

(No Model.)

4 Sheets—Sheet 1.

W. LIDDELL.
PAPER BAG MACHINE.

No. 487,225.

Patented Nov. 29, 1892.

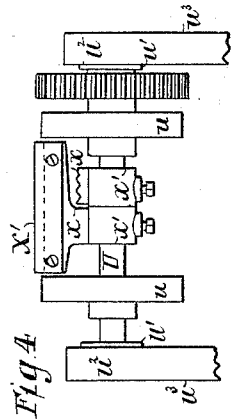
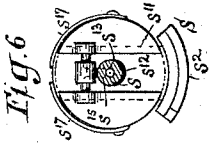
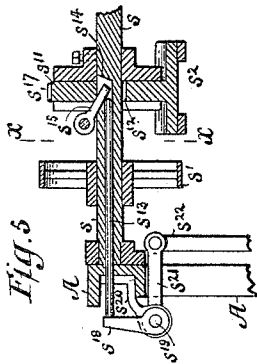
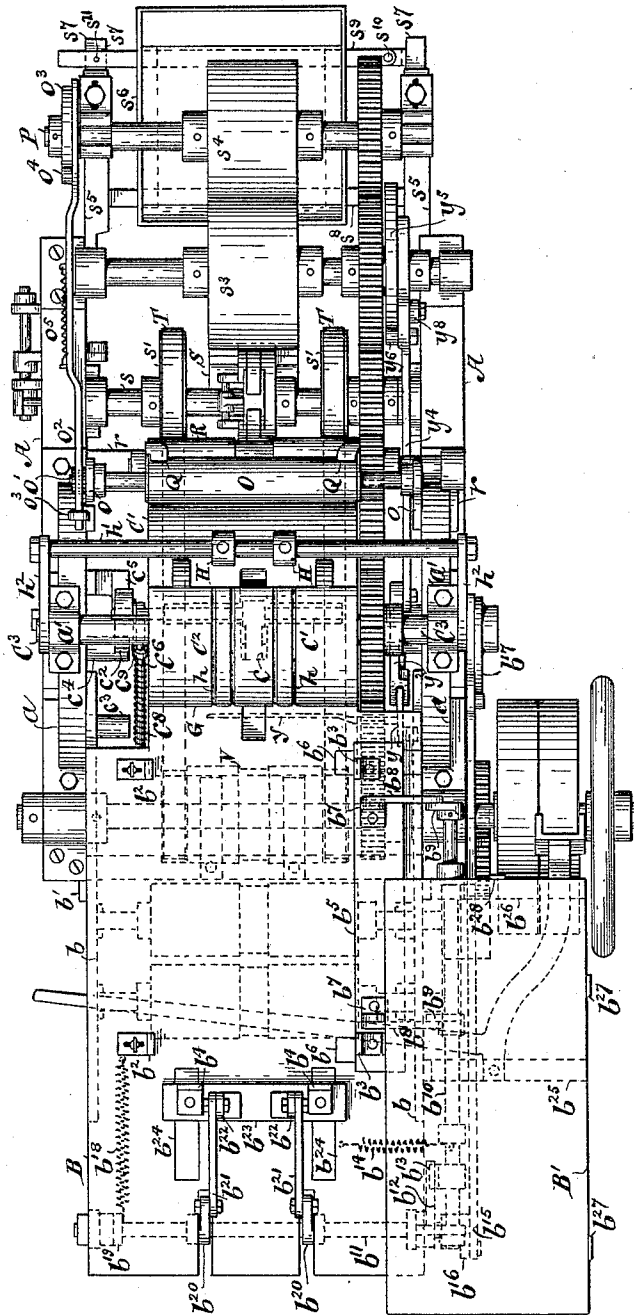


