C. ROBERTS.

Grinding Mill.

No. 15,255. Patented July 1, 1856.

Fig. 1

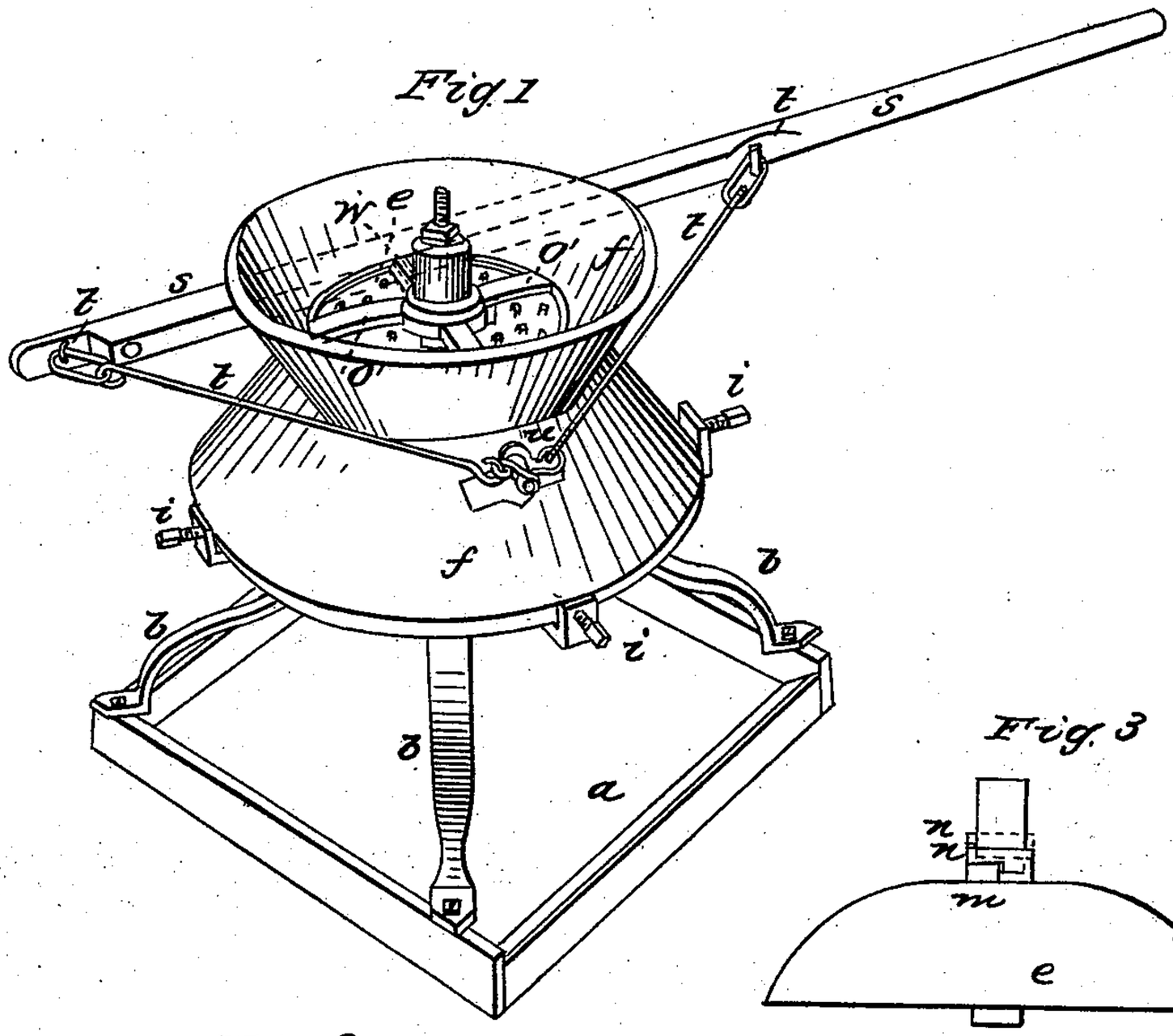


