

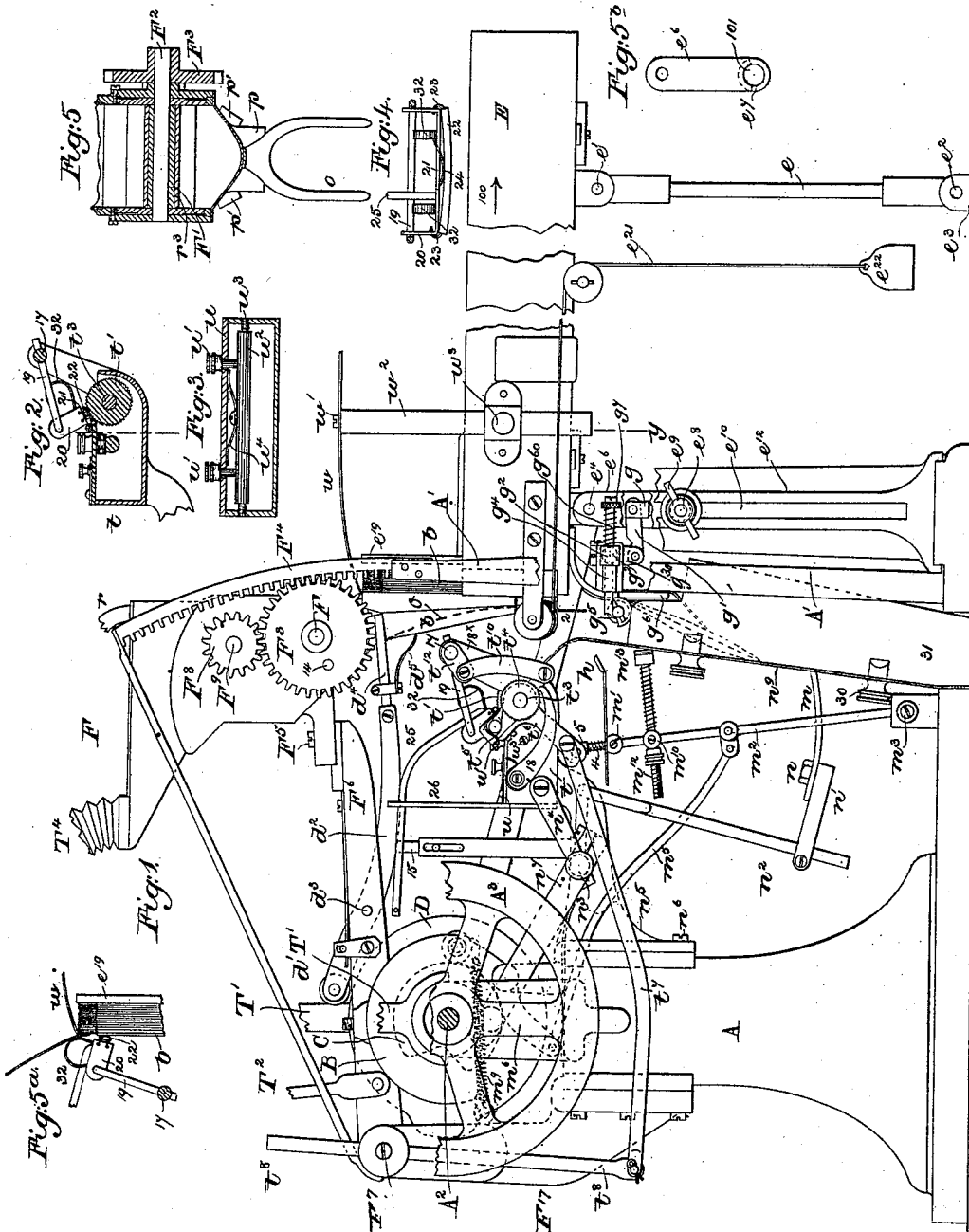
(No Model.)

5 Sheets—Sheet 1.

H. H. CUMMINGS.
MACHINE FOR FILLING BAGS.

No. 539,218.

Patented May 14, 1895.



Witnesses:
Edgar A. Goddin.
Fred S. Greenleaf

Inventor:
Henry H. Cummings
by Leroy H. Gregory
Atty.

