(No Model.) 2 Sheets—Sheet 1.

E. L. CANTWELL.

MACHINE FOR HULLING RICE.

No. 483,899. Patented Oct. 4, 1892.

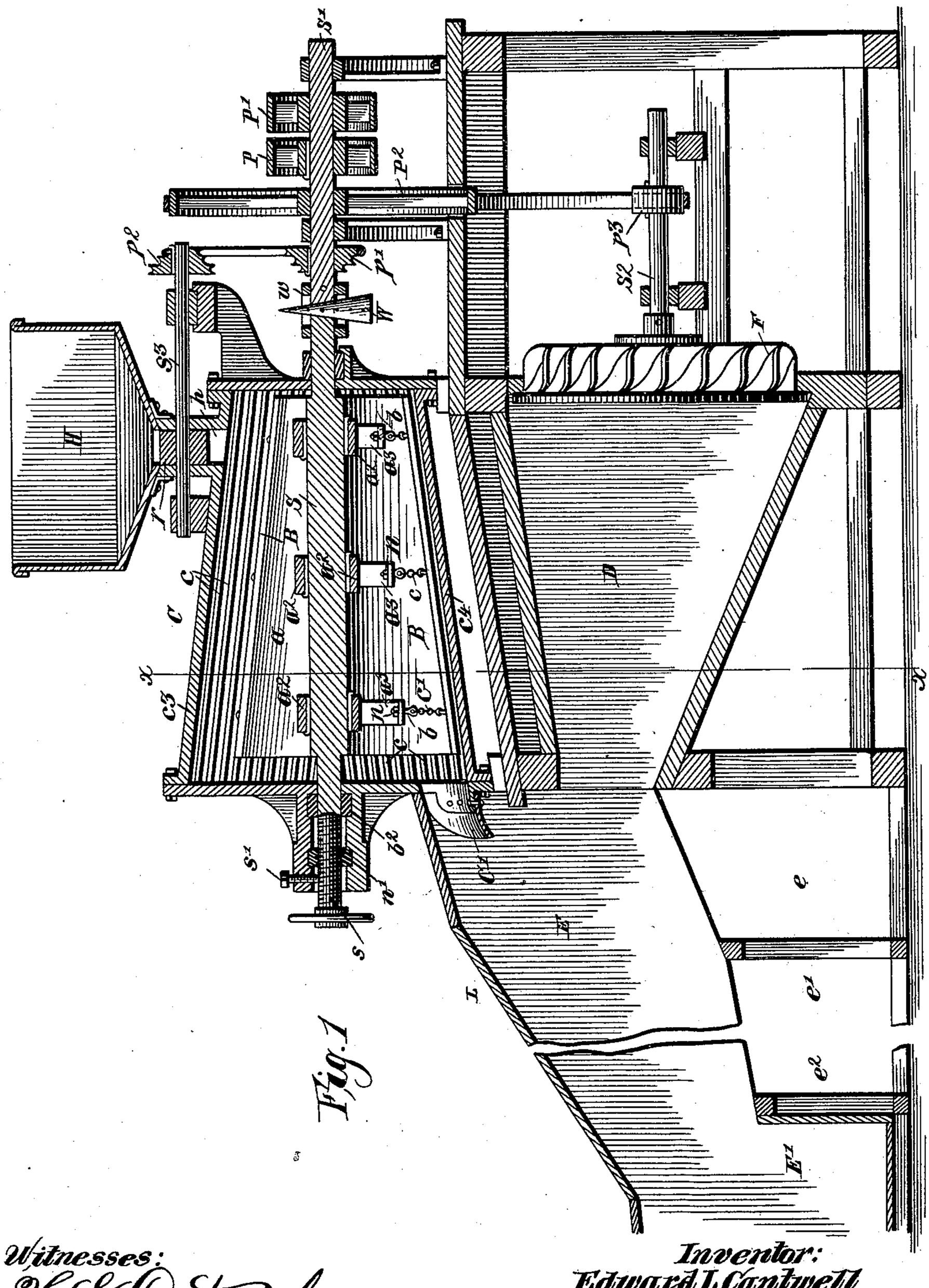

Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

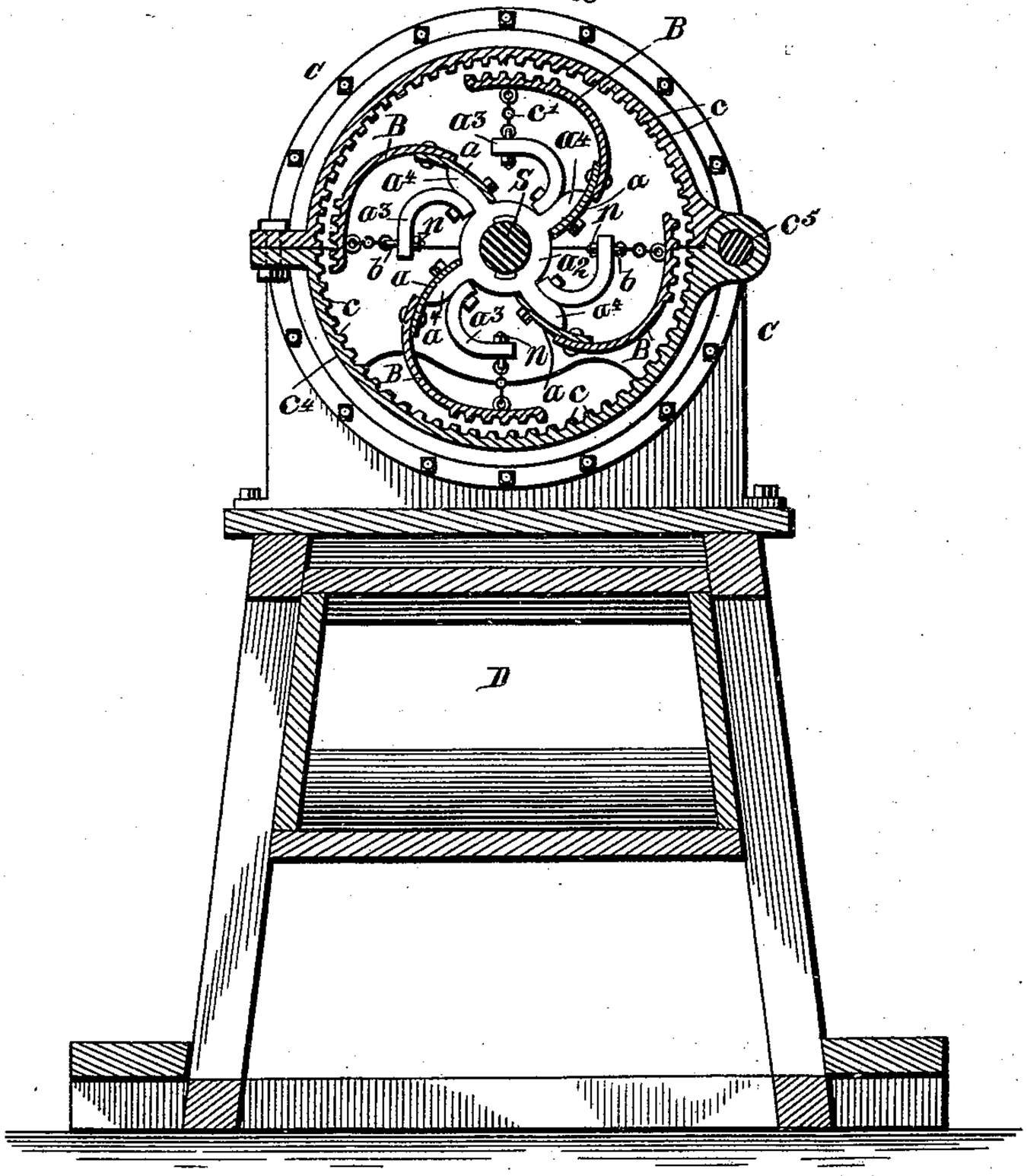
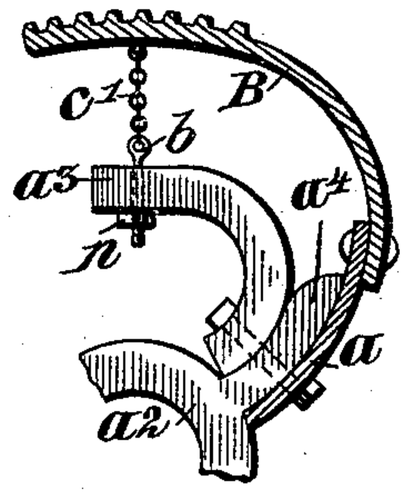


Fig. 3.



