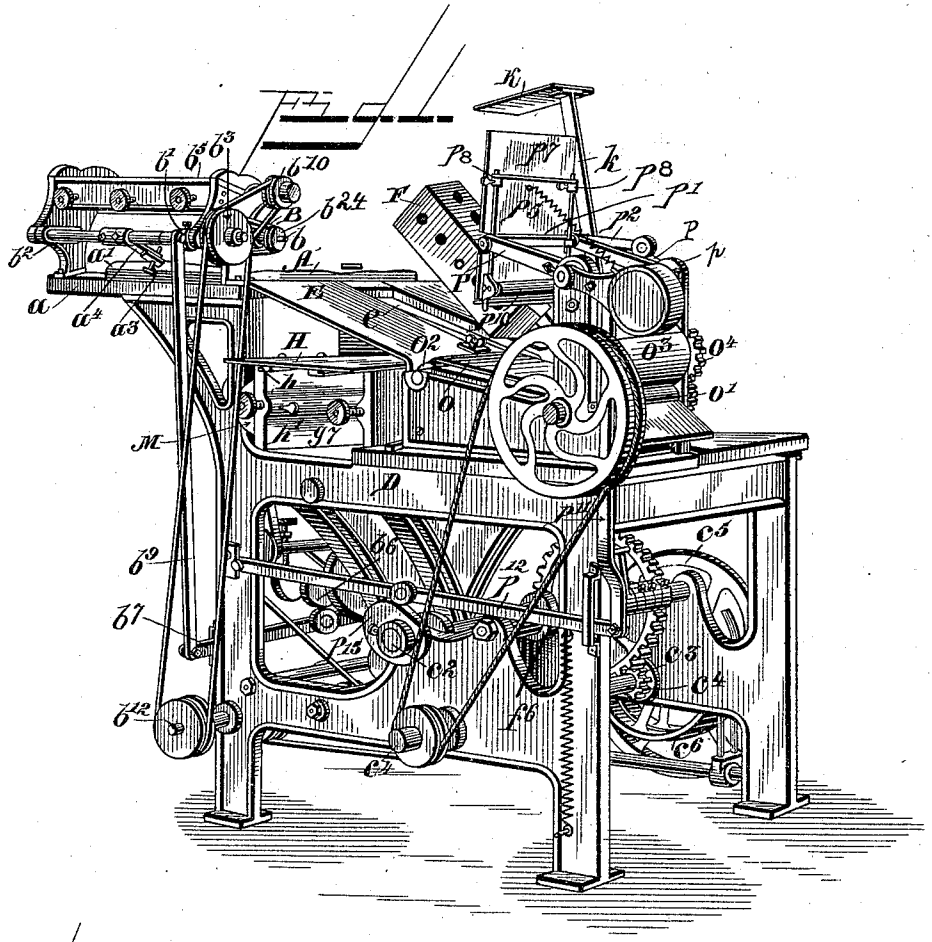
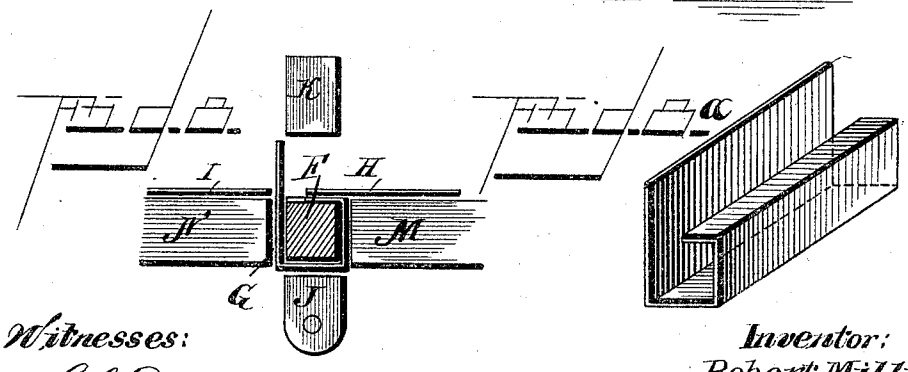
(No Model.) 11 Sheets—Sheet 1.