Fig. 1



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Edwin H. Brown

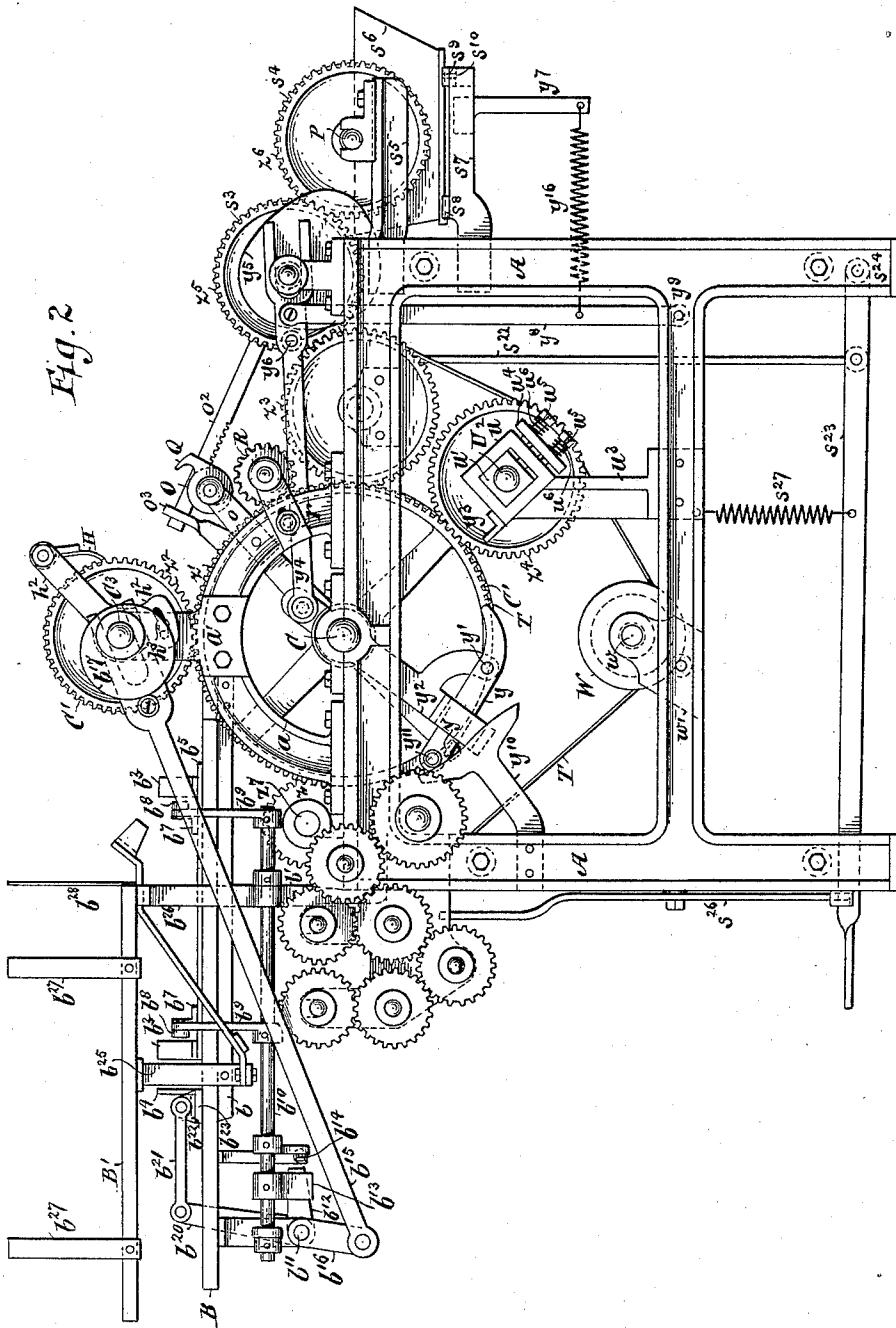
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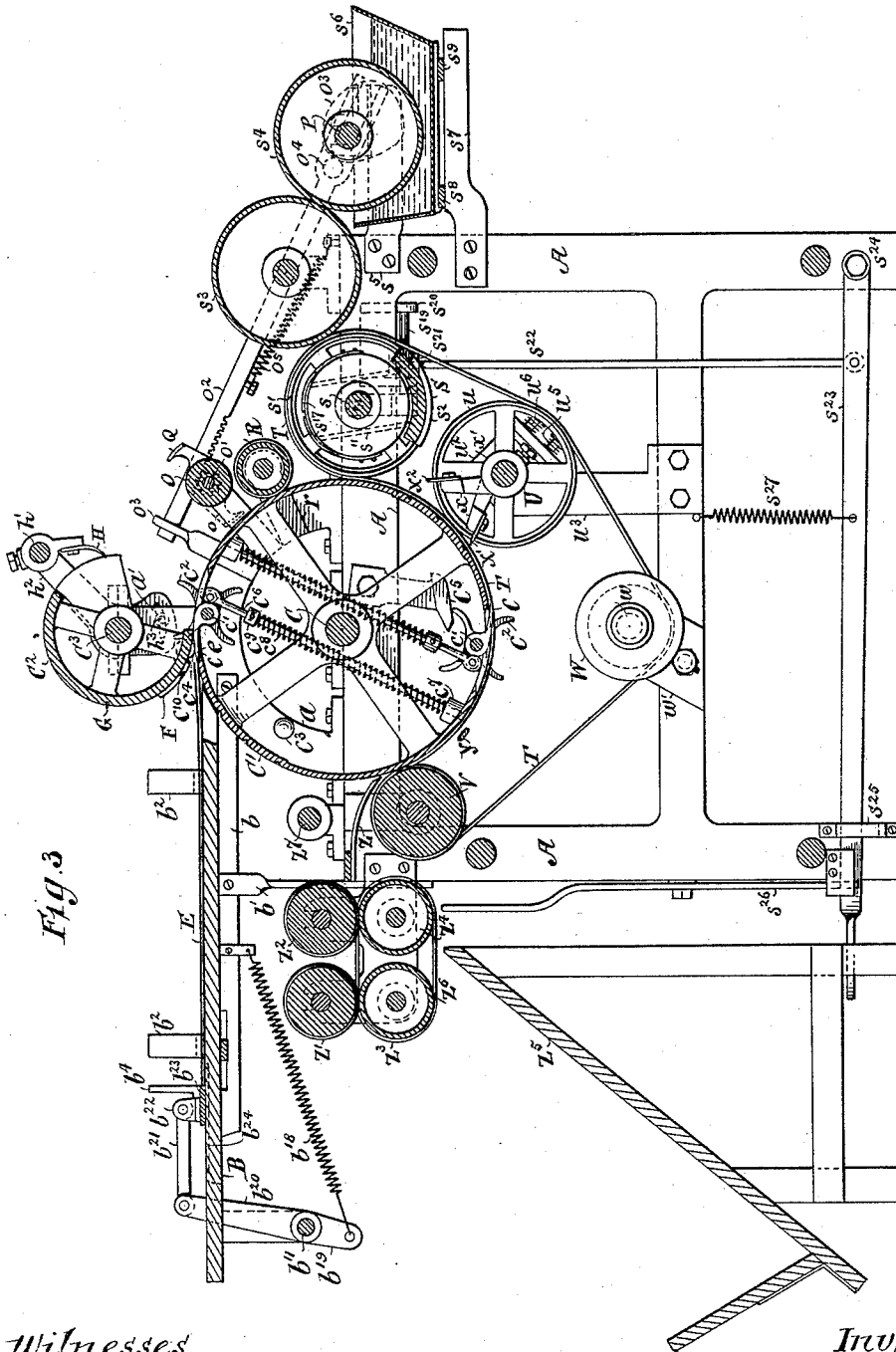
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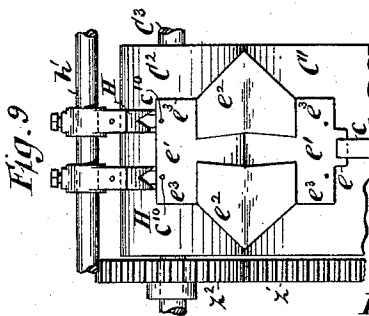
