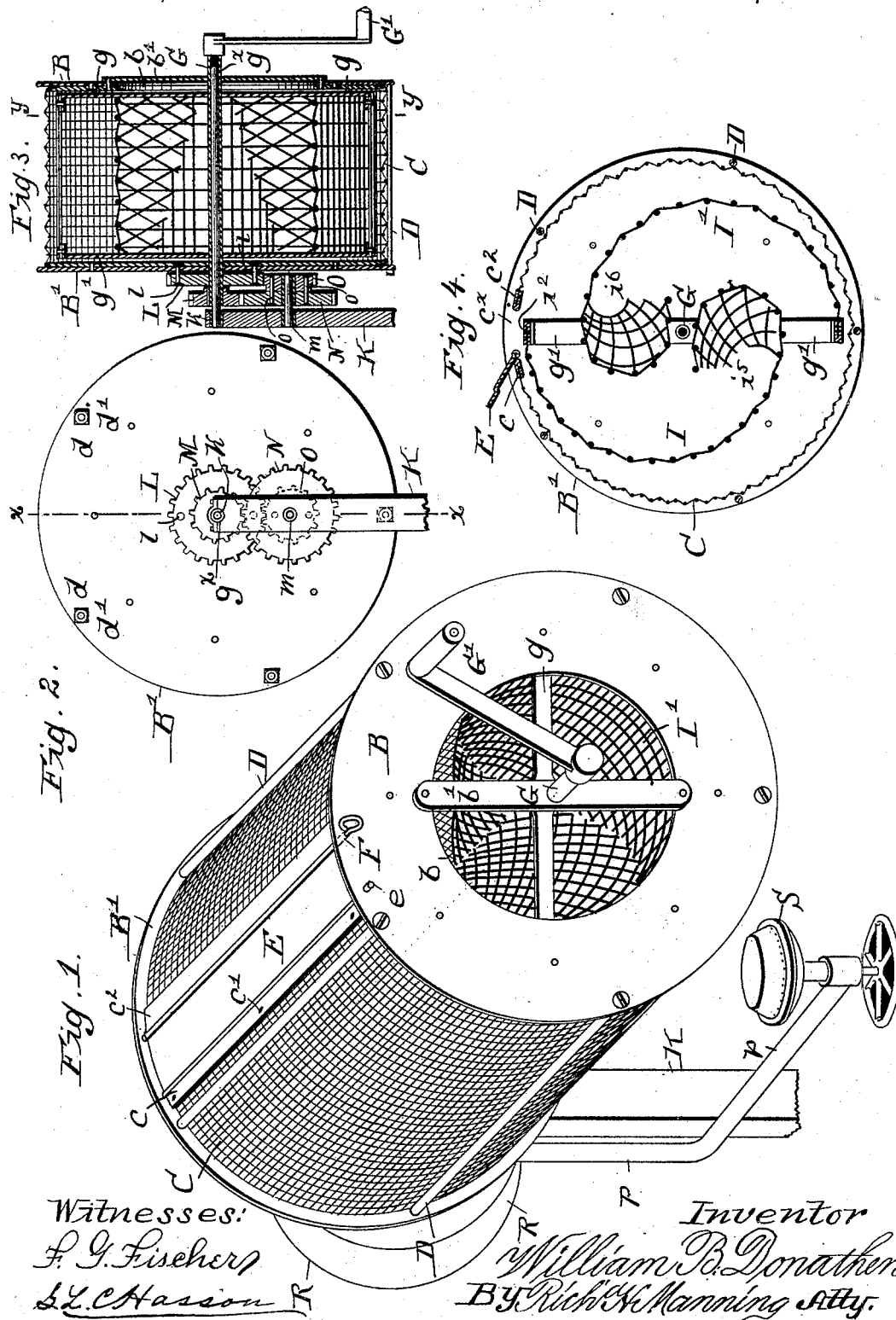


W. B. DONATHEN.  
CORN POPPING APPARATUS.

No. 489,939.

Patented Jan. 17, 1893.



(No Model.)

