(No Model.) 2 Sheets—Sheet 1.

R. O. STUTSMAN.

CORN POPPER.

No. 564,231. Patented July 21, 1896.

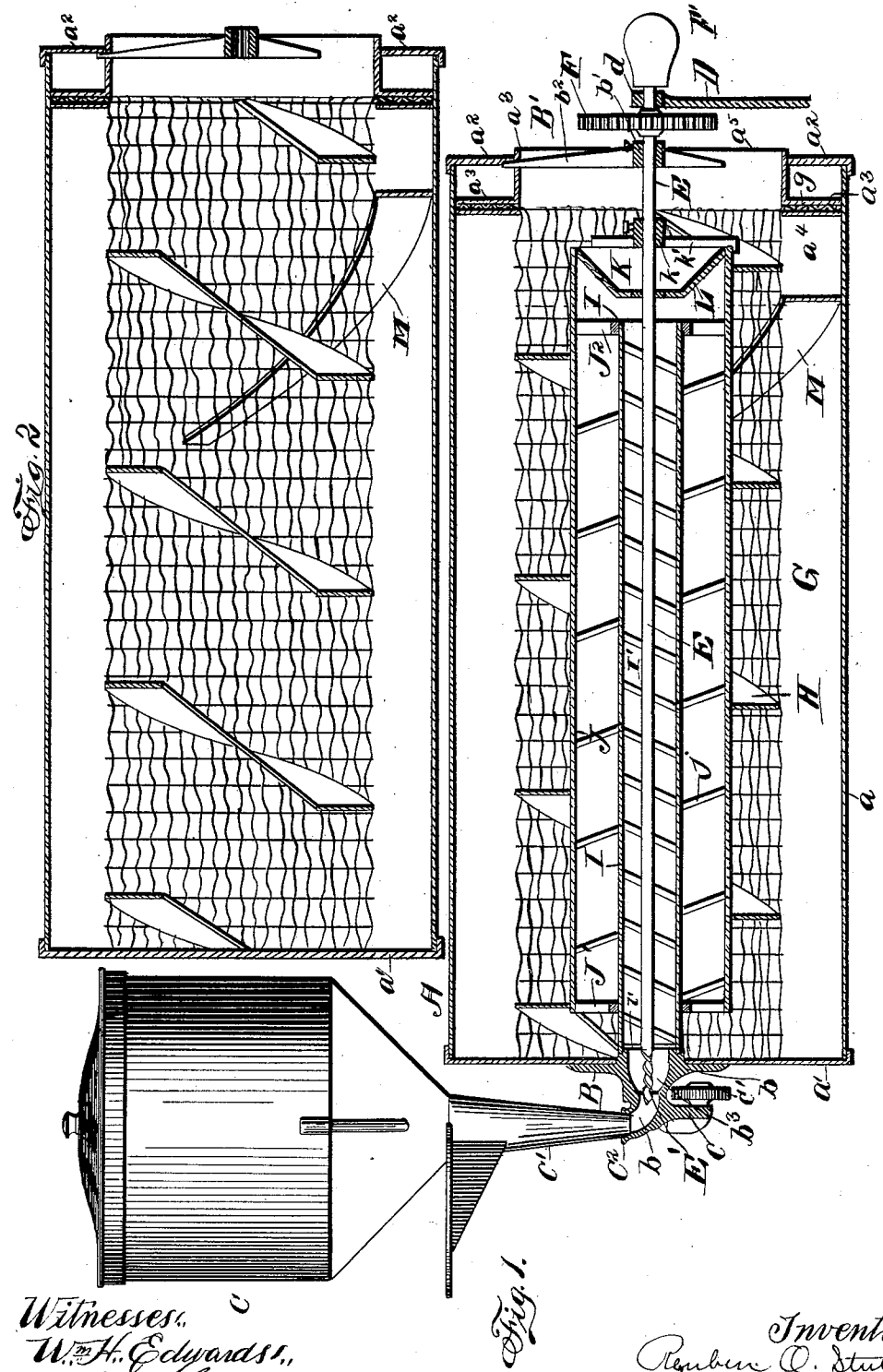

Fig. 2.