R. MILLIS.

PAPER BAG MAKING MACHINE.

No. 513,519. Patented Jan. 30, 1894.





Witnesses:
H. G. Dieterich
B. W. Sommers

Inventor:
Robert Millis:
By Munn & Co
Attys:

THE NATIONAL LITHOGRAPHING COMPANY,
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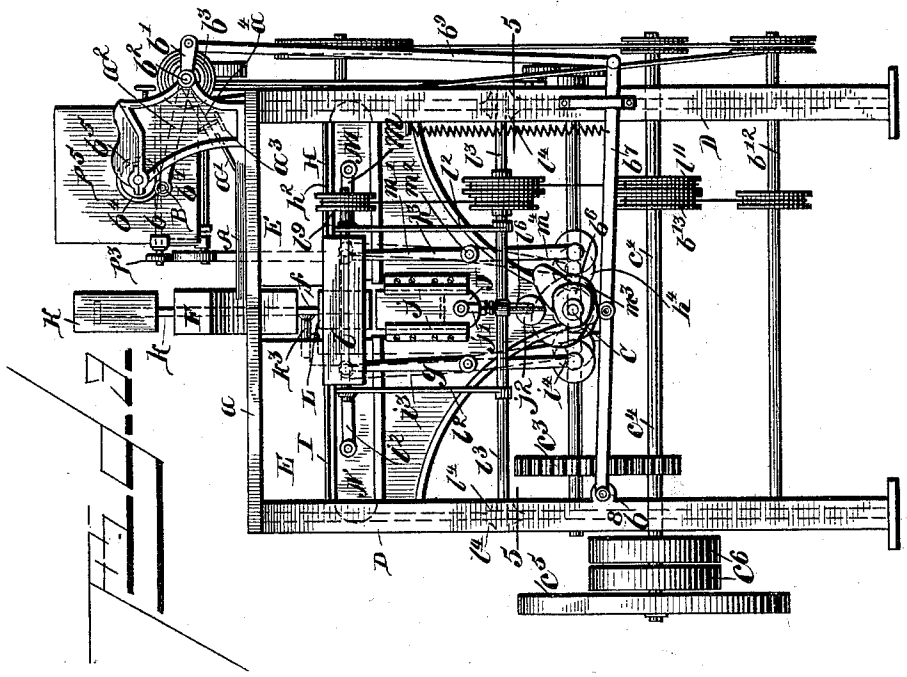
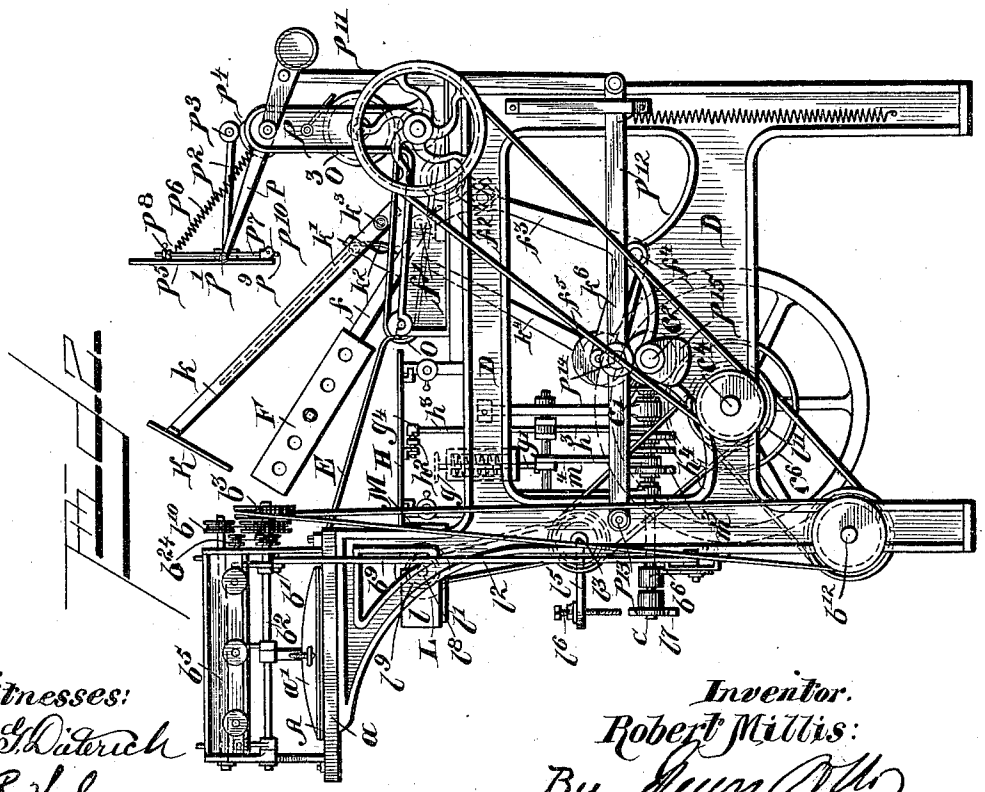
(No Model.) 11 Sheets—Sheet 2.