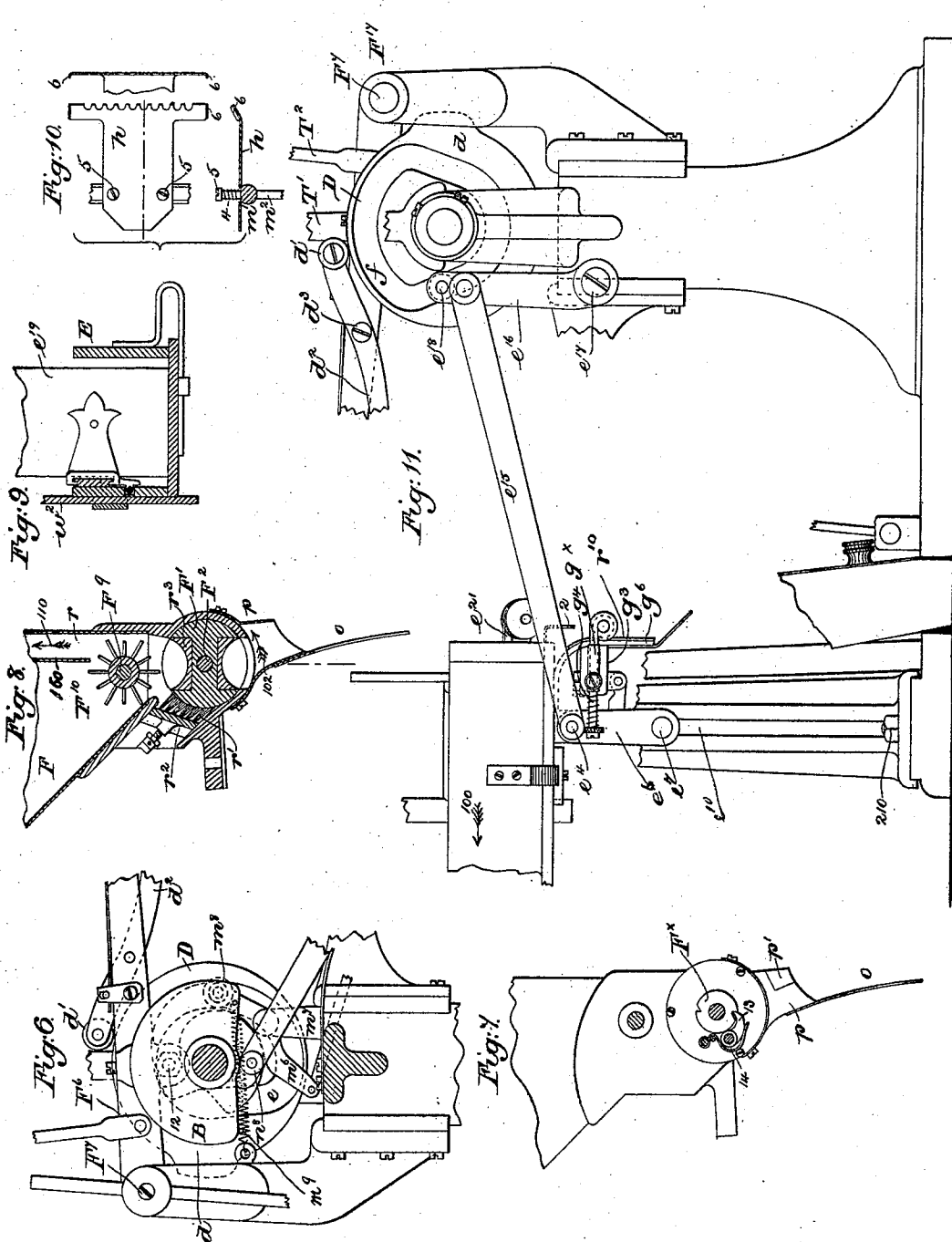
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Witnesses:
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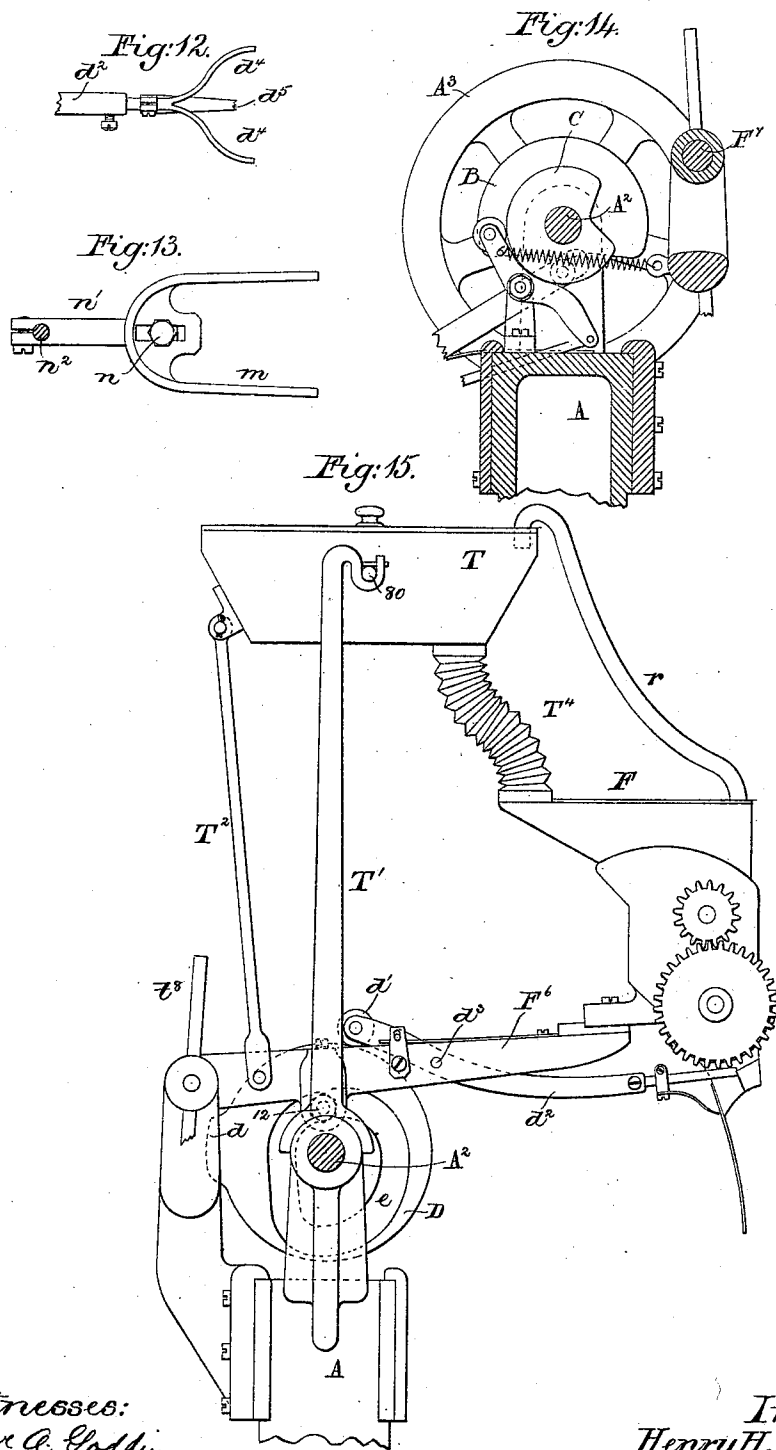
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H. H. CUMMINGS.
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(No Model.)