Fig. 1.

Witnesses:
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(No Model.) 2 Sheets—Sheet 2.

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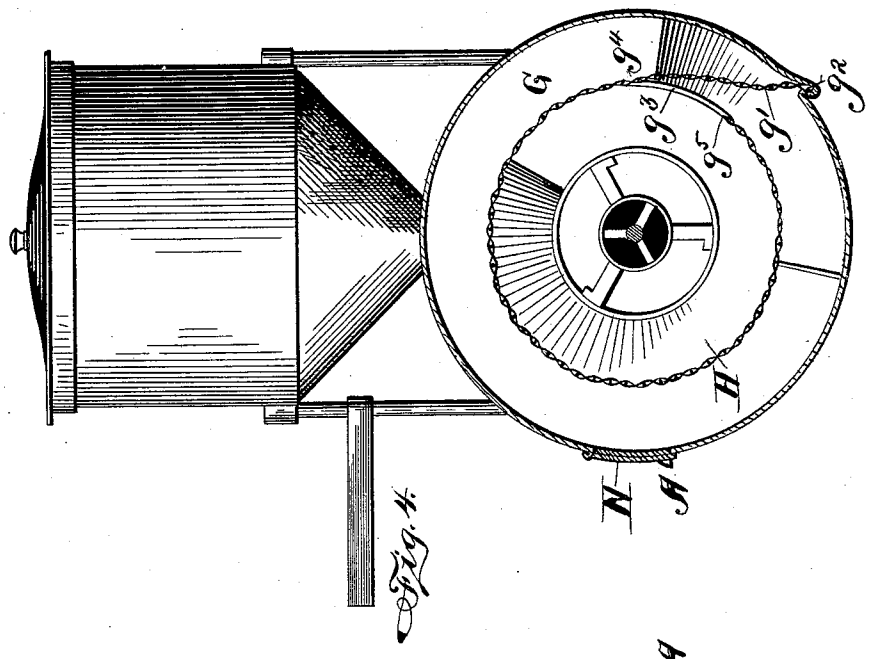

Fig. 4.

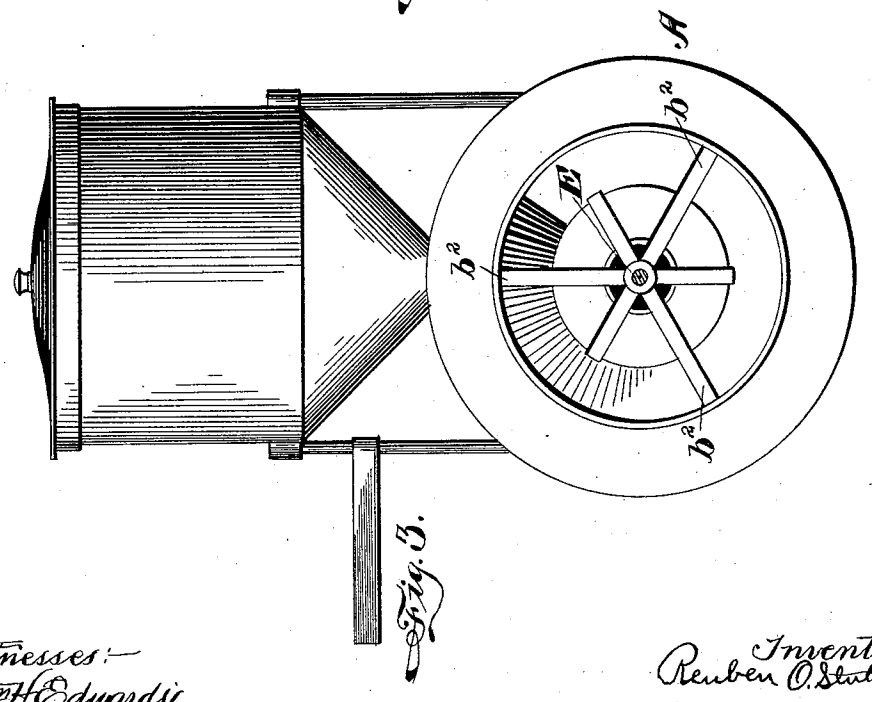

Fig. 3.