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UNITED STATES PATENT OFFICE.

EDWARD LENNON CANTWELL, OF CALCUTTA, INDIA.

MACHINE FOR HULLING RICE.

SPECIFICATION forming part of Letters Patent No. 483,899, dated October 4, 1892.

Application filed February 5, 1892. Serial No. 420,444. (No model.)

To all whom it may concern:

Be it known that I, EDWARD LENNON CANTWELL, a subject of the Queen of Great Britain, residing at Calcutta, in British India, have invented certain new and useful Improvements in Machines for Hulling Rice; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings and to letters of reference marked thereon, which form a part of this specification.

This invention relates to machines for hulling rice and coffee, applicable also to the cleansing and scouring of grain; and it consists in certain improvements in the construction of these machines and in novel combinations of parts, whereby the efficiency of said machine is materially enhanced, as will now be fully described, reference being had to the accompanying drawings, in which—

Figure 1 is a longitudinal sectional elevation of a machine embodying my invention. Fig. 2 is a section thereof on line $x\ x$ of Fig. 1, and Fig. 3 is a detail view.

The hulling devices consist, essentially, of a shell or casing C, that has the form of a truncated cone, whose greatest diameter or base constitutes the discharge end, at which point it is provided with a discharge-spout C′. The inner surface of the conical shell C is ribbed or corrugated longitudinally, the space between the ribs c and the width of the face thereof depending somewhat upon the size of the grain operated on. The huller-casing is constructed of two parts $c^3\ c^4$, hinged together at c^5, so as to afford ready access to the huller-blades for adjustment or other purposes.

The construction of the shell in the form of a truncated cone has many advantages over a cylindrical shell. In the first place the lower interior surface forms an inclined plane from feed to discharge end, so that the material moves automatically along said inclined plane from the feed to the discharge end, and, secondly, by increasing the cross-sectional area of the shell from the feed to the discharge end a continuously-increasing space is provided for the continuously-increasing bulk of grain and hulls as these progress from the feed to said discharge end.

In conjunction with the interior longitudinally ribbed or corrugated surface of the shell C, I employ co-operative revoluble hulling-blades B of nearly the same length as the interior of said shell. These blades B are elastic or yielding and for small grain may be made of thin sheet-steel, the blades being corrugated or ribbed to conform to the interiorly corrugated or ribbed shell C, and are secured to arms radiating from hubs mounted on a shaft S, that passes axially through the shell C. For such grain as rice or coffee the blades B are constructed of more rigid material and are secured to elastic arms a, constructed of spring-steel or equivalent material, said arms being bolted to the arms a^4, radiating from a hub or sleeve a^2, secured to shaft S, as shown.

In order that the blades B may be adjusted relatively to the inner corrugated surfaces of the huller C according to the grain operated upon, I provide a series of intermediate curved shorter arms a^3, bolted to the opposite side of the arms a^4, radiating from hubs a^2. The arms a^3 are preferably connected with the blades B by means of a chain c', one end of which is secured to the blade and the other to a bolt b, adjustable in the intermediate arm a^3 by means of a nut n, as more clearly shown in Fig. 3.

Although I prefer chains c' for adjusting the hulling-blades B as more convenient and on account of their flexibility, yet said blades may be connected with the arms a^3 by means of threaded rods having free motion in the said arms and suitable nuts.