5 Sheets—Sheet 4.

H. H. CUMMINGS.
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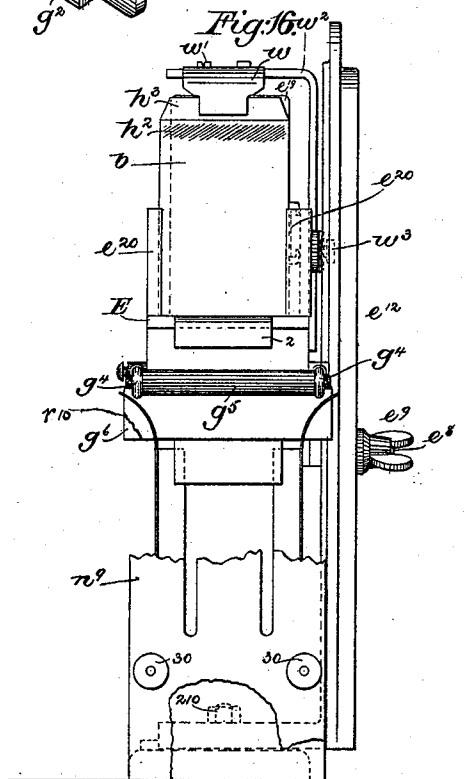
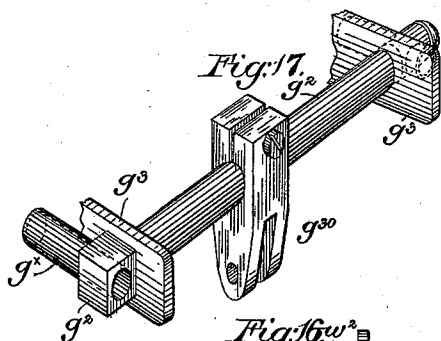
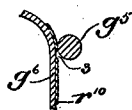


Fig. 18.



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(No Model.)

5 Sheets—Sheet 5.

H. H. CUMMINGS.
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Fig. 19.

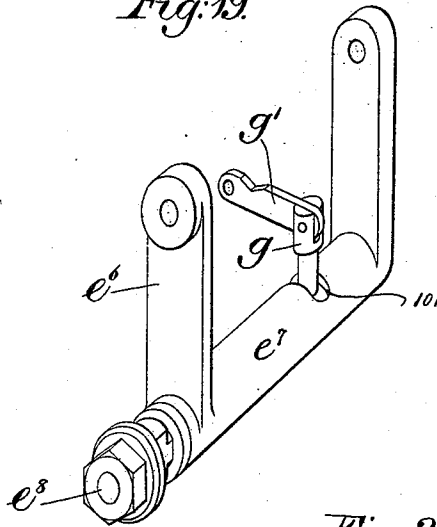


Fig. 21.