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UNITED STATES PATENT OFFICE.

REUBEN O. STUTSMAN, OF DES MOINES, IOWA, ASSIGNOR TO THE BARTHOLOMEW COMPANY, OF IOWA.

CORN-POPPER.

SPECIFICATION forming part of Letters Patent No. 564,231, dated July 21, 1896.

Application filed February 26, 1895. Serial No. 539,816. (No model.)

To all whom it may concern:

Be it known that I, REUBEN O. STUTSMAN, a citizen of the United States, residing at Des Moines, in the county of Polk and State of Iowa, have invented certain new and useful Improvements in Corn-Poppers; and I do 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 the letters of reference marked thereon, which form a part of this specification.

Figure 1 is a view, partly in longitudinal section, partly in side elevation, of a corn feeding and popping mechanism embodying my improvements. Fig. 2 is a longitudinal section of the parts used in effecting the popping shown detached from the others. Fig. 3 is an elevation from the discharge end, the shaft being shown in section. Fig. 4 is a cross-section of the same.

I will first describe more particularly the features of construction incident to that form of the apparatus which I here employ for clearly illustrating the essential features of the invention, and will then point out the matters of advantage, wishing it to be noted that there can be modifications with respect to the details shown and described without departing from said important features.

A represents the main, outer, shell or cylinder of the popper. It is formed with an imperforate cylindrical shell *a*, which is secured to the two heads a' a^2, the cylindrical part *a* being preferably made of sheet metal as thin as can possibly be used. The head a' at the receiving end has a relatively small central aperture, while that at a^2 is formed with a considerably larger opening to permit the ready discharge of the corn which has been popped.

The head a' is secured to a central casting B, which is formed with a hollow journal or bearing projection *b*, that provides a means of supporting the feed end of the cylinder.

C is an elevated receptacle or hopper in which the corn is initially stored, it having a funnel-like duct at C', terminating in or detachably seated in a throat at C^2. Preferably the latter is formed in a casting adapted to be secured to the supporting-frame. There is an inward-projecting hollow extension at *c*, to which the journal *b* of the cylinder is connected. At c' there are antifriction supporting-rollers arranged to take the weight of this end of the popping-cylinder, these rollers being mounted on the aforesaid casting. At the opposite end the cylinder is supported by means of the spider B', having the hub b' and the arms b^2 secured to the central shaft E. This shaft extends outward to permit it to be detachably seated in a bearing at *d*, formed in the stand, bracket, or wall D. The shaft E is provided with a gear-wheel F, by means of which it may be rotated, and with a handle attachment at F', to which a crank can be applied if preferred.

a^3 is a ring or plate near the discharge end a^2, formed with or secured to a tubular mouthpiece a^5, which passes somewhat through the end wall-piece a^2 and provides the discharge-passage from the popper.

Within the cylindrical sheet-shell *a* is placed a foraminous cylinder, (indicated as a whole by G.) At one end it contacts with the head a', being secured to a spiral conveyer, to be hereinafter described, and at the other the longitudinal wires of which it is formed are bent outward, as at *g*, and clamped between a ring-plate a^4 and the above-described plate at a^3. Throughout the greater part of it this part G conforms to a cylinder, parallel to the external shell *a;* but at g^4 the portion g' is bent outward to lie in a plane approximately tangential to the cylindrical part, and has its edge secured to the sheet-shell *a* at g^2, the other edge being situated at g^5. This provides a passage-way at g^3 for a purpose to be described.

