(No Model.)

H. A. ADAMS.

2 Sheets—Sheet 1.

CORN SHELLER.

No. 386,371. Patented July 17, 1888.

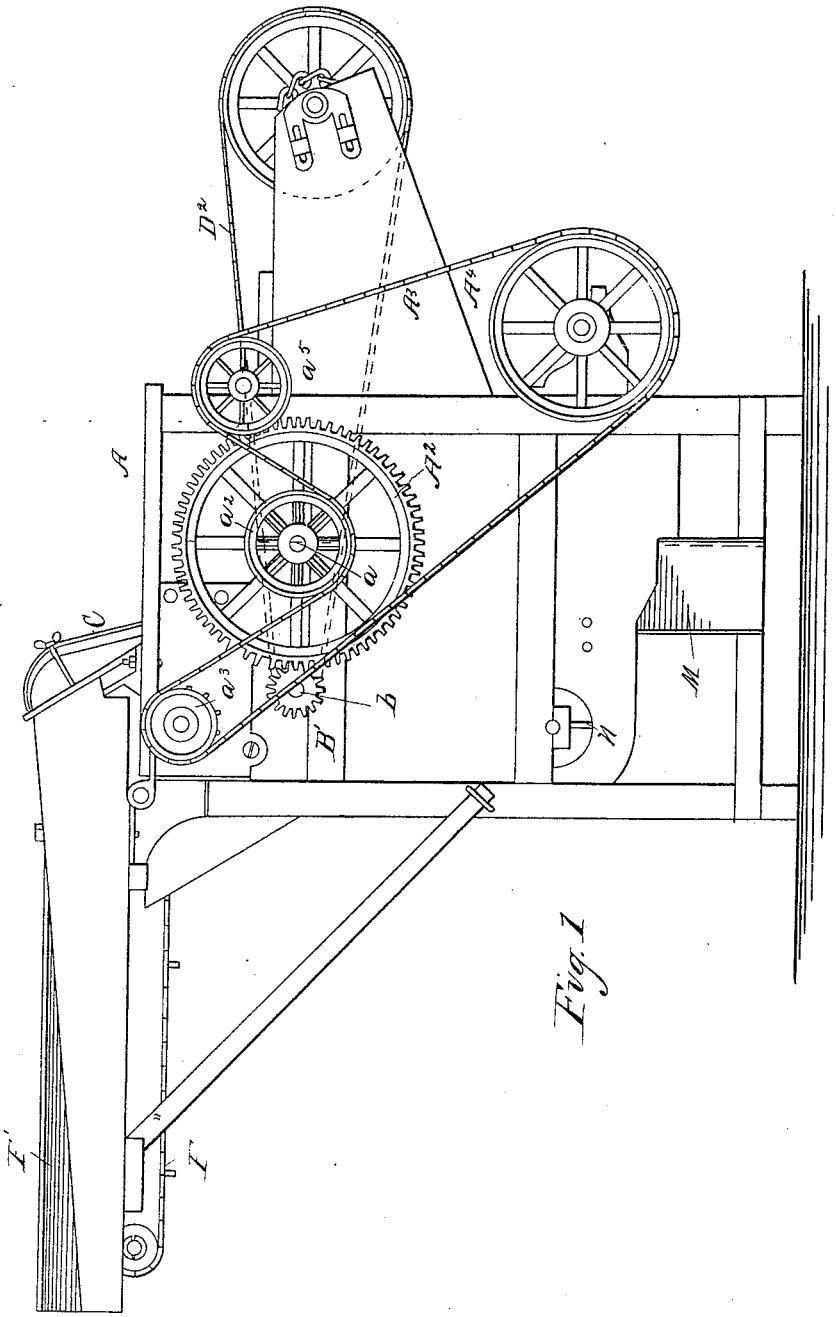

Fig. 1

Witnesses.
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(No Model.)