2 Sheets—Sheet 2.

W. B. DONATHEN.  
CORN POPPING APPARATUS.

No. 489,939.

Patented Jan. 17, 1893.

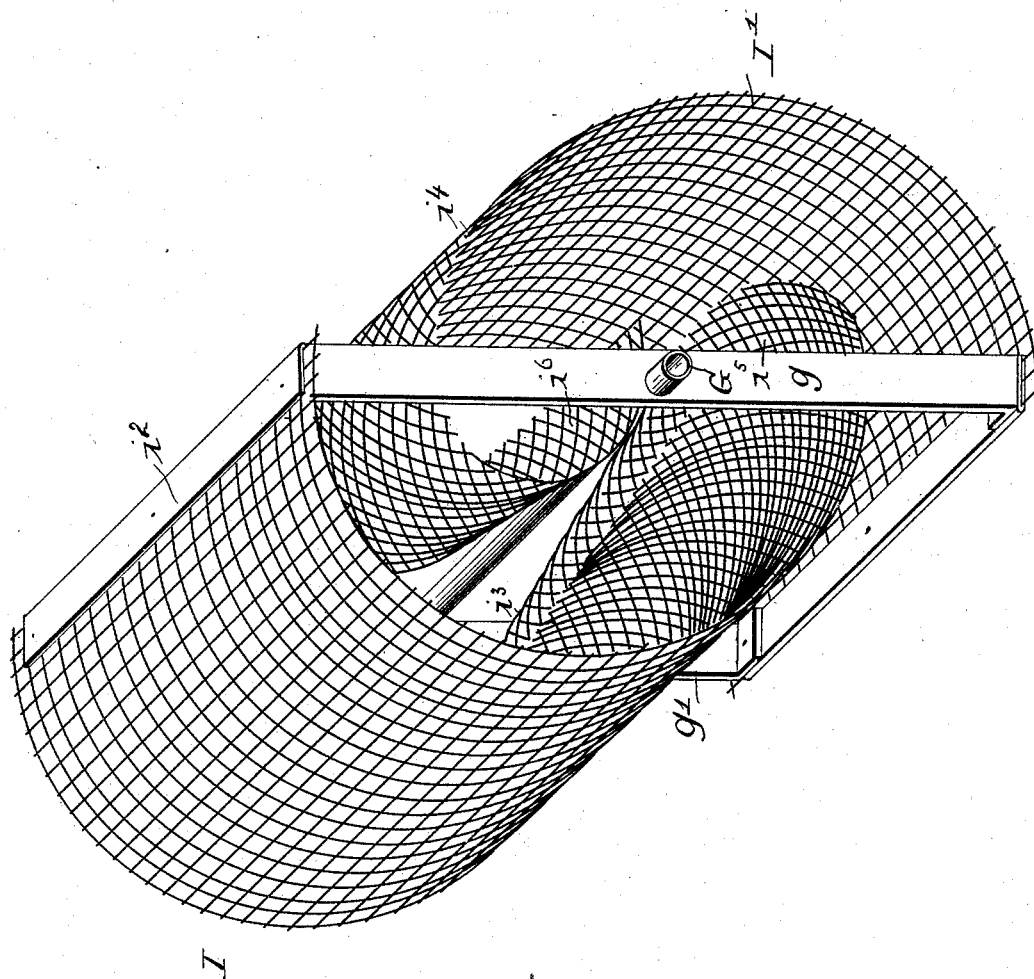


Fig. 5.

Witnesses:  
F. G. Fischer  
S. L. C. Hasson

Inventor  
William B. Donathen  
By Rich<sup>d</sup> H. Manning Atty.

# UNITED STATES PATENT OFFICE.

WILLIAM B. DONATHEN, OF KANSAS CITY, MISSOURI.

## CORN-POPPING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 489,939, dated January 17, 1893.

Application filed August 3, 1892. Serial No. 442,078. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM B. DONATHEN, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Corn-Popping Apparatus; and I do hereby declare that the following is a full, clear, and exact description thereof, such as will enable others to make and use the same, reference being had to the accompanying drawings, forming a part of this specification.