I indicates a relatively small centrally-arranged tube. At one end it is secured to the aforesaid journal-casting B, and near said end contains a spider *i* or cross-head, also secured to the part B, in the hub of which is placed the end of the central shaft E.

J indicates a second tube or cylinder, preferably concentric with that at I. At one end it is supported by a spider K, having arms k' and a hub *k*, attached to the shaft E. At the other end it is supported by a spider or arms

at J′, secured to the tube I. This tube J is at its delivery end held in proper relation to the other parts by a spider or arms at J^2, which connect it to the supplemental cylinder or tube I.

It will be seen from the above description, in connection with the drawings, that the cylindrical parts above described at *a*, G, I, and J are secured together to form one unitary structure, all of whose elements rotate together.

The corn which is received on the sheet-cylinder *a* is popped, and as the cylinder rotates the popped kernels are caught by the deflected part *g′* of the wire-mesh or foraminous cylinder and are thereby carried toward the axis far enough to enter the cylinder G, while the unpopped kernels pass through the meshes and remain on or near the shell *a* until they have been popped. After the popped corn has been thus withdrawn or sieved from the unpopped by the foraminous or sieve-like cylinder it is moved longitudinally toward the discharge-opening by the spiral conveyer H, which is arranged within the part G and connected thereto near its rear end.

The unpopped corn is fed from the receptacle C through the duct C′ and the throat or passage-way at C^2, through the receiving end of the cylinder to its interior. Its passage is controlled or governed by means of a screw or conveyer E′, which is arranged longitudinally of the cylinder and lies more or less within the inlet-throat. As shown, it is formed on or secured to the end of the axial shaft E. It serves to nearly close the throat and prevent the escape of heat from the interior of the popping-cylinder, and yet when rotating acts to draw inward the unpopped corn. The latter does not drop immediately from the chamber b^3 down to the inner surface of the popping-cylinder *a*, but is received by the aforesaid duct, tube, or cylinder I, placed within and arranged longitudinally of the popping-cylinder. It is advanced through the popping-cylinder by any suitable means, as by a wire or other spiral conveyer I′, and at a point suitably near the discharge end is delivered to the second duct or cylinder J, there being a guard or fender at L, which prevents the corn from bounding or passing beyond said duct J. In the latter it is moved longitudinally of the popping-cylinder backward again by suitable device, as by a spiral conveyer *j*, which ultimately delivers the unpopped corn to the highly-heated wall of the main popping-cylinder.

The spiral conveyer H outside of the ducts I and J is supported by them, they being at the axis of this conveyer and passing longitudinally through it.

At M there is a conveyer or a section of a conveyer secured to the external popping-cylinder, and arranged so as to engage with the unpopped corn which may reach the delivery end of the popping-cylinder and cause it to move longitudinally toward the other end, insuring that it shall be repeatedly subjected to the action of the heat and be finally popped if in condition to produce such results.

At N there is a door, which is normally closed, but which can be opened when it is desired to clean from the popping-cylinder the corn which has refused to pop.

The mode of operation of the mechanism above described will be readily understood. After a charge of corn has been placed in the receptacle C and the burners have been properly arranged beneath the external popping-cylinder *a* the cylinder is put into rotation. The shaft and screw E′ cause the corn to be drawn from the feed-throat with a predetermined speed into the initial duct I. The rotating conveyer I′ causes it to move comparatively slowly through the duct I, where it receives a preliminary heating and is at the same time agitated and rolled, so that each and every kernel shall have its entire body exposed to the heated surface of the duct. After the corn drops into the duct J the conveyer *j*, as above described, moves it backward again over the surface of this second duct, which is somewhat more highly heated than that at I. In this way the corn is gradually raised in temperature and prepared for dropping upon the exceedingly highly-heated shell or popping-cylinder *a*. After it reaches the latter it is very rapidly popped. After opening or expanding its kernels become so enlarged that the sieve-like separator engages with it and lifts it away from the unpopped kernels and deposits it in the central or cylindrical part G. Here it is engaged by the spiral conveyer H, and although supported vertically on the meshes of the part G it is advanced longitudinally by the conveyer and is by it ultimately discharged through the mouth at a^5.