The shaft S has endwise motion in its bearing in the shell C, thereby providing a further means of adjustment of the blades B relatively to the inner surfaces of the said shell, as it is obvious that if said shaft is moved more or less toward the feed end of the shell the blades are brought correspondingly nearer to the inner surfaces thereof. This adjustment of the shaft S is effected, first, by means of an adjusting-screw s, that is fixed in position after adjustment by a binding or set screw s', the adjusting-screw serving as a bearing for one end of the shaft S and working

in an interiorly-threaded gland or nut n', contained in the stuffing box or bearing b^2, and, secondly, by means of an adjusting-wedge W, interposed between the shaft S and the driving-shaft S'. The latter shaft carries a vertically-slotted coupling-sleeve w, by means of which and the adjusting-wedge W the shaft S is revolved by driving-shaft S', said shafts having a recess formed in their proximate ends for the reception of the wedge that passes through the slot in the coupling-sleeve w, said wedge being secured in position by means of a split pin passing through one of the holes therein and through corresponding holes in the sleeve w.

The driving-shaft S' carries a loose and fast belt-pulley P and P', respectively, and a pulley P^2, belted to a pulley P^3 on fan-shaft S^2 of a blower or fan F, that revolves in the end of greatest diameter or base of a blast-duct D, having the general form of a truncated cone of substantially the same length as the huller-shell C, and is located below the same, the smaller or discharge end of the blast-duct D being immediately below the discharge-spout C' of the huller-shell, so that as the grain and hulls are discharged from the latter they are exposed to the blast of air for the purpose of winnowing the hulls from the grain. At the left end of the machine are arranged several bins. For hulling rice three such bins will be found sufficient; but a greater or less number may be used if found necesssary to a proper separation of the material. These bins e e' e^2 are contained in an exhaust trunk or chest E, that is normally closed by a lid L, so as to gain access to the bins e, e', and e^2.

As the grain and hulls drop from the discharge-spout C' the hulls and dust are carried by the blast into the contracted portion E' of the trunk or chest E, while the broken grain, being of greater specific gravity, will drop into bin e^2, the small and large grain, owing to their increased specific gravity, dropping into bins e' and e, respectively. The arrangement of the bins relatively to the discharge-spout is according to the specific gravity of the material discharged from the spout—that is to say, the bin e, that receives the heaviest material or whole grain, is arranged immediately under the spout, the bin e', that receives the lighter small grain, is arranged next to bin e, and the bin e^2, that receives the still-lighter broken grain, comes next to bin e', the lightest material—such as the hulls and dust—being carried over the bins by the blast into the contracted portion E' of the trunk or chest E, the whole forming a gravity-separator.

In practice I employ an exhaust-fan in connection with the contracted portion E' of the trunk or chest E for the purpose of assisting the blast from fan F to carry the lighter materials over the bins into and out of duct E'. Any suitable exhaust-fan may be employed, and as the construction of these is well-known I have deemed it unnecessary to illustrate or describe the same.

The driving-shaft S' carries a step or cone pulley p', that is belted to a like pulley p^2 on the shaft s^3 of the feed jenny or roller r on said shaft within the throat h of the feed-hopper H, said throat h registering with a feed-aperture in the huller-casing C.

The grain in the several bins e e' e^2 can be removed in any desired or preferred manner, and this may be effected mechanically by a suitable conveyer; or the bottom of the bins may be constructed in the form of a hopper and provided with a suitable discharge-spout, to which the bags to receive the grain may be attached, a gate or valve being arranged within the throat of the said discharge-spout.

In the drawings I have shown four huller-blades B, in connection with the huller-casing C; but it will be understood that a greater or less number may be employed, as may be desired or found necessary.

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

In a grain-huller, the combination, with the imperforate conical shell C, having a longitudinally-corrugated interior face, a feed-aperture at the small end, and a discharge-aperture at the large end of said shell, of an endwise-adjustable shaft passing loosely through the center of the heads of the shell, said shaft having radial arms a^4, the supporting-arms a, secured to arms a^4, the elastic hulling-blades B, secured to arms a, and means for adjusting the blades relatively to the corrugated face of the shell, consisting of the curved arms a^3, also secured to arms a, the adjusting-bolts b in the outer end of said arms a^3, and the chains c', respectively, connected with the free end of the blades and the said bolts, substantially as and for the purpose set forth.

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Witnesses:
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HARRY CANTWELL.