2 Sheets—Sheet 2.

H. A. ADAMS.

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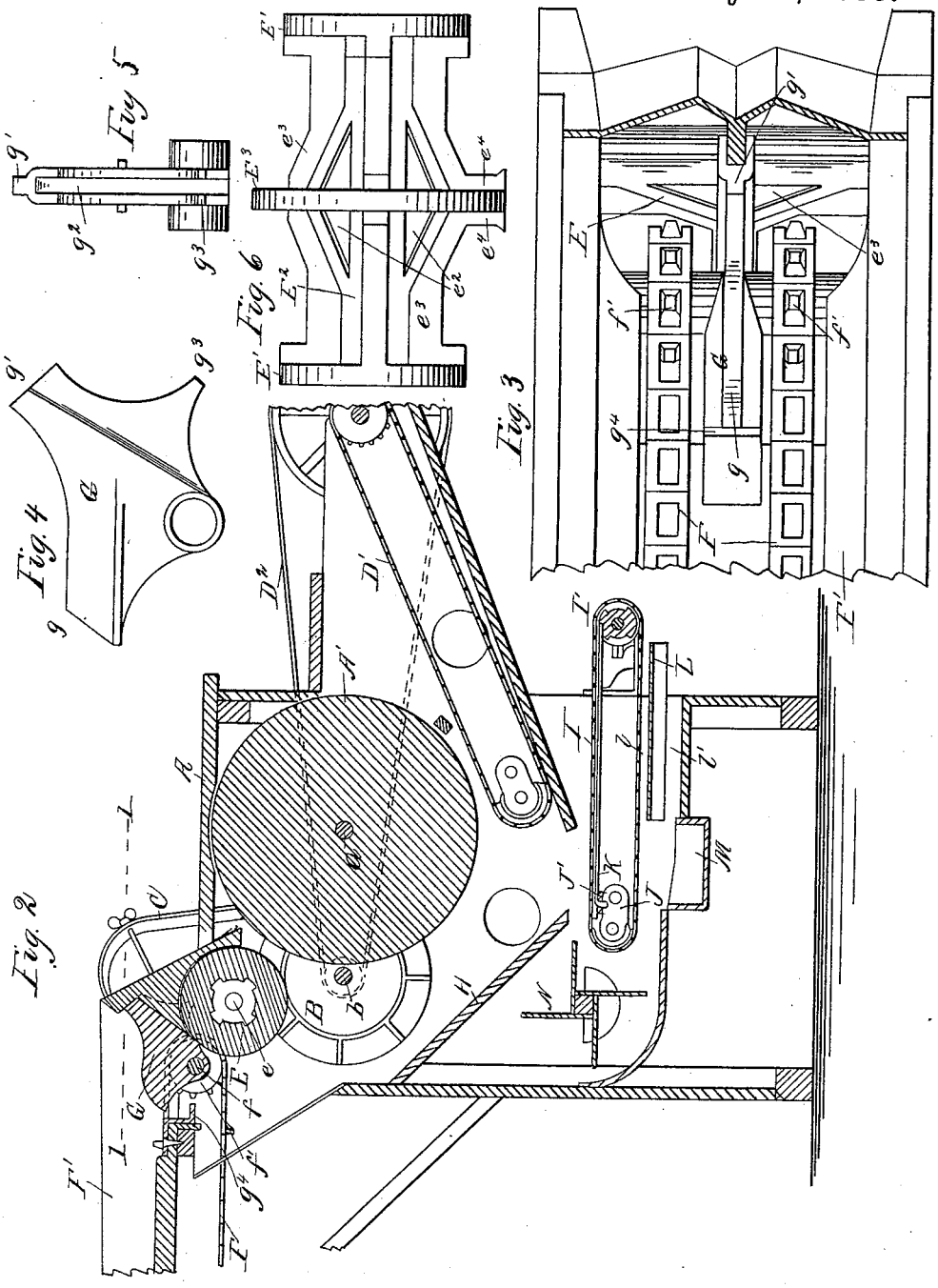

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UNITED STATES PATENT OFFICE.

HENRY A. ADAMS, OF SANDWICH, ILLINOIS.

CORN-SHELLER.

SPECIFICATION forming part of Letters Patent No. 386,371, dated July 17, 1888.