It has been long well known that the bringing of relatively cold corn suddenly into contact with a highly-heated surface or into the region of a flame does not insure the best results, and it has been long recognized as very desirable to provide some means and method for gradually raising the temperature of the corn until the degree of heat necessary for popping is reached. Several plans have been followed or proposed for attaining this. One involved the employment of a sieve-like or foraminous cylinder having two compartments of the same diameter and in different planes transversely of the axis, these compartments being separated by a partition having valve-apertures for permitting the passage of corn from one to the other. In such case it is impossible to secure a graduation in the application of the heat. The sieve-like cylinder brings the corn so close to the flame region as to endanger the undesired popping of it prior to its entering the popping-chamber proper. Again, the cylinder as a whole must be unduly elongated in order to carry a suf-

ficient quantity of the corn for extensive working, and when so elongated more or less of the mass is necessarily held at a distance from the heating-flame. The other plan which within my knowledge has been proposed involves the extending of a flue up through the corn-receptacle (corresponding to that at C herein) for carrying some of the products of combustion upward through the corn, on the supposition that a material amount of preliminary heating would result therefrom. In the mechanisms last referred to the kernels of corn are not individually treated and there is no assurance that each part of the mass shall be heated uniformly with all others.

I obviate the difficulties which have been incident to these earlier plans by means of the preliminary heating-ducts, as at I or J, placed directly within the popping-cylinder. While passing through these the mass of corn is broken up and is spread out into a thin stream or sheet, the kernels being rolled over and over and the operation being prolonged until they are gradually brought up to a high temperature, and before being able to lose any of their heat are instantly dropped upon the external or popping cylinder, which receives the direct impact of the heating-flame. The corn in the hopper or receptacle is not affected at all, so that the operation can be stopped at any time without impairing the freshness or other desirable qualities of the corn in the receptacle, it being well known that if the corn is once heated and then cooled it is seriously impaired for popping.

The present machine differs in another important respect from the earlier ones used or proposed. It has also been known that the use of a sieve-like or foraminous popping-cylinder in direct contact with the heating-flames was objectionable, as the flame plays through the meshes upon the corn, the products of combustion being as a result intermingled with it; but it has been further found that an imperforate or continuous sheet-metal shell was not practicable in corn-poppers as heretofore constructed because of the difficulty of subjecting the corn to a sufficiently high heat over a long enough period and at the same time treat large enough quantities of the material. In this respect the present construction is eminently successful. I employ, as described, a plain tight thin sheet-metal shell *a*, and yet avoid the necessity of making this unduly long or large by placing within it the supplemental heating-ducts, as at I or J. The flame is kept from the material, and yet sufficient heat is provided on the interior of the popping-cylinder to attain the desired result because of the prolonged and graduated action upon the unpopped corn prior to finally dropping it on the most highly-heated surface.

I do not herein make any claim for the means illustrated and described for feeding the unpopped corn from the supply-receptacle to the popper, as such means are similar to those shown, described, and claimed in another application, Serial No. 493,126, heretofore filed by me.

What I claim is—

1. In a corn-popper, the combination of a popping-cylinder, means for lifting therefrom the popped corn, and means for conveying the unpopped corn, longitudinally through the said cylinder and subsequently depositing it thereon to be popped, substantially as set forth.

2. In a corn-popper, the combination of a popping-cylinder, means for lifting or sieving the popped corn from the unpopped and delivering it through the discharge end of the cylinder, and means for continuously passing unpopped corn longitudinally through said cylinder and ultimately depositing it upon the external wall thereof, at the end opposite to the discharge for the popped corn, substantially as set forth.