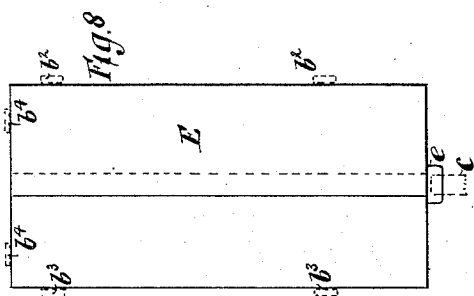
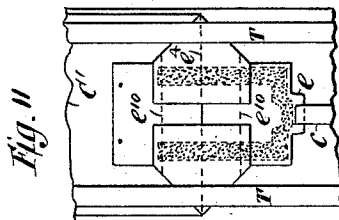
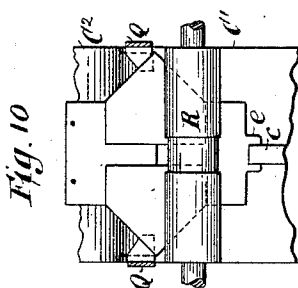
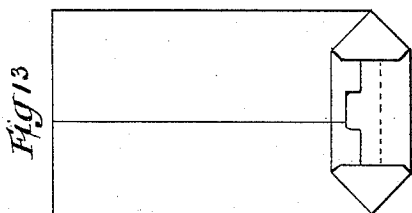
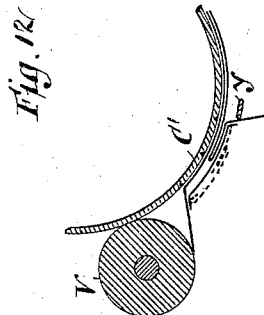
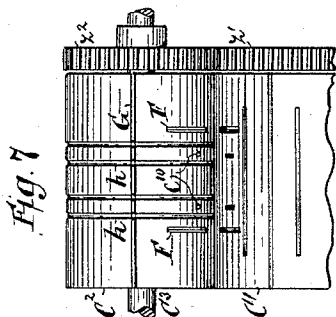
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UNITED STATES PATENT OFFICE.