Application filed January 3, 1888. Serial No. 259,738. (No model.)

To all whom it may concern:

Be it known that I, HENRY A. ADAMS, a citizen of the United States, residing at Sandwich, in the county of De Kalb and State of Illinois, have invented a certain new and useful Improvement in Corn-Shellers, which is fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a side elevation of a corn-sheller embodying my invention; Fig. 2, a vertical section of the same, taken lengthwise of the machine; Fig. 3, a detail plan section taken on the line 1 1 of Fig. 2; Fig. 4, a detail side elevation of the vibrating breaker-arm detached; Fig. 5, a rear elevation of the same, and Fig. 6 a detail elevation of the force-feed beater detached. Figs. 1 and 2 of the drawings are on the same scale. The remaining figures are on the same relative scale, but enlarged as compared with Figs. 1 and 2.

My invention relates to corn-shellers, and to that class in which the ears of corn are fed into the machine and pass through the shelling devices endwise. I have heretofore applied an improvement to the feeding mechanism in this type of machine, consisting of a force-feeding device, for which Letters Patent No. 132,128 were granted to me October 15, 1872.

My present improvement has for its object to provide means for preventing the formation of what is known as a "bridge" at the mouth of the sheller, which is sometimes occasioned by the clogging of ears of corn in front of the beater-shaft at the entrance to the throat of the machine.

The invention also has for its object the improvement of the feeding devices of the machine in other particulars, as will be hereinafter more fully indicated.

I will now describe the construction and operation of a machine in which I have practically carried out my invention in one way, and will then point out definitely in claims the special improvements which I believe to be new and wish to protect by Letters Patent.

In the drawings, A represents the main frame of the machine, which contains the shelling devices and supports the other devices belonging to the sheller, and may be of any construction suitable for this purpose. The shelling devices may be of any approved construction. As shown in the drawings, they consist of a straight runner, A′, mounted on the main shaft *a*, and bevel-runners B, mounted on the shaft *b*, with the usual rag-irons, C—a type of shelling devices well known and in general use. The cobs are delivered from the shelling devices to an elevator, D′, by means of which they are discharged from the machine.

A force-feed device or beater, E, is arranged in the throat of the machine, the purpose of which is to drive the ears of corn forward into the shelling devices, being substantially the same in operation as the beater-shaft described and shown in my prior patent mentioned above. This device as here shown, however, contains certain features of novelty. It consists of two end disks, E′, by means of which it is mounted on a shaft, *e*, and a central or body portion, E^2, the diameter of which is enlarged midway of its length, so that this body bulges outward at the middle and tapers therefrom outward in each direction toward the respective disks E′. This body portion is made hollow and cut away, as shown at e^2, to give combined lightness and strength. A central circular flange or ring, E^3, is mounted on the body E^2, and radial ribs e^3 run from this central flange or ring to the side disks, E′, where they are projected outward flush with the periphery of the latter. These ribs form the beaters or projections, which, as the shaft to which they are attached is rapidly revolved, strike the ears of corn and drive them forward into engagement with the shelling devices, the impetus thus given the ears being sufficient to overcome any hesitancy of the ears in the throat of the machine or in engaging with the shelling mechanism. Feed-chains F, of any suitable construction, are employed to bring the corn to the throat of the machine. These chains are arranged at the bottom of a hopper or feed-trough, F′, in the usual manner. This trough, instead of being inclined, as usual, I arrange in a horizontal position, the inner end being connected to the top of the main frame and extending straight outward therefrom. The feed-chains carry the ears of corn forward to the beater E, which, as shown in the drawings, is arranged slightly below the head roller of said chains, so that the ears of corn are inclined downward somewhat as they are delivered. This arrangement, however, is a mat-

ter of choice. Both the beater and the feed-chains are driven positively, as will be described further on.