Fig. 3

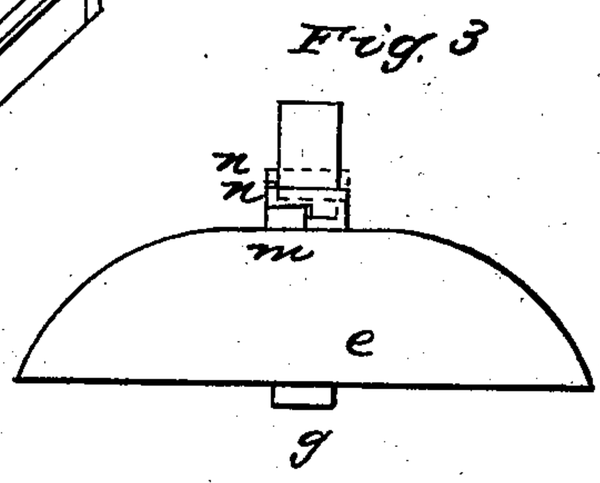
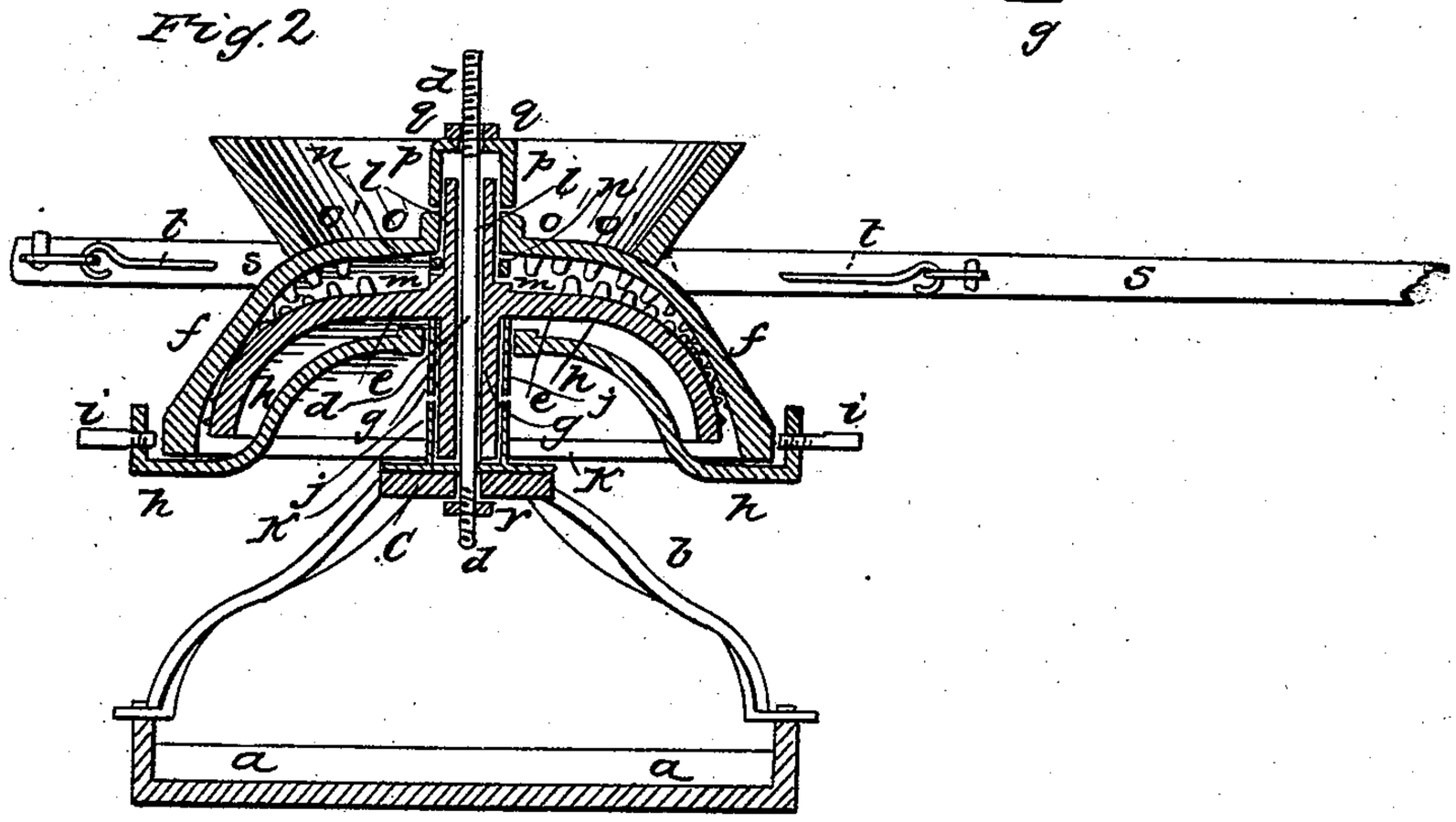