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PAPER-BAG MACHINE.

SPECIFICATION forming part of Letters Patent No. 487,225, dated November 29, 1892.

Application filed February 11, 1892. Serial No. 421,134. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM LIDDELL, of Brooklyn, Kings county, and State of New York, have invented a certain new and useful Improvement in Paper-Bag Machines, of which the following is a specification.

My improvement relates to machines for forming the bottoms of paper bags.

I will describe a machine embodying my improvement and then point out the novel features in the claims.

In the accompanying drawings, Figure 1 is top view of a machine embodying my improvement. Fig. 2 is a side elevation of this machine, the driving-pulleys being omitted. Fig. 3 is a central longitudinal section of the machine. Fig. 4 is an elevation, taken transversely of the machine, showing certain creasing devices. Fig. 5 is a sectional elevation taken transversely to the length of the machine and illustrating certain parts of pasting mechanism. Fig. 6 is a vertical section taken at the plane of the dotted line $x x$, Fig. 5. Fig. 7 is an elevation taken transversely to the length of the machine and illustrating certain creasing and slitting devices. Fig. 8 is a top view of a bag blank or tube of the kind which is intended to be treated in this machine, and in this figure are also illustrated certain guides to secure the proper presentation of the bag blanks or tubes to the machine. Fig. 9 is an elevation of certain parts, taken transversely to the length of the machine, and illustrating one stage in the formation of a bag-bottom. Fig. 10 is an elevation of certain parts, taken transversely to the machine, and illustrating another stage in the formation of the bag-bottom. Fig. 11 is an elevation of certain parts, taken transversely to the length of the machine, and illustrating another stage in the formation of a bag-bottom. Fig. 12 is a section of certain parts, taken longitudinally of the machine, and illustrating the final folding of a bag-bottom. Fig. 13 is a top view of a bag having its bottom completed.

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

A designates the frame of the machine. This frame may be of any suitable construc-

tion. In the present instance it consists of side pieces and transverse stretchers.

B designates a table or platform, upon which bag blanks or tubes are placed one at a time and presented to a pair of cylinders $C' C^2$.

The table B, as here shown, is supported at the end which is the nearer to the cylinders $C' C^2$ by having side frames b , which are comprised in it, fastened to arc-shaped brackets a , which are mounted upon the side pieces of the frame A, and also by having its side pieces b secured to brackets b' , which are supported by the side pieces of the frame A.

On the table B are guides $b^2 b^3 b^4$. The guides b^2 are intended to be stationary during the operation of the machine. They are, however, adjustable transversely to the length of the table B to suit different-sized bag-blanks. As here shown, their adjustment is provided for by forming in them slots, which extend transversely to the length of the table, and passing through these slots thumb-screws, which engage with tapped holes in the table and serve to clamp the guides in position after adjustment. The guides b^3 are mounted upon a bar b^5 , which is fitted to slide upon the table B transversely to the length of the latter. It will suffice to merely rest this bar upon the table. Where it has its bearings I may provide the table with metal plates b^6 , when the table is made of wood, as will ordinarily be the case. On the top of the bar are brackets b^7 , and to these are pivotally connected at one end links b^8 , whose other ends are connected with arms b^9 , mounted upon a rock-shaft b^{10} . The oscillation of this rock-shaft will cause the bar b^5 , with its guides b^3 , to reciprocate toward and from the stationary guide b^2 . Owing to the movement of the guide b^3 the person tending the machine can place a bag-blank without special care upon the table and it will be brought to the proper position transversely of the table to be presented to the cylinders $C' C^2$.

The rock-shaft b^{10} is operated by a rock-shaft b^{11} , extending transversely to the table B. Motion is transmitted from the rock-shaft b^{11} to the rock-shaft b^{10} in one direction by means of an arm b^{12} , affixed to the rock-shaft b^{11} , bearing upon a cam b^{13} , affixed to the rock-shaft b^{10} . A spring b^{14} moves the rock-shaft

b^{10} in the reverse direction by being connected at one end with the table and at the other end with an arm affixed to said rock-shaft. The rock-shaft b^{11} is oscillated in one direction by a rod b^{15} , which at one end is pivotally connected to an arm b^{16} , extending from said rock-shaft. The rod b^{15} is reciprocated in one direction by a cam b^{17} , mounted upon a shaft C^3 , carrying the cylinder C^2 . The rock-shaft b^{11} is oscillated in the reverse direction by means of a spring b^{18} , connected at one end with an arm b^{19} , extending from said rock-shaft, and at the other end with the table B.

From the rock-shaft b^{11} arms b^{20} extend upward through slots in the table B. Links b^{21} connect these arms with brackets b^{22} , mounted upon a plate b^{23} , upon which the back guides b^4 are mounted. The bar b^{23} may simply rest upon the top of the table B, and, if desired, wearing-plates of metal b^{24} may be arranged under it upon the table B when the latter is made of wood. The bar b^{23} and back guides b^4 are reciprocated lengthwise of the table B. When they reciprocate forward a bag-blank transversely fed upon the table in front of them will be adjusted to the proper place for presentation to the cylinders C' C^2 .

B' designates a table which may be supported in any suitable manner. As here shown, it is supported by a standard b^{25} , extending to it from the side pieces of the table B, and by a standard b^{26} , extending from one of the side pieces of the frame A. This table is elevated considerably above the table B and is arranged to one side of it. It has side guides b^{27} and an end guide b^{28} . A pile of bag blanks or tubes may be placed upon this table B' and fed one at a time to the table B.