In this class of machines it has been found heretofore that, during the operation of shelling, the ears of corn will sometimes clog at the point where they are delivered from the feed-chains to the beater, forming what is known as a "bridge" just in front of the beater, which then prevents the ears from entering the machine. This is occasioned by ears getting crosswise as they are brought to the throat of the machine, or by misshapen ears or those which tend to displace others and come to the throat in improper position to enter it. It will be understood, of course, that in these power corn-shellers the feed is crowded and the trough usually kept full, so that more than one layer of ears go forward with the chains in ordinary use. It has therefore been necessary frequently to have an attendant watch this point of the machine, in order to release ears by breaking the bridge when formed and permit the stream of corn to go forward into the machine. In order to overcome this difficulty and to dispense with this attendant, I have devised means for breaking this bridge, which are operated automatically while the machine is running. It consists of a vibrating arm, G, which is arranged, as shown in the drawings, between the feed-chains F, and is mounted, in the present instance, on the shaft f of the sprocket-wheels f', by means of which the feed-chains are driven. The arm is mounted loosely on the shaft, so as to turn upon it freely, and, as shown in detail, Figs. 4 and 5, consists of a portion, g, extending outward between the chains, and a portion, g', extending upward and inward toward the throat of the machine. This latter portion is slotted or bifurcated at its rear edge, as shown at g^2, so as to embrace the circular flange or ring E^2 of the beater E, and is also provided with fingers g^3, arranged on each side of said flange and in the path of projections e^4, which extend outward from the central portion of said beater. It is obvious, then, that as the beater is rotated these projections e^4, coming in contact with the fingers g^3, will vibrate the arm G upon its support, throwing it positively and forcibly outward. When at rest in its normal position, this arm G forms a simple partition or division between the shelling-holes of the machine at the entrance to the throat; but when the projections on the beater come in contact with the arm it is thrown quickly outward, as described, and if a bridge is formed, or there is any tendency to form such an obstruction to the inrunning corn at this point, it will be effectually broken up by this movement, and the ears will be pushed back and turned to one side in proper position to enter the throat of the machine. In the drawings I have shown but one set of projections e^4 on the beater, so that the bridge-breaker will be vibrated only once with each revolution of the beater; but, if desired, more than one set may be applied to the beater, so as to vibrate the breaker more frequently. I have found in practice, however, that one vibration with each revolution of the beater is sufficient for all ordinary conditions of work. A stop, g^4, attached to the bottom of the trough, limits the outward vibration of the arm G, as the front portion, g, of the latter will come in contact with this stop as the arm is turned backward. The stop is arranged so as to give the arm such throw as may be desired, and the latter, upon release from engagement with the projections on the beater, will turn forward to its normal position again by its own weight and the effect of the inrunning ears of corn. The beater revolves rapidly, so that the vibrations of this breaking-arm will be so frequent as to effectually prevent the formation of a permanent bridge at the throat of the machine, the corn at this point being constantly loosened by the operation of the arm. I am thus enabled to dispense entirely with the attendant, mentioned above as necessary to prevent clogging from bridges in ordinary machines.

In the usual construction of machines of this class the feed hopper or trough has been placed upon an incline. This has been done for the purpose of retarding somewhat the approach of ears to the throat of the machine and thereby obviating to some extent the formation of bridges. With this vibrating arm which I have applied I am enabled to arrange the hopper in a horizontal position, thereby saving the lifting work of the feed-chains and obtaining their full and complete capacity for feeding the ears of corn to the machine. In fact, the feed may be crowded to the fullest extent and to a degree considerably in advance of what can be obtained with an inclined hopper.

There are other devices belonging to the machine designed to effect the separation of the corn from the refuse matter, to which I will only briefly allude, as they are not a part of my present invention. The shelled corn mixed with the refuse matter passes from the shelling devices to a separator, being guided thereto by an incline, H. The separator consists of an endless chain, I, composed of transverse rods of well-known construction. It passes over a sprocket-drum, I', at the rear of the machine, and at its inner end over curved guide-plates J, provided with flanges j to retain the chains in position. These guide-plates are attached to the main frame and are connected by cross-bars J'. The chain I also passes over a series of vibrating rods, K, arranged under its upper portion. The rods K are attached at their inner ends to the cross-bar J', and at their outer ends rest upon the drum I', which has cams by which the rods are vibrated. Entirely below the chain I is a table, L, reaching from the outer end of the chain to the discharge-spout M. A clear space, l, is left between this table and the chain, and a similar space, l', between this table and the bottom casing of the machine. A blast-fan,