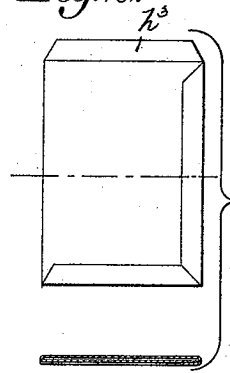
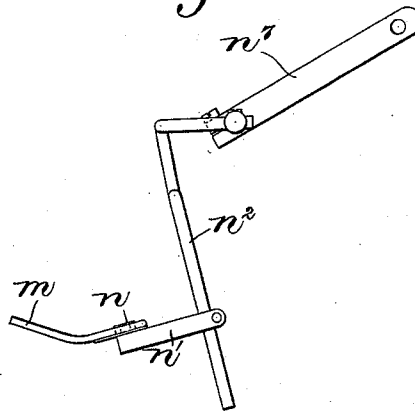


Fig. 20.



Witnesses:

Edward F. Allen.
John W. Daley.

Inventor.

Henry H. Cummings,
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UNITED STATES PATENT OFFICE.

HENRY H. CUMMINGS, OF MALDEN, ASSIGNOR TO J. C. BROWN AND B. F. BROWN, OF BOSTON, MASSACHUSETTS.

MACHINE FOR FILLING BAGS.

SPECIFICATION forming part of Letters Patent No. 539,218, dated May 14, 1895.

Application filed July 1, 1890. Serial No. 357,346. (No model.)

To all whom it may concern:

Be it known that I, HENRY H. CUMMINGS, of Malden, county of Middlesex, State of Massachusetts, have invented an Improvement in Machines for Filling Bags, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

10 The machine the subject of this invention is adapted to fill bags, and is especially useful for filling paper bags with seeds, granular material, &c.

The machine shown is adapted to hold a series of bags, open the mouth of each bag, in succession, and place a funnel therein which is connected to a hopper having a measuring device, whereby in the operation of the machine a measured quantity of seed or other material is discharged intermittently from the funnel into the bag. The filled bag having a lip and pasted near its open end, is dropped upon a rest, in which position it is preferably clamped while a folding blade acts against the bag near its pasted open end folding the said bag transversely between the nip of a roll and a suitable folding bed, said roll serving to close the pasted mouth of the bag, and thereafter the bag is discharged from the machine.

The particular features in which this invention consists will be specified at the end of the following specification:

Figure 1, in side elevation, partially broken out, represents a bag-filling machine embodying my invention, the hopper-feeder being broken off and shown separately in Fig. 15; Figs. 2 and 3, details of the pasting or gumming mechanism. Fig. 4 is a detail of the frame and elastic face which applies the paste or gum to the envelope; Fig. 5, a sectional detail of the hopper, funnel, and bag-opening fork; Fig. 5^a, a detail showing the pasting or gumming device in contact with and in the act of applying paste or gum to a bag; Fig. 6, a sectional detail showing the cam-shaft with some of its cams and parts actuated thereby; Fig. 7, a detail of the hopper and bag-opening fork; Fig. 8, a vertical section of the parts shown in Fig. 7. Fig. 9 is a partial section to the left of the dotted line *y*, Fig.

1; Fig. 10, detail views of the folding-blade; Fig. 11, a partial rear side elevation of the machine shown in Fig. 1; Fig. 12, a top or plan view of the holder and knocking-off device; Fig. 13, a top or plan view of the bag-rest; Fig. 14, another sectional view of the shaft and some of its attached cams; Fig. 15, an elevation of the hopper-measuring device and bag-opening device; Fig. 16, a detail looking at the delivery end of the guide-box and other parts to be described, and Figs. 17 and 18 are details to be referred to. Fig. 19 represents in detail the stud *e*³ and the sleeve *e*⁷; Fig. 20, a detail of the fork *m*, and Fig. 21 a bag and section thereof.

The frame-work, as shown, consists essentially of the column A and upright A'.

The column A has suitable bearings for the main shaft A² having a suitable belt or driving pulley A³, and provided with cams B, C, D, the latter cam having two cam grooves *e*, *f*, on opposite sides, see Figs. 6 and 11, the cam D having a lump *d* to act on the roller or other stud *d'* of the lever *d*² pivoted at *d*³ and having a forked end, as at *d*⁴, see Fig. 12, to partially surround the funnel *p*, so as to strike against and aid in pushing the filled bag from the funnel, the said lever having a bag holder *d*⁵ attached to it, the point of which contacts with the bag at the rear side of the said funnel, the said holder preventing the bag slipping off the funnel while the endmost bag is being disengaged from a series of bags in a guide box.

The guide box or trough E will in practice be made adjustable so that it may be adjusted to correspond with the width of the bags to be filled. This guide box is mounted at or near its receiving end on a leg *e* jointed to the box at *e'*, and at *e*² to a stand *e*³, the delivery end of the guide box having suitable ears through which are passed pivot pins *e*⁴, which enter arms *e*⁶ of a rocking sleeve or shaft *e*⁷ mounted, as herein shown, on a stud *e*⁸ made adjustable vertically by a thumb nut *e*⁹ in the slot *e*¹⁰ of an upright *e*¹² connected to and in practice made horizontally adjustable on the base of the frame by a suitable set screw, 210, shown by dotted lines Fig. 16.