The cylinder C' is mounted upon a shaft C , which is journaled in bearings on the side pieces of the frame A. The shaft C^3 , whereby the cylinder C^2 is supported, is journaled in bearings provided in standards a' , erected upon the arc-shaped brackets a of the frame A.

The cylinder C' is twice the size of the cylinder C^2 and is intended to operate in connection with two bag-blanks at the same time, while the cylinder C^2 is intended only to operate upon one bag-blank at a time.

The cylinder C' is provided with grippers consisting of a finger c , mounted on a rock-shaft c' and lying within a suitable recess in the periphery of the cylinder C' , the rock-shaft being journaled in the cylinder. The rock-shaft c' of each gripper has affixed to it a tumbler-head c^2 , which co-operates with certain fixed cams c^3 c^4 c^5 . The fixed cams c^3 c^4 are made in the form of studs or pins, preferably furnished with antifric-tion-rollers. The cam c^3 is supported by one of the arc-shaped brackets a of the frame A. The cam c^4 is supported by one of the standards a' of the frame A. The cam c^5 is made in the form of a plate depending from an arm which is fastened to one of the side pieces of the frame

A. The cam c^3 co-operates with the tumbler of each gripper to throw the gripper-finger wide open into a position to be engaged with the bag-blank. The cam c^4 coacts with the tumbler of each gripper, so as to cause the gripper to engage with the bag-blank. The cam c^5 co-operates with the tumbler of each gripper to slightly open the gripper for the purpose of releasing a bag-blank.

It may be well for me to here remark that each bag blank or tube E has a lip e on that side which does not comprise the longitudinal seam. The bag-blanks are laid upon the table with the seamed side uppermost, and consequently with the side which is provided with the lip undermost. Each gripper of the cylinder C' engages with the lip e of a bag-blank, and consequently engages with the lower unseamed side of the bag-blank. The other side of each bag-blank will be engaged with the cylinder C^2 . The tumbler belonging to each gripper of the cylinder C' is pivotally connected with one end of a rod c^6 , which at the other end works longitudinally in a bearing c^7 , with which the cylinder is provided. A spiral spring c^8 surrounds each rod c^6 between the bearing c^7 and a collar c^9 , affixed to the rod.

The engagement of the upper seamed slide of each bag-blank with the cylinder C^2 is effected by pins c^{10} , extending from this cylinder. There may be any number of these pins. Only two have been shown. They are inserted in recesses in the cylinder. Preferably the cylinder will be provided with a number of sets of recesses, into which these pins may be inserted to suit different-sized bag blanks or tubes. Opposite the recesses for these pins the cylinder C' will be provided with similar recesses, so that the pin-points will not be dulled by contact with the latter cylinder. As the cylinders C' C^2 rotate they will pull opposite sides of a bag-blank apart, so as to spread out the side flaps e' and cause the end flaps e^2 to turn inward. The cylinder C^2 is not a complete cylinder, but has a segment entirely removed. Each bag blank or tube will be adjusted by the movable guides closely within the bite of the cylinders while this open segment is passing the cylinder C' . Owing to this no feeding of the bag blank or tube to the cylinders will take place until the proper time, when a gripper of the cylinder C^2 becomes engaged with it.

The cylinder C^2 is provided with slitting-knives F , extending circumferentially of it. These knives are fitted into recesses in the cylinder and secured in any suitable manner. Preferably the cylinder will be provided with a number of sets of recesses for receiving the slitting-knives, in order that the latter may be set suitably for bag blanks or tubes of different sizes. Opposite the recesses with which the cylinder C^2 is provided for the slitting-knives there will be formed in the cylinder C^2 similar recesses, so that the edges of the

knives will not be dulled by contact with the cylinder C². The function of the slitting-knives is to cut slits forming the edges e³ of the side flaps e' of each bag blank or tube.

5 On the cylinder C² is a creasing-bar G. It is set in a recess extending parallel with the axis of this cylinder, and in the opposite portion of the cylinder C' a similar recess will be formed to allow the edge of the creasing-bar to work inward of the periphery of the cylinder C'. The function of this creasing-bar is to form a crease along the line e⁴, Fig. 11, rearward of the side flaps and end flaps, so as to cause the accurate folding of the bag-bottom against the body of each bag at this line. There may be a number of recesses in the cylinder C² for receiving this creasing-bar, the object of a plurality of these recesses being to enable different sizes of bag blanks or tubes to be inserted. In the cylinder C' there will be a corresponding number of recesses.

In the cylinder C² are a number of circumferential grooves h. Opposite these circumferential grooves are the points of stripping-fingers H, which are mounted upon a rod h', which is bolted to arms h², mounted upon the shaft C³, supporting the cylinder C². By slackening the nuts whereby the rod h' is bolted to the arms h² the stripping-fingers may be rocked inward and outward relatively to the periphery of the cylinder C². The arms h² have depending portions, which are provided with arc-shaped slots concentric with the axis of the shaft C³. Screws h³, passing through these slots and engaging with tapped holes in the standards a', serve to clamp the arms h² in position. On slackening the screws the arms may be adjusted to vary the position of the stripping-fingers circumferentially of the cylinders C². After the adjustment of the arms they may be clamped in position by tightening the screws.