N, is arranged in front of the separator and sends air along the latter, both above and below it, through the spaces described. Any suitable devices for driving the several parts of the machine may be employed. In the drawings, these devices consist of a main shaft, *a*, upon which is fastened a gear-wheel, A^2, arranged to engage with a pinion, B′, on the shaft *b*. A sprocket-wheel, a^2, mounted on the shaft *a*, serves to drive the sprocket-chain A^3, which passes over sprocket-wheels a^3 and a^4, the former on the beater-shaft *e* and the latter on the shaft of the sprocket-drum I′. An idler, a^5, is employed to properly guide the chain A^3. The cob-elevator D′ is driven by means of a sprocket-chain, D^2, from a sprocket-wheel on the bevel runner-shaft, *b*, and the feed-chains are driven by a train of gear-wheels from the beater-shaft. It will be seen that with this driving mechanism a positive movement will be given to all of the operating devices of the machine.

The general operation of the machine will be understood from the preceding description, and the operation of the particular devices to which my present invention relates has been described in connection with the description of the construction and arrangement of said parts. Further particular description of the operation is therefore not necessary.

The separating devices, although shown and briefly described herein, form no part of my present invention, but constitute the subject-matter of another application for Letters Patent filed July 9, 1887, Serial No. 243,860.

I do not wish to be understood as limiting the present improvement to the particular devices which are herein shown and described, for it is obvious that changes may be made without departing from the main feature of my invention, which is a vibrating or movable piece at the entrance into the throat of the machine, actuated by suitable mechanism at intervals to loosen up the ears of corn and prevent clogging of the feed at this point.

It will be understood of course that the improvement is applicable to a machine with any number of shelling-holes.

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

1. In a corn-sheller having two or more shelling-holes, the shelling devices, in combination with the feeding devices, the stationary partitions between the shelling-holes, a movable piece mounted in advance of the partitions, and mechanism for moving said piece back and forth in the line of the feed, substantially as and for the purposes specified.

2. In a corn-sheller having two or more shelling-holes, the shelling devices, in combination with the feeding devices, the stationary partitions between the shelling-holes, and a vibrating arm arranged in line with the feed and immediately in front of each partition, substantially as and for the purposes specified.

3. In a corn-sheller having two or more shelling-holes, the shelling devices, in combination with a force-feed beater arranged in advance of the shelling devices, a vibrating bridge-breaking arm arranged in advance of the beater, and feeding devices, substantially as and for the purposes specified.

4. In a corn-sheller having two or more shelling-holes, the shelling devices, in combination with the feed-trough arranged in a horizontal position, the feed-chains running in said trough, and a vibrating bridge-breaker arranged between the feeding devices and the shelling devices, substantially as and for the purposes specified.

5. In a corn-sheller, the hopper and feed-chains F, in combination with the shaft *f*, provided with sprocket-wheels *f′* for the feed-chains, the vibrating arm G, mounted on said shaft *f*, and the beater E, provided with projections engaging with said arm to vibrate it, substantially as and for the purposes specified.

6. In a corn-sheller, the feed-trough and feed-chains running therein, in combination with a vibrating arm, G, mounted and arranged to vibrate in line with the feed, and a revolving shaft provided with projections arranged to engage said arm at suitable intervals and throw it outward contrary to the direction of the feed, substantially as and for the purposes specified.

7. In a corn-sheller, the feed-trough and feed-chains running therein, in combination with the vibrating arm G, and a shaft having projections for engaging said arm and turning it outward at suitable intervals, and a stop for arresting this outward movement of the arm, substantially as and for the purposes specified.

8. In a corn-sheller, the vibrating arm G, provided with the front and rear extensions *g* g^3, the revolving beater E, provided with lugs or projections e^4, and the stop g^4 on the feed-hopper, substantially as and for the purposes specified.

HENRY A. ADAMS.

Witnesses:
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C. C. JONES.