R. MILLIS.

PAPER BAG MAKING MACHINE.

No. 513,519. Patented Jan. 30, 1894.





Witnesses:
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Inventor.
Robert Millis:
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Atty.

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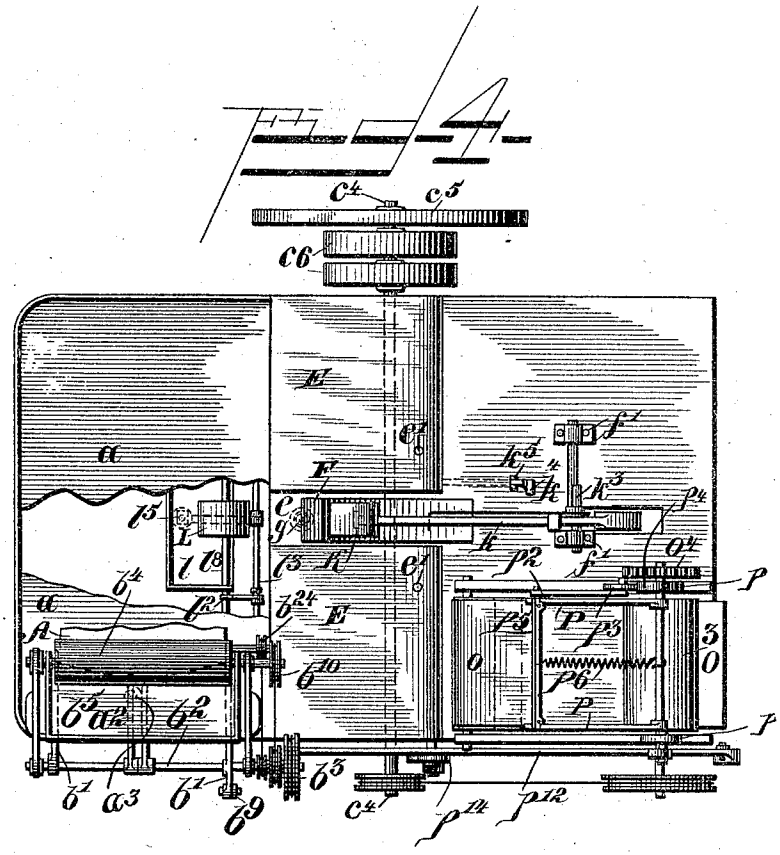
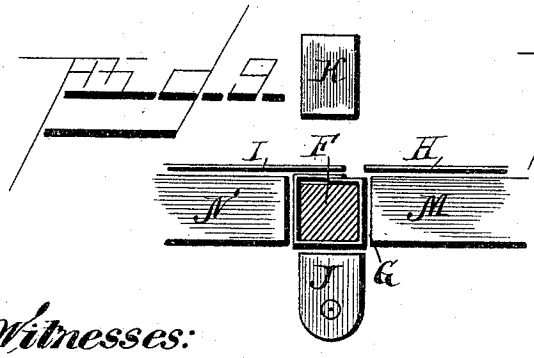
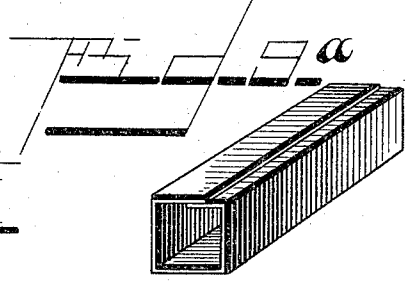
R. MILLIS.

