter entrains the released hulls and flows upwards through the outlet, a baffle ring of materially greater size than the anvil and the duct extending around the space between the anvil and the upper end of said duct and adapted to arrest the outwardly deflected hulled kernels so that they gravitate towards the casing bottom wall, and a hull deflecting drum mounted on, and extending around, the duct at a point above said member and embodying a continuous side wall which is spaced a small distance inwards of the adjacent portion of the casing side wall and forms therewith a continuous restricted throat whereby the portion of air under pressure that enters the casing interior via said member is increased in velocity prior to mixing with said remainder of air under pressure, said drum also embodying a downwardly and outwardly inclined top wall which is disposed beneath the baffle ring and serves to direct into the throat for downward passage therethrough the hulled kernels after the latter are arrested by said baffle ring.

7. A grain hulling apparatus comprising a vertically elongated casing containing a continuous side wall, a bottom wall connected to the bottom margin of the side wall, and a top wall connected to the top margin of the side wall and provided with an outlet in the central portion thereof, a fixedly mounted horizontal disc-like anvil positioned in the casing a small distance beneath the outlet and having a flat bottom surface, a vertical duct of circular cross section and sectional construction extending upwards through the bottom wall of the casing, having the lower end thereof connected to receive a stream of grain to be hulled and air under pressure and its upper end positioned concentrically with respect to the anvil but terminating a small distance beneath the bottom surface, embodying a tubular intermediate member and a tubular outlet member at the upper end of the intermediate member, and adapted to guide the stream upwards so that the kernels of grain are impacted against the bottom surface of the anvil for hull releasing purposes and then deflected outwards by said bottom surface and the air under pressure impinges against and is outwardly deflected by the bottom surface of the anvil and then entrains the removed hulls and flows upwards with the latter through the outlet, and an imperforate horizontally extending baffle ring of materially greater diameter than the anvil and of uniform diameter from end to end, positioned concentrically with respect to the anvil and the duct, extending completely around the space between the anvil and the upper end of the duct, having the upper end thereof surrounding but spaced from the anvil and its lower end surrounding but spaced from said upper end of the duct, and adapted to arrest the outwardly deflected hulled kernels so that they gravitate onto the casing bottom wall, the space between the bottom surface of the anvil and the upper end of the baffle ring being free or unobstructed in order that the air under pressure after impinging against and being outwardly deflected by said

bottom surface is permitted to flow directly upwards therethrough with the entrained hulls, said tubular outlet member of the duct having its lower end connected telescopically and slidably to the upper end of the intermediate member in order that it may be raised or lowered to a limited extent to vary the height of the space between it and the anvil and being provided at its lower end with releasable means for securing it in place.

8. A grain hulling apparatus comprising a vertically elongated casing consisting of a continuous side wall, a bottom wall and a top wall with an outlet in the central portion thereof, a horizontally extending disc-like anvil positioned in the casing a small distance beneath the outlet and having a flat bottom surface, a vertical duct of circular cross section and sectional construction, extending upwards through the bottom wall of the casing, having the lower end thereof connected to receive a stream of grain to be hulled and air under pressure and its upper end positioned concentrically with respect to the anvil but terminating a small distance beneath said bottom surface thereof, embodying above the casing bottom wall a tubular member with numerous small sized holes therethrough for permitting a portion of the air under pressure to enter the casing interior for up-flow therein, and adapted to guide the stream upwards so that the kernels of grain are impacted against the bottom surface of the anvil for hull releasing purposes and then deflected outwards by said bottom surface and the remainder of air under pressure impinges against and is outwardly deflected by the bottom surface of the anvil and then mixes with said portion and together with the latter entrains the removed hulls and flows upwards through the outlet, and an imperforate horizontally extending baffle ring of materially greater diameter than the anvil and of uniform diameter from

end to end, positioned concentrically with respect to the anvil and the duct, extending completely around the space between the anvil and the upper end of the duct, having the upper end thereof surrounding but spaced from the anvil and its lower end surrounding but spaced from said upper end of the duct, and adapted to arrest the outwardly deflected hulled kernels so that they gravitate onto the casing bottom wall, the space between the bottom surface of the anvil and the upper end of the baffle ring being free or unobstructed in order that said remainder of air under pressure after impinging against and being outwardly deflected by said bottom surface of the anvil and mixing with the aforementioned portion is permitted to flow directly upwards therethrough with the entrained hulls, said duct having mounted for vertical slidable movement thereon a sleeve valve for controlling the amount of air under pressure that flows through the casing interior via the holes in said member.

JOHN E. GILES.

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