The object of my invention is:—First to pick up and discharge the popped corn during the interval in which the unpopped corn is gravitated toward the heat at one degree of speed. Second:—to maintain variable speed between the elevator and the corn popping apparatus.

My invention further consists in the novel construction and combination of parts which will first be fully described and specifically pointed out in the claims.

In the drawings:—Figure 1:—is a view in perspective of my improved corn popping apparatus, showing the head through the opening in which the popped corn is discharged, also the driving shaft and its support, and the oil tank and its pipe and the burner beneath the rotary case. Fig. 2:—is a rear end view of the apparatus showing the other head than that seen in Fig. 1, also showing the broken upper end of the standard supporting the corn popping machine and its variable speed gear. Fig. 3:—is a vertical sectional view of the apparatus taken transversely to the heads upon the line *x, x*, of Fig. 2. Fig. 4:—is a vertical sectional view of the apparatus taken upon the line *y, y*, of Fig. 3. Fig. 5:—is a detail view in perspective of the revoluble elevator buckets.

Similar letters of reference indicate corresponding parts in all the figures.

In the construction of the apparatus and referring to the drawings, A. represents a circular hollow case or drum. The ends or heads of the case consist of circular plates or heads B. B'. the diameters of which are equal. In one of the heads B. is a circular discharge opening *b*, the edge of which opening is described in a circular line from the axis of said head, and extends one third of the distance from said axis in the line of the diameter of

the said head to the periphery. Upon the outer side of the head B. near the edge of the circular opening *b*, is rigidly attached one end of the cross bar *b'*, which bar extends diametrically to the head B. across said opening *b*, and the other end attached rigidly to said head upon the other side of said opening.

The side of the case or drum is composed of a single piece of fine wire mesh C. which extends in width from the inner side of the head B. to the inner side of the head B'. upon the upper surface and across one end of the mesh C. is extended the width of the mesh, a narrow plate *c*, which plate is bent over said end of the mesh and upon the under surface of said mesh, and the two parts riveted together as at *c'*. One end of the plate *c*, is attached rigidly to the inner side of the head B. at a point on said plate a short distance toward the axis of said head from its periphery. The other end of the plate *c*, is attached to the inner side of the head B'. at a similar point as upon head B. The wire mesh C. is bent in a circular form between the said heads B. B'. and in plane of the periphery, and the other end extended to a position a short distance from the plate *c*, upon the end of which mesh is bent a strip *c<sup>2</sup>*, which is similar to the strip *c*, and secured to the inner sides of the heads B. B'. in like manner. Between the strips *c, c<sup>2</sup>*, is a longitudinal discharge opening *c<sup>x</sup>*. Between the periphery of the head B. and the outer side of the mesh C. near the strip *c*, is inserted one end of a stay bolt D. the other end of which bolt is extended transversely through the other head B'. which end is screw-threaded at *d*, and upon said end on the outer side of said head is fitted a nut *d'*. Similar stay bolts D. are inserted through the heads at suitable distances from each other and in like position, and in the plane of the periphery of said heads.

Through the head B. and parallel with the inner edge of the strip *c*, is extended one end of a rod *e*, the other end of which rod is passed through the head B'. Around the rod B' is bent one longitudinal edge of a plate or valve E. which plate extends from the inner side of the head B. to the inner side of the head B'. the other edge of which plate E. extends to and rests upon the outer edge of the strip *c<sup>2</sup>*. Through the head B. near its periphery and

above the line of the vibratory edge of the valve E. is extended one end of a removable valve securing rod F. the other end of which rod is passed through the head B. at a point similar to that upon head B'.

Axially to head B'. and a short distance beyond the outside of said head and through the interior of the case A. and axially through head B. and the bar  $b'$ , and extending a short distance from the outer side of said bar, is a hollow driving shaft G. and upon which the case A. is loosely mounted and rotates.