Fig. 2



UNITED STATES PATENT OFFICE.

CYRUS ROBERTS, OF BELLEVILLE, ILLINOIS.

CORN AND COB MILL.

Specification of Letters Patent No. 15,255, dated July 1, 1856.

To all whom it may concern:

Be it known that I, CYRUS ROBERTS, of Belleville, in the county of St. Clair and State of Illinois, have invented a new and useful Improvement in Machines for Grinding Corn and Cobs, &c., of which the following is a full, clear, and exact description, reference being had to the accompanying drawing thereof, in which—

Figure 1 represents a view in perspective of a machine embracing my improvements; Fig. 2 a vertical section of the same, taken centrally through Fig. 1; and Fig. 3 a side elevation of the ball, spiral ratchet, and spiral cam, detached.

My invention relates to that class of mills in which the power is applied directly to the hull or concave, to effect the grinding, as contradistinguished from those in which the conical ball is made to revolve, for the same purpose, motion being communicated to the latter by means of a belt and pulley, or other equivalent device from some prime motor. The first of these classes has been found defective in several points, to remedy which is the object of my invention. The chief of these defects consists in the want of proper supports or braces, to prevent the lateral vibrations of the hull or concave produced by the irregular and uneven draft of the horses, which has a tendency to bend or twist the spindle or shaft upon which the hull and ball are mounted, thus destroying their concentricity, upon the preservation of which the efficiency of the mill depends.

My improvement consists in mounting a revolving spider on a neck or journal formed on, and projecting downward from the center of the concave side of the conical ball, this spider having a series of arms radiating outward from its collar, and projecting upward at their end for the reception of the hull or shell, which is firmly secured between them, by means of adjusting screws or other device. By mounting the spider on the neck of the nut in this manner, and the radial arms being made equal in length, it must be apparent that the hull when once properly secured and adjusted between these arms will preserve the same relative position to the ball, no matter what its vibrations might be.

On the trough (*a*) which receives the meal or feed as it is ground, are erected four standards (*b*), all converging toward a common center, having a disk (*c*) secured or cast on their upper ends, the whole forming the frame upon which the operative parts of the mill are supported. Through the center of this plate or disk is a mortise for the reception of the shaft or spindle (*d*), upon which the stationary ball (*e*) is mounted, this ball or grinding nut being made slightly conical, to conform to the shape of the concavity of the hull or shell (*f*), the latter having a series of ridges or cogs on its inner or concave side, while the former has corresponding ones on its convex side, similar to those used in other mills for the same purpose.