To one of the studs *e*⁴, see Fig. 11 is, jointed a link *e*¹⁵ in turn jointed to the lever *e*⁶ piv-

oted at e^{17} and having a roller or other stud e^{18} which enters the cam groove f , the latter causing the guide box to be reciprocated a short distance, it being moved in the direction of the arrow 100 after the bag opener o to be described enters the bag to be filled, thus enabling all but the endmost bag of the series of bags then in the guide box, and held pressed forward therein by a suitable follower e^{19} , to be carried back away from the bag then held by the opener within it.

The delivery end of the guide box is provided at its inner side walls with lips e^{20} , see Fig. 16, against which the front bag of the package of bags is borne by the follower, herein shown as acted upon by a cord e^{21} and weight e^{22} , the cord being extended over suitable pulleys.

The lips h^3 of the bags stand upright and are acted upon by a lip holder w , attached by screw w' to an upright w^2 made adjustable vertically by a set screw w^3 .

The reciprocating guide box constitutes what I denominate a bag presenting mechanism.

The stud e^8 referred to, has, see Fig. 1, a second stud g extended vertically through a slot 101 in the sleeve e' , see the detail Fig. 19, and to the upper end of stud g is jointed a link g' in turn jointed to an arm g^{30} of a rock shaft g^2 having its bearings in ears g^3 of the plate g^6 attached to the bottom of the guide-box, said plate being shown as convex at its outer face, the circle occupied by the face of the plate having as its center the center of the rock-shaft g^2 .

The rock-shaft g^2 , see Fig. 17, is provided at its ends with like hollow arms g^x through which are extended slides g^4 , each having at one end a bearing for the journal of a roll g^5 , the said slides being surrounded by spiral springs g^{60} which normally act to keep the said roll pressed toward the preferably rubber face r^{10} of the folding bed g^6 , the springs g^{60} being made adjustable as to their strength by suitable adjusting nuts g^7 screwed upon the slides.

Owing to the connection of the rock-shaft g^2 with the stud e^8 , as described, it follows that when the guide box E is moved in the direction of the arrow 100, the roll g^5 is carried up toward the bottom of the guide box along over the folding bed g^6 until the said roll occupies a position quite close to the bottom of the box, it, as shown, rising up behind the plate 2 which is connected to the bottom of the box near its delivery end and projects downwardly therefrom, the said plate, as herein shown, aiding in supporting the package of bags, but this plate is not essential. It is while this roll is in its elevated position that the folding blade h is moved forward to contact with the filled bag then resting upon the rest m , the folding blade contacting with the bag at a point just below the upper edge of the outer ply thereof upon which the paste or gum has been applied, as shown at h^2 in Fig. 16, the said folding blade with its up-

turned and preferably toothed end holding the said bag at a point below its lip h^3 firmly against the elastic surface r^{10} of the folding bed g^6 , the said elastic surface preferably having in it at that point a sort of groove 3, as shown in Fig. 18.

While the upturned forward end of the tucking blade so holds the bag, the roll g^5 , by the oscillation of the rock-shaft g^2 (the box E then moving in opposition to the arrow 100) causes the said roll to fold the lip h^3 of the bag down upon the pasted upper part of the outer ply of the bag, causing the said lip to be pasted down firmly. While the roll so acts to roll down the said lip, the front end of the folding blade descends with the roll, the said blade in order that it may so descend being preferably made of spring metal, and being loosely connected with the bar m' at the upper end of the oscillating frame m^2 pivoted at m^3 .

The folding blade is kept seated upon the bar m' by suitable springs 4, shown in Fig. 1, surrounding screws 5 screwed into the said bar m' , the heads of the screws 5 acting upon the upper ends of the springs while the lower ends of the springs act upon the blade, the holes in the blade being slightly larger in cross section than the screws 5 as best shown in the section Fig. 10, to thus enable the said blade to rock upon the bar m' , the springs normally acting to keep the blade in the position shown in Figs. 1 and 10, with relation to the said bar m' .

To prevent the roll g^5 from contacting with the teeth of the blade when the roll acts to push the blade down, as described, to fold the lip h^3 over the toothed edge of the blade in the process of closing the mouth of the bag, I have provided the said folder with ears 6 at its opposite end against which the roll bears.

The frame m^2 has jointed to it a link m^5 which is in turn jointed to a small lever m^6 shown by dotted lines in Fig. 1, and by full lines in Fig. 6, the said lever being pivoted upon a stand m^7 and having at its opposite end a suitable roller or other stud m^8 , shown by dotted lines in Fig. 6, which roller is acted upon at suitable times to move the frame by the cam C , the said roll being kept normally in contact with the said cam by a suitable spiral or other spring m^9 . The frame m^2 has a suitable cross bar m^{10} which receives the slide rods m^{12} , there being two such rods parallel to each other, to which is connected the bag detainer m^{13} which is preferably made to spring or yield somewhat, the said detainer acting against the outer ply of the bag at a point below where it is pasted, and holding the said bag against the folding bed g^6 during the time that the roll g^5 is being carried down to lay over the lip h^3 , as described, the said detainer being moved back to release the bag immediately after the roll has completed the folding over of the said lip.

