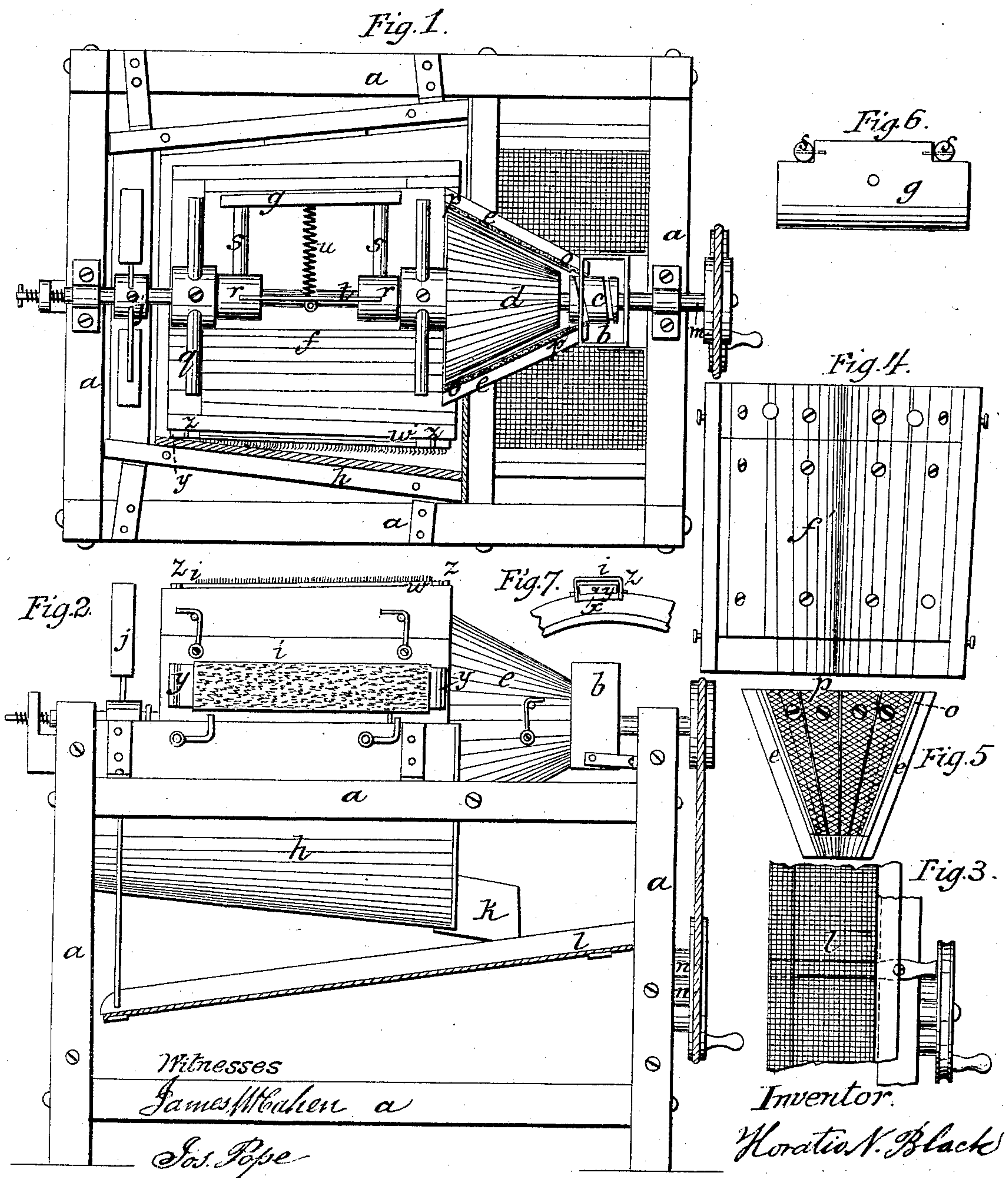


H. N. BLACK.

Rice Cleaner.

No. 30,653..

Patented Nov. 13, 1860.





# UNITED STATES PATENT OFFICE.

HORATIO N. BLACK, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO HIMSELF, H. KORN, JR., AND E. S. BODINE, OF SAME PLACE.

## MACHINE FOR HULLING AND CLEANING RICE.

Specification of Letters Patent No. 30,653, dated November 13, 1860.

*To all whom it may concern:*

Be it known that I, HORATIO N. BLACK, of the city of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements on Rice Hullers and Cleaners; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings and to the letters and marks thereon.

The drawings forming part of this specification represent a rice huller and cleaner in which the huller, chafer, polisher, and blower are upon or around the same shaft, Figure 1 being a top view thereof with the upper sections of the cylinders or chambers removed; Fig. 2 a like view with the upper section of the exterior cylinder only removed; Fig. 3 a view of the outer or upper end of the sifting table with the means for vibrating it; Fig. 4 a view of the interior or bed surfaces of the cylinders showing the detachable sections of those surfaces; Fig. 5 a view of the interior surface of the hollow cone of the huller; Fig. 6 a view of the rubber of the chafer cylinder; and Fig. 7 an end view of one of the polishing slabs and a part of the cylinder to which the slabs are attached. In each of these figures where like parts are shown like marks and letters are used to indicate the parts.