The function of the stripping-fingers is to disengage the upper seamed side of each bag blank or tube from the pins c¹⁰. When the disengagement of the bag-blank from the pins c¹⁰ occurs, the end flaps will be turned inward, although not flattened down. To prevent them from bending out to their original position before being folded down flat, I employ a roller O, journaled in arms o, extending from the arc-shaped brackets a. This roller is located at a considerable distance from the cylinder. On one of its journals a pinion o' is affixed, and with this engages a rack-bar o², which at one end works through a guide o³, extending from one of the arc-shaped brackets a, and at the other end is forked, so as to straddle and derive support from a shaft P. On the shaft P is a cam o³, which acts upon a stud or roller o⁴, mounted upon the rack-bar o². The cam reciprocates the rack-bar in one direction. A spring o⁵, fastened at one end to the rack-bar and at the other end to one of the side pieces of the

frame A, reciprocates the rack-bar in the reverse direction. An oscillating motion of the roller O is derived from the reciprocations of the rack-bar. On the journals of the roller O tuckers Q are fixed. As the roller is reciprocated these tuckers are swung downward into the position indicated by dotted lines in Fig. 3 to fold in the material where the end tucks join the upper side of the body of the bag blank or tube, as may be readily understood by reference to Fig. 10.

R designates a presser-roll journaled in arms r, extending from the arc-shaped brackets a. While the end flaps are folded inward each bag blank or tube will pass between the presser-roller R and the cylinder C', and thus the side flaps will be folded down flat, as illustrated in Fig. 10. Leaving the presser-roller R each bag blank or tube passes to pasting 85 devices.

S designates a pasting-roll supported upon a shaft s, journaled in bearings arranged upon the side pieces of the frame A. On the shaft s there are pulleys s', and around these pass belts T, which also pass around pulleys u on a shaft U, which is supported in bearings on the side pieces of the frame A. These belts also pass around a pressing-roller V and around guide-rollers and tighteners W.

The pasting-roll S has a pasting-segment s², which is periodically moved opposite the cylinder C' to deposit paste upon a bag-blank. The shape of this pasting-segment may be understood from the dotted lines in Fig. 11, which illustrate the paste applied by it to a bag-blank. Paste is obtained by this pasting-segment from a roll s³, journaled in bearings erected upon the side pieces of the frame A, and said roll s³ receives paste from a roller s⁴, which is journaled in brackets s⁵, extending from the side pieces of the frame A. The roller s⁴ runs in a tank s⁶, containing paste. Brackets s⁷, extending from the side pieces of the frame A, in connection with cross-pieces s⁸ s⁹, support the tank s⁶. The tank rests directly upon the cross-pieces s⁸ s⁹. The cross-piece s⁹ is at one end pivoted by a pin s¹⁰ to one of the brackets s⁷, or an extension of the latter, and at the other end rests upon the other bracket s⁷. On the latter bracket is a pin s²¹, which will ordinarily hold the cross-piece s⁹ in position upon the bracket s⁷, upon which its free end rests. By slightly lifting the free end of the cross-piece s⁹ this cross-piece may be swung off the bracket s⁷, which is provided with said pin s²¹, and then the paste-tank may be removed. As the rolls s⁴ s³ rotate in close contact they will disintegrate any lumps which may occur in the paste. The pasting-segment s² of the pasting-roller is connected with the hub of the roller, so that it may be adjusted radially inward whenever it is not desirable to apply the paste. Sometimes it happens that the bag-blank becomes disarranged, and in consequence of such disarrangement it is desirable to stop the operation of pasting