3. In a corn-popper, the combination of the external cylinder which supports the corn while it is popping, means for feeding the corn into the cylinder through one end, means for sieving or lifting the popped corn from the unpopped and discharging it through the other end of the cylinder, and a conveyer within the popping-cylinder which supports the unpopped corn independently thereof and carries it from the feed end toward the discharge end while being supported within the popping-cylinder but out of contact therewith, substantially as set forth.

4. The combination in a corn-popper, of the external cylinder adapted to support unpopped corn, an inner cylinder arranged within and longitudinally of the external cylinder, means for advancing unpopped corn longitudinally through the inner cylinder and delivering it to the outer cylinder, and a sieving or lifting mechanism between the inner and the outer of said cylinders for withdrawing the popped corn from the unpopped, substantially as set forth.

5. In a corn-popper, the combination of a popping-cylinder, means for lifting therefrom and discharging the popped corn, a duct within the popping-cylinder for unpopped corn, means for advancing the corn therein away from the discharge end of the popping-cylinder and delivering it to the latter at its opposite end, and a supplemental duct I within the popping-cylinder for unpopped corn, and means for advancing the corn therein toward the discharge end and delivering it to the aforesaid duct, substantially as set forth.

6. In a corn-popper, the combination of a popping-cylinder, means for sieving or lifting the popped corn from the unpopped and discharging it, and two supplemental ducts for the unpopped corn arranged longitudinally within the popping-cylinder and adapted to deliver corn from one to the other, one extending from the feed end of the popping-cylinder toward the discharge end and the other

extending in the opposite direction, substantially as set forth.

7. In a corn-popper, the combination of three concentric cylinders placed one within the other and all adapted to support unpopped corn and arranged to deliver said corn from the inner cylinder to the second and from the second to the outer, and means for continuously withdrawing the popped corn in the outer cylinder from the unpopped corn and discharging it from said outer cylinder, substantially as set forth.

8. In a corn-popper, the combination of an exterior, sheet-metal, popping-cylinder adapted to be rotated, means within said cylinder for supporting the unpopped corn, means for moving the unpopped corn over the popping-chamber and subsequently delivering it thereto, and means for lifting or sieving the popped corn from the unpopped in the popping-chamber, substantially as set forth.

9. In a corn-popper, the combination of a popping-cylinder, means for supplying unpopped corn to the interior thereof, a sieve-like or foraminous cylinder for separating the popped corn from the unpopped, a spiral conveyer within the said separating-cylinder for moving the popped corn longitudinally of the popping-cylinder, a duct extending longitudinally through the said spiral conveyer, and means for advancing unpopped corn through said duct, substantially as set forth.

10. In a corn-popper, the combination of a popping-cylinder, a sieve-like or foraminous cylinder within the popping-cylinder for withdrawing the popped corn from the unpopped, a duct within and extending longitudinally of the said separating-cylinder, means in the interior of said duct for conveying unpopped corn in one direction, and means outside of said duct for conveying the popped corn supported by the foraminous cylinder in the opposite direction, substantially as set forth.

11. In a corn-popper, the combination of the external popping-cylinder, means therein for lifting or sieving the popped corn from the unpopped, a conveyer between the said sieving devices and the axis for moving the popped corn longitudinally of the cylinder in one direction, and a conveyer outside of the sieving devices for moving the unpopped corn in the opposite direction, substantially as set forth.

12. In a corn-popper, the combination of the external popping-cylinder, having a feed-aperture at one end and a discharge-aperture at the other, means for lifting or sieving the popped corn from the unpopped, and means for moving the unpopped corn longitudinally of the popping-cylinder while resting thereon, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

REUBEN O. STUTSMAN.

Witnesses:
A. J. OSWANDEL,
S. W. LEONARD.