The rest m before referred to is a U-shaped piece of wire bent to form two like arms which

are adjustably attached by a screw n to an arm n' made vertically adjustable on an arm n^2 which is in one piece, preferably, with a rock-shaft n^3 having its journals in an arm n^4 and in a bracket n^5 bolted to a column by the screws n^6 .

The rock-shaft n^3 has a second arm n^7 which, extended backwardly, is provided at its rear end with a suitable roller or other stud n^8 , see Fig. 6, the said stud being acted upon by the cam B, the movement of the rock-shaft being such as to project the rest or fork m forward through the slots in the plate n^9 immediately after the pasted and filled bag is dropped or discharged from the bag opener o and funnel p , the said rest remaining in such position to thereby support the bag until after the roll g^5 has acted to turn the lip of the bag over upon the upper ply thereof, it retiring from the bag to leave it ready to drop a second time immediately before or as the roller g^5 starts to roll upwardly and off from the closed lip of the bag.

Fig. 1 shows the rest as retracted and the roller g^5 as about to start upwardly.

The seed or other granular material to be put into the bags automatically, is fed into the hopper F, it being represented as provided at its lower end with a measuring device F', shown as a rotating cylinder, the journals F² of which are extended through the lower part of the hopper, one of the said journals, (see Fig. 7,) being provided with a ratchet plate F^x which is engaged by a spring pressed pawl 13 mounted on a pin 14 at the inner side of a gear F³ mounted loosely upon the said journal and engaging the toothed rack F⁴ secured at its lower end to the upper end of the upright A' forming part of the frame-work, the said upright being broken out in Fig. 1 to save space upon the drawings.

The hopper F has connected to it below the measuring device a funnel p and the funnel at its sides is provided with lips p' which aid in keeping the month of the bag open clear to its folded edges, and the funnel has connected to it the bag opener o made as a fork and of spring metal so as to be elastic, the points of the prongs contacting with the lip opener w which holds back the lip h^3 of the bag when the hopper is made to descend, the said prongs sliding along on the inner side of one ply of the bag until the funnel enters the mouth of the bag, the prongs of the opening device yielding as they enter the bag, for it will be understood that the said opener works in the arc of a circle while the bag stands substantially perpendicular, and as the prongs complete their descent by reason of their working in a curve, they aid in pulling the endmost bag then to be filled, off from the end of the pile of bags, the pile of bags being at the same time moved back or away from the opening device as described by the movement of the guide box E, the lever d^2 during the descent of the hopper meeting the stud 15 so that the finger d^5 is

thrown up into the position represented in Fig. 1 to act against the outer ply of the bag and hold it against the rear side of the funnel p , as in Fig. 1, in which figure it is supposed that the funnel is standing within a bag.

The hopper is adjustably connected by screw F⁵ to the lever F⁶ secured to a rocking stud F⁷ mounted in a bearing F¹⁷, the said lever having a suitable roller or other stud 12 which enters the cam groove e which causes the lever F⁶ and the hopper and its attached parts to be raised and lowered at the proper time, the gear F³ in engagement with the rack teeth F⁴ when the hopper descends acting through the pawl 13 to rotate the measuring device half around, and at the same time the said gear F³ by its engagement with the pinion F⁸ on the shaft F⁹ of the agitator F¹⁰ is oscillated to stir the seeds or other granular material, and prevent the same from clogging above the measuring device.

The hopper has an air delivery spout or passage r which communicates by means of a duct formed in the hopper by the partition 160 with the space in which the measuring device rotates, so that when any one of the seed receptacles of the measuring device comes uppermost to receive material, the air dislodged therefrom by the material coming into it, may escape in the direction of the arrow 110, as shown in Fig. 8, into the hopper feeder T.

The hopper feeder T to contain the seed or other material to be put into bags has journals 80 at each side which are supported in bearings at the upper ends of arms T' connected rigidly to the frame-work, the rear end of the said hopper feeder having connected to it a link T² which is jointed to the lever F⁶, the latter in its movement causing the hopper feeder to be tipped or shaken and cause the material therein to pass through the flexible conduit T⁴ into the hopper F which in practice is of less area than the hopper feeder.

The air pipe referred to is carried up and made to enter the hopper feeder so that in case the material being put into bags is a powder, the same will not escape into the atmosphere.

The measuring device is rotated in the direction of the arrow 102, Fig. 8, and to prevent the seeds, as might be the case with flat seeds, from being broken or cut by the sharp edges of the measuring device or the hopper in which it rotates, I have provided the hopper with a cushion r' , shown as a brush which is connected to a contact plate r^2 , preferably made adjustable, to compensate for wear.