without stopping the whole machine in order to avoid the application of paste to the surface of the cylinder C'. It is to provide for suspending the operation of pasting that the pasting-segment is afforded opportunity for inward adjustment. The means for adjusting the pasting-segment relatively to the hub of the pasting-roller are best illustrated in Figs. 5 and 6, although Figs. 1 and 3 may also be referred to for an understanding of these means. It will be seen that the pasting-segment s^2 has a shank s^{11} , having a hole s^{12} , which surrounds the shaft s and having its edges fitted in slide-ways formed in the hub of the pasting-roller. The hole s^{12} is considerably larger than the shaft s in the direction of the length of the shank of the pasting-segment, so as to afford provision for the adjustment of the pasting-segment radially to the hub. In the shaft s is a hole within which a rod s^{13} is fitted so that it can slide longitudinally. At the inner end of this hole is a recess s^{14} , which opens at the periphery of the shaft s . Through this opening extends a toe s^{15} , mounted upon a shaft s^{16} . The rod s^{13} abuts against the toe s^{15} , and the toe abuts against the hole s^{12} in the shank of the pasting-segment, bearing against that portion of the shank of the pasting-segment which is on the opposite side of the shaft s to the portion of said shank on which the pasting-segment is affixed. Obviously when the rod s^{13} is forced inward the toe s^{15} will be forced outward, and this will cause the pasting-segment to be retracted, so that it will not apply paste to anything upon the surface of the cylinder C' or to the surface of said cylinder. The pasting-segment is normally held in its outermost position and is adjusted to that position whenever this is possible by means of springs s^{17} , secured at one end to the periphery of the hub of the pasting-roller and at the other end bearing upon that end of the shank of the pasting-segment on which the pasting-segment is not arranged. The rod s^{13} is forced inward by means of a toe s^{18} , mounted upon a rock-shaft s^{19} , supported in brackets s^{20} , affixed to one of the side pieces of the frame A. On this rock-shaft is an arm s^{21} , and to the outer end of the latter is connected a rod s^{22} , which at the lower end is connected to a treadle s^{23} . The treadle s^{23} is fulcrumed at one end to a stud s^{24} , supported by the frame A, and at the forward end is guided in a bracket s^{25} , mounted upon one of the side pieces of said frame. Above the forward end of this treadle is a lever s^{26} , which is fulcrumed between its ends to one of the side pieces of the frame A and may be rocked so as to engage with the upper end of the treadle for the purpose of holding it depressed. A spring s^{27} normally holds the treadle s^{23} in an elevated position, said spring being connected at one end with the treadle and at the other end with one of the side pieces of the frame A.

Obviously the operator of the machine may

retract the pasting-segment at any time by depressing the treadle s^{23} . If he desires to keep the pasting-segment permanently retracted, he has only to fasten the lever s^{26} in its depressed position by means of the lever s^{26} .

The shaft U, upon which the belt-pulleys u are mounted, also has mounted upon it creasing-bars $X' X^2$, whereby the bag-blank is creased along the dotted lines e^{10} . These creasing-bars are supported by arms x , having cylindric hubs x' . The latter may be fastened in any position upon the shaft U by means of set-screws. Provision is therefore afforded for adjusting the arms rotarily upon the shaft for different-sized bag-blanks. If the bars $X' X^2$ are transversely slotted, as shown in Fig. 4, and fastened to the arms by screws passing through the slots and engaging with tapped holes in the arms, they can be adjusted radially to the shaft U.

The cylinder C' will be provided with grooves opposite to the positions into which the creasing-bars will be adjusted for different-sized bag-blanks. It is advantageous to afford provision for the yielding of these creasing-bars, and consequently the shaft U is supported in yielding journal-boxes u' . These journal-boxes are supported in housings u^2 , formed on brackets u^3 , extending from the side pieces of the frame A. A rod extends through the lower part of the housing and bears against each journal-box. This rod has a head u^4 . Screws u^5 pass freely through this head and engage with tapped holes in the housing. Springs u^6 surround these screws between their heads and the head u^4 , so as to press each journal-box upward or toward the cylinder C'. It will be understood that this method of supporting the shaft U allows the creasing-bars to yield away from the cylinder while performing their work.

The guide-pulleys W are supported on studs w , extending from brackets w' , fastened to the side pieces of the frame A. These brackets are intended to be adjustable, so that the pulleys W will also serve as belt-tighteners. They may be adjustably connected with the side pieces of the frame A by forming longitudinal slots in them and passing screws through these slots and into tapped holes in the side pieces of the frame, for then the brackets may be clamped in different positions. The pressing-roller V presses down the bag-bottom after the folding is completed, and thereby completes the bag-bottom.

It will of course be understood that the belts T by moving along with the lower part of the cylinder C' will hold the bag blanks or tubes against the cylinder. The manner in which they do this may be understood by reference to Fig. 11.

Just before the final pressing of the bag a folding-bar Y folds over the side flaps e' . This bar Y extends along the cylinder C' and is supported at one end only. Its support

consists of an arm y , fulcrumed between its ends to a pin y' , carried by a bifurcate arm y^2 , which is loosely hung on the shaft C. The pin y' extends through one of the bifurcate extremities of the arm y^2 . The other bifurcate extremity of the arm y^2 has a guide, through which the arm y may swing to a limited extent on its fulcrum-pin y' . The arm y^2 has but a limited oscillating motion, and its motion is restricted in one direction by a stop y^3 , mounted upon one of the housings u^2 , this stop being so arranged that the lower extremities of the bifurcate portions of the arm y^2 , serving as a guide for the arm y , will contact with them.