At the apex of the concave side of the ball (*e*), and mounted on the shaft (*d*), is formed the tubular neck or journal (*g*), concentric with the rim of the ball (*e*), and slightly exceeding in length the depth of the concavity, (as seen at Fig. 3), upon which is mounted the revolving spider (*h*), between the arms of which, the under side of the hull or concave (*f*) is adjusted and secured concentrically with the ball or nut (*e*), by adjusting screws (*i*), or their equivalent. But as great difficulty is experienced in casting the neck or journal (*g*) concentric with the rim of the ball (*e*), I pass a collar (*j*) loosely over it, and adjust the collar concentrically with the rim of the ball, by means of a gage, and then pour lead or solder into the open space between the collar and the neck. The spider (*h*) being mounted upon this collar, and the hull or concave (*f*) properly secured and adjusted between its arms, it must be apparent that any vibration given to the one will be communicated to the other, without altering their relative position to each other in the least, a fact of great practical importance to machines of this class, as it prevents choking and consequent damage to the machine. Notwithstanding that this great evil is remedied as above stated, it is still very desirable to prevent the spindle or shaft (*d*) from being twisted or bent, by any sudden wrench of the machine, and which it is exceedingly liable to be, at that point where it passes through the aperture of the disk (*c*). This I effect by mounting upon the lower end of the latter a flanged collar or cup (*k*), the flange resting upon and being coextensive with the disk (*c*), thus forming a sufficient bearing for the whole operative parts of the mill, and preventing any twisting or bending of the shaft.

On the upper side of the ball (*e*) is formed another tubular neck or journal (*l*), and spiral ratchet (*m*), on the former of which is mounted the spiral cam (*n*) and resting on the latter, forming a bearing for the hull or shell (*f*), which is mounted upon the neck (*l*) by means of the collar (*o*),and arms (*o'*) secured to the inside of the hull or shell; the whole being kept in place by the cupped washer (*p*), and the latter secured by the locknut (*q*).

When it is desired to grind coarse, (supposing in this instance the mill to be adjusted to grind fine,) the locknut (*q*), and washer (*p*) are first unscrewed, the shell (*f*) slightly raised, to permit the spiral cam to be turned on the ratchet (*m*), to the desired height, when the tooth on the underside of the former, will take into a notch of the latter, and keep it in this position, as shown in red lines in Fig. 3, the hull is then allowed to rest again upon the cam (*n*) and the cupped washer (*p*) and lock nut (*q*) secured as before, the adjustment being then complete; the collar of the spider (*h*) being free to slide up and down the neck (*g*) to permit of the adjustment. And it may here be observed, that the lower end of the shaft (*d*) is made of less diameter than the upper, the channel of the lower neck (*g*) and underside of ball (*e*) being also made less than that of the upper neck or journal (*l*) to correspond therewith, thus forming a shoulder and bearing, by which the ball (*e*) is firmly secured to the disk (*c*) by means of the nut (*r*) on the lower end of the shaft, keeping it stationary while the operation of grinding is being carried on by the rotation of the hull (*f*), motion being communicated to the latter, through the lever (*s*), which is mounted upon a pivot (*w*), (shown in red lines Fig. 1), and free to play thereon, the lever being kept in position, and braced in front and rear by link rods (*b*), attached at one end to the lever by hooks (*t'*) and at the other to the pin (*u*), on the opposite side of the hull. By pivoting and bracing the lever in this manner, it is free to accommodate itself to any inequalities of the ground without jarring or wrenching the machine, and by having a series of holes and hooks, the leverage and speed can be increased and lessened as may be desired. When pivoted on the last hole the rear link-rod is brought forward and hooked in front with the other, this adjustment giving the maximum power and least speed, this peculiar attachment of the lever rendering it easy of removal for the purposes of transportation or otherwise, the same remark being also applicable to the other parts of the mill from the fact of their being all secured and mounted upon a single shaft, a fact of considerable importance, rendering them easy to be taken apart and put together again.

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

The method of rendering the grinding surface of the hull or concave (*f*) concentric with that of the ball (*e*), and of preserving this concentricity, by mounting the revolving spider (*h*), between the arms of which the rim of the hull is secured and adjusted, upon a neck or journal (*g*) formed on the underside of the ball (*e*) in the manner and for the purposes substantially as described.

In testimony whereof I have hereunto subscribed my name.

CYRUS ROBERTS.

Witnesses:
I. H. PHILLIPS,
H. B. TODD.