PAPER BAG MAKING MACHINE.

No. 513,519. Patented Jan. 30, 1894.







Witnesses:
H. G. Dieterich
B. W. Sommers

Inventor:
Robert Millis;
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No. 513,519. Patented Jan. 30, 1894.

FIG. 5.

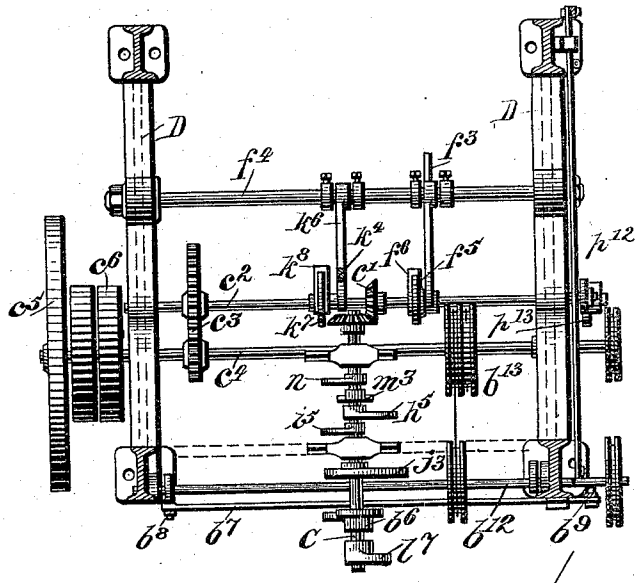


FIG. 6.

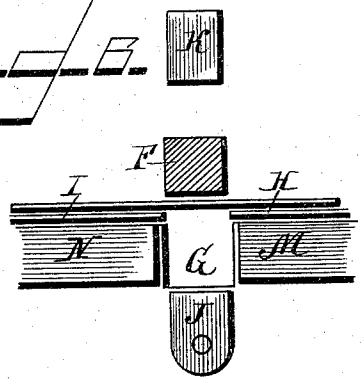


FIG. 6a.

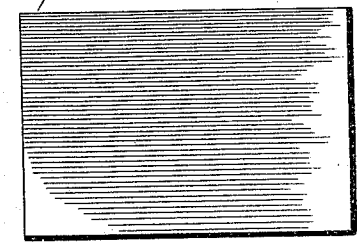


FIG. 7.

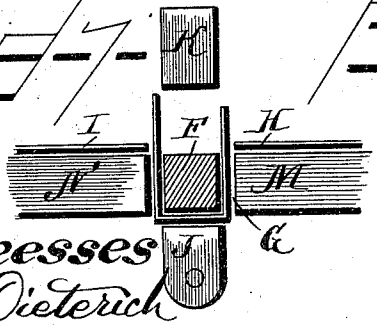
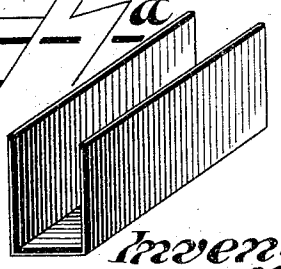


FIG. 7a.