Within the case A. and upon one end of the hollow shaft G in a position a slight distance from the inner side of head B. is attached rigidly and nearly at right angles to shaft G. the revoluble braces  $g, g'$ . One of said braces extends from shaft  $g$ , laterally in one direction nearly to the inner side of the peripheral mesh C. and the other brace  $g$ , extends laterally from the shaft in the other direction and in line with the other brace a corresponding distance. Upon the other end of the hollow shaft G. within the case A. is attached rigidly near the inner side of head B'. the revoluble braces  $g', g'$ , which extend from both sides of shaft G. the same distance as described by the braces  $g, g$ , and are arranged in a parallel position with said braces. To the braces  $g, g, g', g'$ , are attached in the following manner, the revoluble elevator buckets, I. I'. Each bucket I. I'. is composed of a coarse wire mesh or screen which extends in width from a point a slight distance from the inner side of head B. nearly to the inner side of the head B'. Upon the outer surface of the mesh C. and extending across one end of said mesh or screen, is a flat metal strip  $i$ , the outer edge of which strip is bent over the end and upon the under surface of said wire and riveted thereto. One end of the strip  $i$ , is placed flatwise upon and attached rigidly to the upper end of one of the revoluble braces  $g$ . Upon one end of the hollow shaft G. over the end of which braces the mesh extends a slight distance toward the respective heads B. B'. The other end of the strip  $g$ , is attached in a like manner to the upper end of one of the braces  $g'$ , upon the other end of said shaft. The wire mesh to form the bucket is then extended in a single curved line from the said bars  $g, g'$ , to a position in line with edge of the opening  $b$ , on head B. and toward and between the other bars  $g, g'$ , upon the other side of said shaft G. and a suitable distance from the said shaft to form a convoluted or spiral terminal end to the said mesh which is made in the following manner:—From one side of the mesh near head B. a portion of the end is removed or cut away upon a line described from a point  $l^3$ , near head B'. diagonally toward the other side of said mesh I. Upon the other side of the mesh a portion of the side of wire mesh is cut at an angle from the point  $l^4$ , toward the end of said mesh and diagonally, so as to describe an angle of less degree than near head B'. The terminal por-

tion of the mesh thus forming an obtuse angle is bent inwardly in the direction of shaft G. and a short distance past said shaft toward the inner side of the mesh I. thus forming a spiral,  $i^5$ , the rigidity of the wire retaining the position of the parts. In bending the end of the wire forward to form the spiral  $i^5$ , the portion of the spiral near head B'. is raised slightly from the plane of the shaft G. and inclined toward the opening  $b$ , on the head B. The other elevator bucket I'. is formed in precisely the same manner as the bucket I. A separate piece of wire being in like manner secured to the ends of the other braces  $g, g'$ , and the mesh extended in a curved line the other direction than that described by the mesh I. and the spiral  $i^5$ , formed upon the other side of said shaft and between the strip  $g^2$ , and said shaft.

To the upper end of a standard K. is attached rigidly one end of a rod  $g^x$ , which extends at right angles and a suitable distance from said support. On rod  $g^x$ , is loosely mounted the hollow shaft G. Loosely mounted on said shaft G. and secured to the head B'. by the bolts  $l, l$ , is a gear L. Between said gear L. and the support K. and upon shaft  $g^x$ , is rigidly secured a gear M. the diameter of which is less than the gear L.

In the standard K. a short distance below the line of the shaft  $g^x$ , is rigidly attached one end of a mandrel  $m$ , the other end of which mandrel extends toward and nearly to the line of head B'. Upon the mandrel  $m$ , is loosely mounted a large gear N. which is nearly of the same diameter, is the gear L. and is made to mesh with the gear M. on shaft G. On the inner end of the mandrel  $m$ , toward the head B'. of case A. is loosely mounted a gear O. which is similar in dimensions to the gear M. The gear N. and O. are rigidly secured together by means of the bolts  $o$ . Upon the other end of hollow shaft G. near the opening  $b$ , in the head B. is attached a crank  $G'$ . To the side of the standard K. is attached a gas pipe P. which is attached at one end  $p$ , to a suitable storage tank R. for gasoline &c. The pipe K. extends downwardly and is bent at right angles and the bent portion extended beneath the exterior screen or mesh C. and upon said end is attached a burner S.