It is frequently desired to vary the quantity of seed or other material to be put into the bag, and to do this the spaces in the measuring device are made sufficiently large to contain the maximum amount of seed, and to provide for a less amount I have so constructed the measuring device that I may ap-

ply to the said pockets seed receptacles 7^a , see Fig. 8, the said receptacles being more or less dug out or concaved to leave a greater or less space according to the quantity of seed which it is desired to discharge into the funnel and bag surrounding it, at each movement of the hopper and measuring device.

To apply paste or gum to the bag at the point h^2 , I have provided the machine with a suitable paste box t supported upon the bracket n^5 , the said paste box receiving within it a paste roll t' connected to a shaft t^3 , the said shaft at its outer end having a ratchet wheel t^4 which is acted upon by a suitable pawl t^5 on an elbow shaped pawl carrier t^6 having its fulcrum on the said shaft and connected by a link t^7 with an arm t^8 adjustably attached by a set screw t^9 to one end of the rockershaft F^7 , which is oscillated through the lever F^6 moved by the cam groove e . A detent pawl 18 prevents any back movement of the paste roll.

The pawl carrying lever t^6 has a link t^{10} jointed to it, which at its upper end is attached to an arm t^{12} of a rock-shaft 17 supported in suitable stands 18^x attached to the paste box, the said rock-shaft having arms 19 constituting part of a movable frame to which are jointed the ears 20 of the pasting device, the said pasting device being shown as a bar 21, having a flexible pasting pad 22 preferably made as a piece of rubber tubing connected by a suitable wire or string 23 to the said paste bar 21 and backed up, as shown, by a spring 24, the said spring aiding the flexible pasting pad, which is supplied with paste or gum intermittingly from the paste or gum roll, to adapt itself to the surface of the pile of bags.

The bags commonly used to receive seed and fine material, are usually made from pieces or blanks of paper folded at the edge of the bag, a lip on one ply of the bag being folded around the edge of the other ply, thus leaving three thicknesses at the edge, whereas at the center of the bag where there is no seam there are but two thicknesses, and as a result of these different thicknesses at different portions of the bag, it follows that when a number of bags are placed in a body in the guide box against the follower, that pressure put upon the outermost bag causes the mass to assume a somewhat concaved face at that end of the box from which the bags are taken to be filled.

The paste bar 21 has fast to it a rod 25 partially shown in Fig. 4, and fully shown in Fig. 1, the said rod being extended backwardly through and along a hole in an upright 26 attached to the paste box.

Viewing Figs. 1 and 2, the elastic surface of the pasting device is shown in contact with the paste roll and the bag is being filled. When the bag is filled it drops from the position shown in Fig. 1 and the lever F^6 is actuated to elevate the hopper and its attached parts including the funnel and bag opener,

and during this time the pawl carrier t^6 is moved from its position shown in Fig. 1 so that its lower end travels toward the right, causing the link t^{10} engaging the arm t^{12} to lift the pasting device, and as the pasting device is lifted, by swinging in the arc of a circle about the shaft 17, the latter then turning in its bearings, the rod 25 extending through the stand 26 and acted upon by the said stand causes the pasting device to be turned upon the arms 19 and carried up into the position shown in Fig. 5^a, bringing the pasted elastic surface 22 in position opposite the bag then endmost and next to be filled, causing the said pasting device to apply the paste to the bag and immediately thereafter, as the lever F^6 begins to descend, the pasting device is retracted and it arrives back into the position shown in Fig. 1 by the time that the bag just pasted and thereafter opened is in position to be filled.

The cover u of the paste box has extended through it two adjusting screws u' which are screwed into a rod u^2 pivoted at its ends on suitable set screws u^3 , the rotation of the screws u' causing the cover to be depressed, it being elevated when the screws are slackened by means of a spring u^4 .

The end of the cover next the paste box roll has a lip slightly upturned and by the rotation of the screws u' this lip may be brought more or less close to the paste roll so as to gage the quantity of paste which is carried up over and left upon the surface of the roll when the pasting device comes in contact with it.

Preferably the plate n^9 will have adjustably connected to it by suitable screws 30 side plates 31 which may be adjusted to contact with the side edges of the bag to prevent them from tipping over.

In practice a suitable delivery belt, such as used in United States Patent No. 243,858, for a paper bag machine, may be led into the space between the side plates 31 and the plate n^9 to receive the bags upon them, the endless belt carrying the bags away.

As the gumming or pasting device is being carried forward as described, to paste a bag, the spring fingers 32 connected to the bar 21 contact with the inner sides of the prongs of the bag opening device o and push them toward the pile of bags and away from the flexible pasted surface 22, so that the said pasted surface cannot contact directly with the said opening device, for paste or gum on the opening device would be transferred therefrom to the inside of the bag, which would stick it together and cause the seeds to adhere together or to the bag. Therefore these protecting fingers 32 are an important element in this invention.