Witnesses
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Robert Millis.
By Munn & Co Attys

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PAPER BAG MAKING MACHINE.

No. 513,519. Patented Jan. 30, 1894.

Fig. 5a

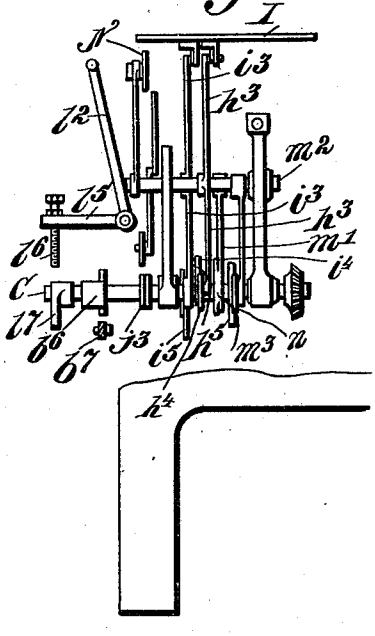


Fig. 5b

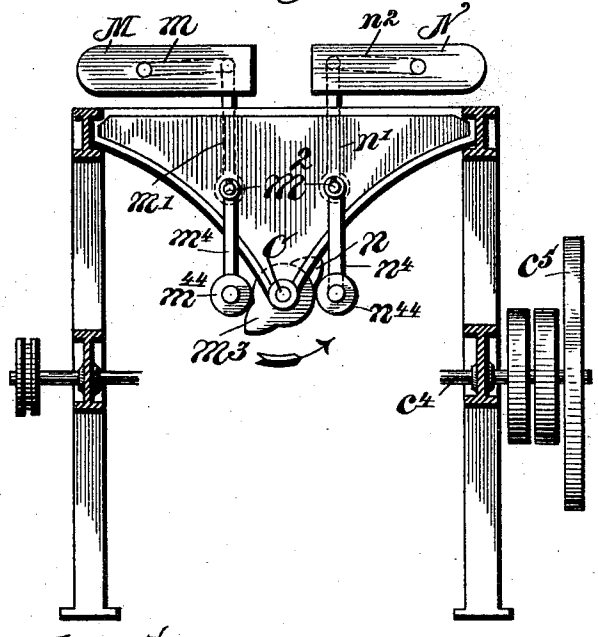
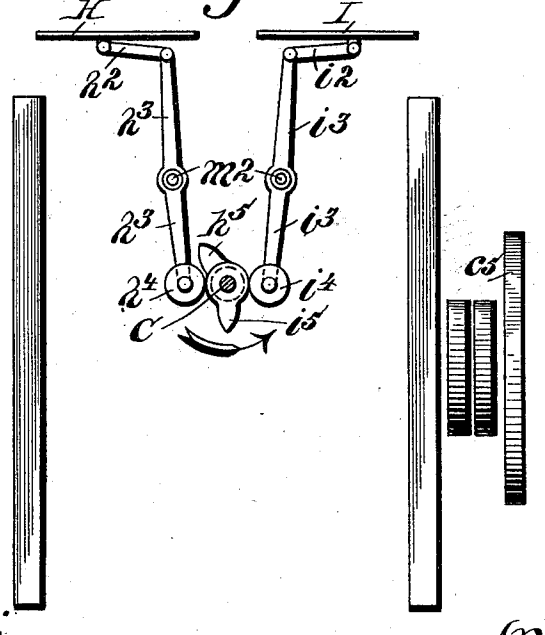


Fig. 5c



Witnesses:
H. G. Dieterich
Henry Orth

Inventor:
Robert Millis:
By Henry Orth Atty.

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R. MILLIS.