Motion is imparted to the arm y^2 by means of a rod y^4 , which is connected with its upper end above the shaft C and is actuated in one direction by a cam y^5 on one of the journals of the roll s^3 . This cam co-operates with a stud or roller y^6 on the rod y^4 . The arm y^2 is moved in the reverse direction by a spring y^{16} , which at one end is fastened to an arm y^7 , depending from one of the brackets s^7 , and at the other end is fastened to a rod y^8 , which at the upper end is pivotally connected to the cam-rod y^4 and at the lower end is pivotally connected by a pin y^9 to one of the side pieces of the frame A.

The object of supporting the folding-rod Y by means of the arm y is to enable the folding-rod to be moved nearer to the cylinder C' when it is moved forward. The operation of the arm y is effected by means of a stationary cam y^{10} , extending from one of the side pieces of the frame A and co-acting with a stud or roller y^{11} , with which the forward end of the arm y is provided. It will be seen that as the arm y^2 swings forward the stud or roller y^{11} of the arm y will travel along the cam y^{10} , and that in consequence of this the folding-rod will be gradually moved closer to the cylinder C'. The cam y^5 is so shaped that the folding-rod will be in advance of the bag-blank moving forward with the under side of the cylinder C'. Owing to this it will lift the forward flap e' of the bag-blank and hold it away from the cylinder C' until it reaches the pressing-roll V, as indicated in Fig. 12. After this the folding-rod will be moved quickly backward, so as to be behind the other flap e' of the bag-blank. Subsequently it is moved quickly forward, so as to fold forward the rear flap e' . At about this time the forward flap e' is moved under the pressing-roller V and is folded down flat over the rear flap e' . The pressing-roller, as before explained, flattens down both the flaps and completes the bag-bottom.

A stripper or guide Z, arranged above the pressing-roller V, prevents the completed bag-blanks from continuing onward with the cylinder C'.

The completed bag-blanks pass between rollers Z' Z^2 Z^3 Z^4 and are carried away and

discharged into a receptacle Z^5 . Belts Z^6 may pass around the lower rollers Z^3 Z^4 , if desired.

Motion may be transmitted to the various rotary parts in any desired manner. As here shown, Z^7 is the driving-shaft of the machine, and on it is a gear z , which engages with a gear-wheel z' on the shaft C, carrying the cylinder C'. On the shaft C³ of the cylinder C² is a gear-wheel z^2 , engaging with the gear-wheel z' . The shaft s of the pasting-roller is provided with a gear-wheel z^3 , which derives motion from the gear-wheel z' . The shaft U is provided with a gear-wheel z^4 , which engages with the gear-wheel z' . One of the journals of the roller s^3 has affixed to it a gear-wheel z^5 , deriving motion from the gear-wheel z^3 and transmitting motion to a gear-wheel z^6 , affixed to the shaft P, supporting the roller s^4 . The pressing-roller V and the delivery-rollers Z' Z^2 Z^3 Z^4 derive motion through any suitable train of gearing.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a paper-bag machine, the combination of a table, a side guide, a rock-shaft, an arm extending from the rock-shaft and connected with the side guide, a second rock-shaft, and a tappet on the second rock-shaft coacting with the tappet on the rock-shaft which is connected with the side guide, substantially as specified.

2. In a paper-bag machine, the combination of a cylinder upon which the bag-blank is fed and an upper cylinder having a segment removed, and mechanism operating with said cylinders for opening the end of the bag-tube, substantially as specified.

3. In a paper-bag machine, the combination of two cylinders arranged one opposite the other, one of said cylinders having a portion removed, and means for automatically presenting a bag-blank to such cylinders, and means substantially such as described for opening the mouth of the bag-tube, substantially as specified.

4. In a paper-bag machine, the combination, with a cylinder around which the bag-blank is passed and an opposite cylinder for coacting with the first-mentioned cylinder to separate the sides of a bag-blank and thereby turn in end flaps, of a cylinder for preventing the end flaps from resuming their normal position and tuckers supported on the journals of said cylinder for tucking in the material of the bag-blanks adjacent to the end flaps, substantially as specified.

5. In a paper-bag machine, the combination, with a cylinder around which a bag-blank is fed, of a pasting-roll having an adjustable pasting-segment and mechanism for retracting said segment, substantially as specified.

6. In a paper-bag machine, the combination, with a cylinder around which a bag-blank is fed, of a pasting-roll having a retractable pasting-segment, a toe extending into the

shaft of said pasting-roll for retracting said segment, a rod arranged in said shaft for actuating said toe, and a treadle for actuating said rod, substantially as specified.

5 7. In a paper-bag machine, the combination, with a cylinder around which bag-blanks are passed, of a shaft carrying rotarily-adjustable creasers and yielding spring-supporting bearings for said shaft, substantially as specified.

10 8. In a paper-bag machine, the combination, with a cylinder around which bag-blanks are passed, of a folding-bar, an arm supporting

said folding-bar and fulcrumed to a second arm, a cam for moving the folding-bar toward and from the cylinder, and means for oscillating the second arm, substantially as specified. 15

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

WM. LIDDELL.

Witnesses:

ANTHONY GREF,
WM. M. ILIFF.