I have herein shown a bag opener to open a bag, a bag presenting mechanism, a hopper, a funnel, and bag folding mechanism, but these devices are not herein claimed broadly as they are made the subject of broad generic

claims in my application, Serial No. 396,926, filed June 20, 1891.

It will be noticed herein that the measuring device interposed between the hopper and the funnel is moved in unison with them, and that the seed or other material is taken in measured quantity from the hopper and passed through the funnel into the bag before another measured quantity is discharged from the hopper.

I am aware that prior to my invention seed and other material placed in a stationary hopper has been delivered into funnels connected with the spokes or arms of a rotating carrier, each funnel having an elastic lower end to enter and aid in opening the mouth of the bag to be filled.

I am also aware prior to my invention that seed has been placed in a hopper having a valve at or near its central part, below which valve there is a rigid funnel, seed in the hopper running therefrom into the funnel and into the bag when the valve is open, but such valve in no way acted as a positive measuring device.

I am also aware that a rotating wheel or carrier provided with pockets has received in each pocket a bag, a lip of which has been pasted, and that a blast of air has been depended upon to open the mouth of the bag, so that seed from a chute might be ejected into the said bag, but in such machine the bag was not opened by a bag opener, nor was a funnel inserted into the bag to aid in depositing the seed therein.

In this my invention it will be understood that the mass of bags to be pasted and filled are placed in a guide box, which is reciprocated positively to bring the endmost bag into position to be entered by an elastic bag opener, which operates in advance of the funnel, the said bag opener standing in the bag and holding its mouth opened to be filled, while the guide box is being retracted and while the bag opener keeps the bag open.

I claim—

1. The hopper feeder, and the vertically reciprocating hopper located below it; combined with an intermediate flexible conduit connecting the said feeder and hopper, substantially as and for the purpose set forth.

2. A hopper feeder; a movable hopper; and a measuring device within it; combined with a conduit interposed between the hopper and the hopper feeder, for the purposes set forth.

3. The hopper; its measuring device consisting of a roll having spaces; a gear on said roll; a rack engaging the said gear, and a pawl and ratchet; combined with means to raise and lower the said hopper and to rotate the said roll intermittently, substantially as described.

4. The hopper feeder; the hopper; and the connecting flexible conduit; combined with an independent air passage leading from the

hopper to the hopper feeder, substantially as described.

5. The hopper, provided with an independent air passage; combined with a measuring device having pockets and contained in the said hopper; and an agitator whereby the material to be measured may always uniformly enter and fill the pockets in the said measuring device, the agitator aiding to direct the air contained in the material and the pockets of the measuring device toward the said air passage, substantially as described.

6. The hopper; its contained measuring device; and agitator; combined with a partition placed in the said hopper and extending below the wings of the said agitator to form an independent air passage for the escape of air freed by the agitator from the material in the hopper and escaping from the measuring device, substantially as described.

7. The bed provided with a groove for the reception of the bag at the point where the latter is to be cross folded; combined with a roll, and folding blade, to operate, substantially as described.

8. In a machine for filling bags, a rest for the lower end of the filled bag; and an intermittently movable bag detainer to hold the bag; combined with cross folding mechanism to fold the bag, substantially as described.

9. In a machine for filling bags, a folding bed to support the bag to be folded, combined with a folding blade having an upturned lip to act against the bag and having ears near its ends and with a roll to co-operate with said ears to prevent said roll from contacting with the teeth of the blade when the roll acts to push the blade down, substantially as described.

10. In a machine for filling bags, a guide box to present a series of bags to be folded; a pasting device, substantially as described, adapted to apply paste to the endmost bag of the series of bags in said guide box; a folding-bed located at the end of said guide box to support the bag to be folded; and a folding blade having an upturned lip and provided near its end with an ear; combined with a roll to co-operate with the said ear to prevent said roll from contacting with the teeth of the blade when the roll acts to push the blade down on the bag, substantially as described.

11. The hopper; its carrying arm, and means to move it; and a measuring device located in the said hopper; combined with gearing to operate the said measuring device; and a rack, and pawl and ratchet to actuate the said gearing, substantially as described.

12. In a bag filling machine, a guide-box to contain the bags to be filled; the hopper; and a funnel; combined with an elastic bag opener, to, in its upward movement, bear against the endmost bag and in its downward movement enter the mouth of the bag, substantially as described.

13. In a machine for filling bags, a guide-box
to contain the bag to be filled; a hopper; and
a funnel; combined with an elastic bag opener,
presenting two yielding fingers and adapted
5 to enter the open mouth of the bag at or close
to the inner side edges of the bag, substan-
tially as described.

In testimony whereof I have signed my
name to this specification in the presence of
two subscribing witnesses.

HENRY H. CUMMINGS.

Witnesses:

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EMMA J. BENNETT.