The bars or pieces making the frame or supports of the machine are lettered (*a*); the hopper (*b*); the feeder from the hopper to the huller (*c*); the solid cone, being the inner pulling surface (*d*); the hollow cone having the outer hulling surface (*e*); the chafer cylinder (*f*); the rubber (*g*); the polishing cylinder (*h*); the polishing slabs (*i*); the blower (*j*); the chute, conducting the rice from the polisher to the sifter (*k*); the main shaft (*m*); and the cams which actuate the arm of the sifter (*n*), the sifter being marked (*l*).

It is obvious that instead of the various parts of this machine being arranged in relation to each other as here shown, they being all upon or around one shaft, and the polisher being around the chafer—that they may be otherwise arranged, each being upon an independent shaft, or the one part of the machine being operated separately and apart from the other, and the same functions be performed by each part as when associated as here represented.

The operation of this machine as a whole is clearly illustrated by the drawings: the special action of each part, so far as may be necessary, will be stated in describing particularly each part.

The huller of this machine is made up of a solid cone (*d*) and a hollow cone (*e*). The solid cone is constructed of stone or of such material as is ordinarily used for such purpose. The hollow cone, however is peculiar and unusual. Its shell or cylinder can be made of any hard and durable substance which is suitable for the attachment of an elastic bed (*o*) interposed between the inner surface of the shell and the plates (*p*) which constitute the outer operating surface of the huller. This elastic bed for the plates may be india-rubber, felt, or any similar or equivalent material. The plates can be made of metal, or of such other substance as may be preferred and the surface of them roughened to the degree found suitable. If made of cast-iron the irregular surface can be formed in the casting. I prefer to make them of metal and of the shape shown by the drawings. They should be so connected with the shell that any one or the entire number of them can readily be detached for repairs or for any purpose; and the means for attaching them to the shell of the cylinder may also be the means for attaching the elastic bed thereto. By using these plates on the elastic bed with a solid interior surface, I find that the hull can be removed from the rice more perfectly and with less injury to the kernel or grain than by any other means.

The chafer is composed of the rubber (*g*) and the interior surface (*f'*) of the chafer cylinder. The chafer is attached to the main shaft (*m*) by arms (*q*) by which it is rotated. The surface (*f'*) may be metal plates smooth, or slightly roughened, or may be plates of any desirable material, and of such dimensions and so connected to the cylinder as to be easily detached. The rubber can be made of the same material as the plates and usually may be smooth, if the plates are rough, but may also be rough. As the function to be performed by the chafer is that of removing the skin which is immediately next to the kernel proper or edible part of the grain the surfaces of it should not be much roughened. The rubber is suspended loosely on the main shaft



and has such motion only as is derived from the rotation of the cylinder communicated to it through or by virtue of the packing of the grains between the surface of the rubber  
 5 and the interior surface of the cylinder. The means of suspending the rubber are the sleeves or collars (*r*), arms (*s*), bar or rod (*t*), spring (*u*) and screw (*v*). The bearings of the arms (*s*) for suspending the rubber I prefer to make adjustable. The screw  
 10 (*v*) is an adjusting screw to the spring (*u*) contracting or extending that spring and thus adjusting the body of the rubber as well as the power of the spring.

15 So far as I am aware the polishing or brushing cylinders of rice cleaners have generally been made of wire or perforated metal plates. This manner of making them, or the making them of metal, has the disadvantages of the liability to tarnish and dis-  
 20 colors the kernels and to abrade them, and hence to lessen the value of the rice. To avoid the evils of iron cylinders, and cylinders of sieves or perforated plates, it is  
 25 necessary to make them solid, as contradistinguished from wire gauze or perforated plates, and to make them of, or to coat them interiorly with non-corrosives such as porcelain or enamels. This coating on the  
 30 plates may be of one entire unbroken surface or may be in sections and detachable, as shown by Fig. 4 of the drawings. The brushes, or opposite polishing surface, and which in the machine here represented is  
 35 the outer surface, or attached to the outer surface of the chaffer cylinder, I make up of metal or hard wood slabs to which I affix sheep or goats hide, or any other suitable material. I place upon the cylinder at  
 40 such points as will give the desired number of brushes or polishers these slabs, so at-

taching them to the cylinder that centrifugal power as the cylinder is rotated will force them upon the kernels being polished. This manner of attaching the slabs and  
 45 brushes prevents the abrasion and breaking of the kernels, and the character of the brush insures a fine, smooth polish to the rice.

The brushes can be attached to the slabs  
 50 by cement, or in any convenient way. My manner of attaching the slabs to the cylinder is shown by Figs. 1, 2, and 7, of the drawings. Both ends of the slabs have a  
 pin (*x*) which acts as a pivot to suspend the  
 55 slab in a block (*y*), and block (*y*) is embraced by clamp rod (*z*), the sides of the clamp fitting in recesses or grooves in the  
 ends of the block, the fitting being loose so  
 as to allow play, and the clamp being suf-  
 60 ficiently large and wide to admit of the movements of the slab by the motion heretofore named.

What I claim as my invention and desire to secure by Letters Patent is— 65

1. The huller made up of plates of metal or other suitable material, the plates being detachable and having an elastic bed, as the exterior hulling surface, and the solid cone for the inner hulling surface, as herein set  
 70 forth.

2. The combination of a rubber constructed and operated as described with the cylinder for chafing the grain as set forth.

3. The brushes or polishers constructed  
 75 and operated as described in combination with a cylinder of solid surface for polishing the grain as set forth.

HORATIO N. BLACK.

Witnesses:

JAMES McCahen,  
 Jos. Pope.