In the operation of the machine, raw corn suitable for parching is placed in the desired quantity within the opening  $b$ , in the head B. which falls through the coarse wire of the elevator bucket upon the inner side of the exterior screen or sides of the case A. The flame from the burner S. is directed upon the screen C. Motion is communicated to shaft G. which in turn communicates a movement to the variable speed gear L. M. N. and O. The shaft G. with which the buckets I. I' rotate at one degree of speed and in one direction communicates the same motion to the spur gear M. which actuates the gear N. and spur gear O. which are united and the spur

gear O. communicates speed to the gear L. in a slower degree, and the case A. is rotated in the same direction in the circle of rotation as the elevator buckets I. I'. and with slower speed. The raw corn on the inner surface of the screen in the flame of the burner S. is made to parch and pop and in the rotation of the elevator buckets the edge *i*, which is slightly above the inner surface of the exterior screen, follows in rear of the raw corn, the latter by gravity in the rotation of the case keeping in advance of the buckets and as soon as the corn pops it is picked up by the bucket and conveyed to the spiral chute *b*, and automatically discharged from machine through the opening *b*, in the head B. Instead of rotating the buckets I. I'. and the case A. in the same circular direction I may rotate the case A. in one direction and the buckets in the other, the popped corn being picked up and discharged in the same manner. The corn which refuses to parch is removed through the opening *c*<sup>x</sup>, the rod F. being first withdrawn from its position in the heads B. B'. the valve E. is released and as the case is rotated to valve opens and the unpopped corn *f* falls into a suitable receptacle provided therefor. The operation is then repeated.

In my invention the unpopped corn remains for a longer period in the flame of the burner and the heat is enabled to parch the corn quicker than heretofore.

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

1. A corn popping apparatus consisting of an exterior revoluble case, having a suitable discharge opening, an axial shaft and an independently mounted interior revoluble elevator for the popped corn actuated by said shaft, for the purpose described.

2. An apparatus for popping corn consisting of an exterior revoluble case having a suitable discharge opening, and an independently mounted axial shaft, having radial arms within the said case, means for rotating said shaft and case at varying degrees of speed and automatic elevating devices upon said braces for the popped corn, substantially as and for the purpose described.

3. An apparatus for popping corn consisting of an exterior revoluble hollow cylinder having a discharge opening in the head thereof and an independently mounted axial shaft and laterally extended fixed braces on said shaft within the compass of the exterior cylinder, means for rotating said shaft and cylinder at varying degrees of speed, and an elevator bucket on said braces having inwardly curved sides, substantially as and for the purpose described.

4. An apparatus for popping corn consisting of an exterior revoluble hollow cylinder having a discharge opening in the head thereof and an independently mounted axial shaft and laterally extended fixed braces on said shaft within the compass of the exterior cylinder, means for rotating said shaft and cylinder at a variable speed, and an elevated bucket for the popped corn on said braces having inwardly curved sides, and an automatically discharging chute inclined in the direction of the opening in the head of said cylinder as and for the purpose described.

5. In an apparatus for popping corn comprising an exterior revoluble case having a suitable support and an independently mounted axial shaft and an interior revoluble elevator for the popped corn actuated by the said shaft within the compass of the exterior case of speed regulating mechanism on said support connected with said driving shaft substantially as and for the purpose described.

6. In a corn popping machine the combination with a suitable support therefor, of a driving shaft and a revoluble exterior case loosely mounted on said shaft, an independently mounted interior revoluble elevator for the popped corn actuated by the said shaft within the compass of the exterior case, variable speed gear on said driving shaft connected rigidly with the outer side of said exterior case and also loosely mounted on said shaft and variable gear connected with each other on said support meshing with the gear on the driving shaft for the purpose described.

WILLIAM B. DONATHEN.

Witnesses:

P. W. POWERS,  
S. L. C. HASSON.