PAPER BAG MAKING MACHINE.

No. 513,519. Patented Jan. 30, 1894.

Fig. 10.

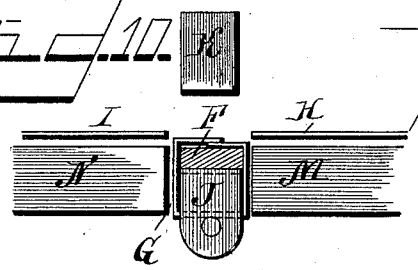


Fig. 10a.

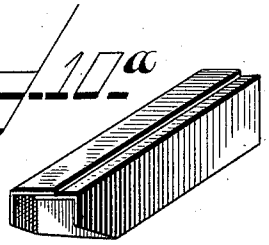


Fig. 11.

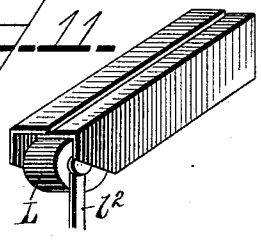


Fig. 12.

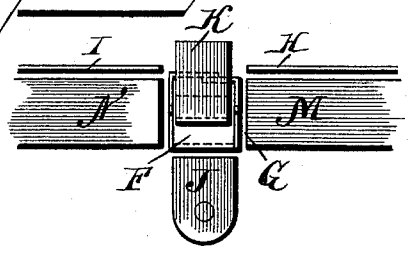


Fig. 12a.

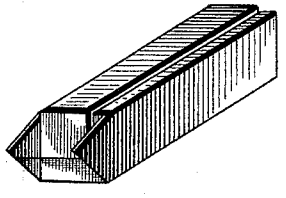


Fig. 13.

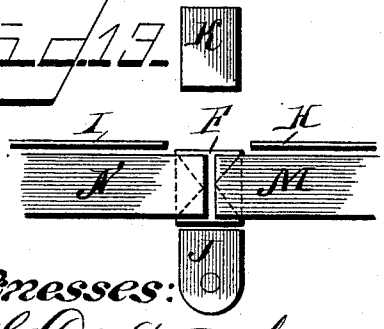
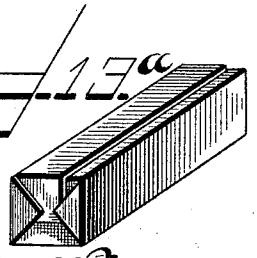


Fig. 13a.



Witnesses:
H. G. Dieterich
B. W. Sommers.

Inventor:
Robert Millis:
By Munn & Co Attys

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R. MILLIS.

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No. 513,519. Patented Jan. 30, 1894.

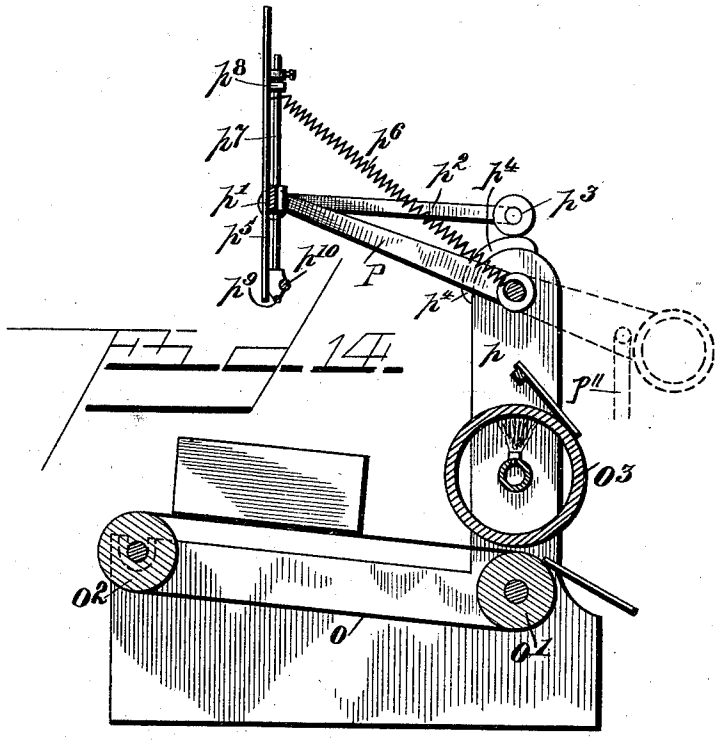

Fig. 14.

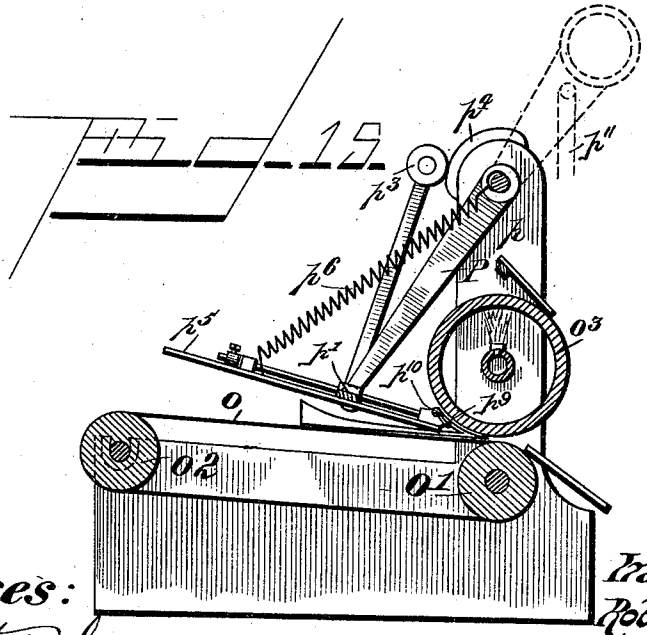

Fig. 13.

Witnesses:
H. S. Dieterich
C. W. Sommers.

Inventor:
Robert Millis.
By Henry Orth
Atty

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R. MILLIS.

PAPER BAG MAKING MACHINE.

No. 513,519. Patented Jan. 30, 1894.

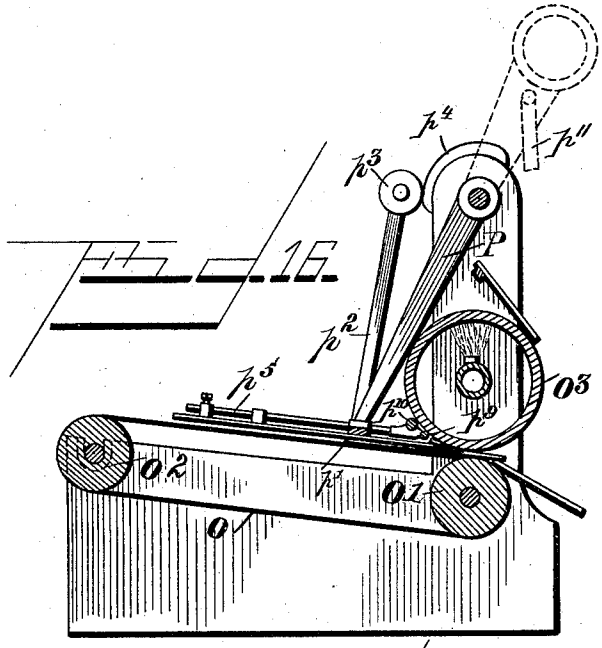

Fig. 16.

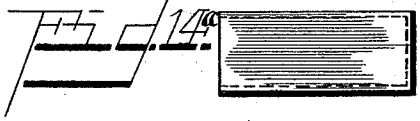

Fig. 14a.

Fig. 15a.

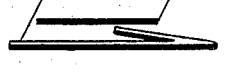

Fig. 16a.

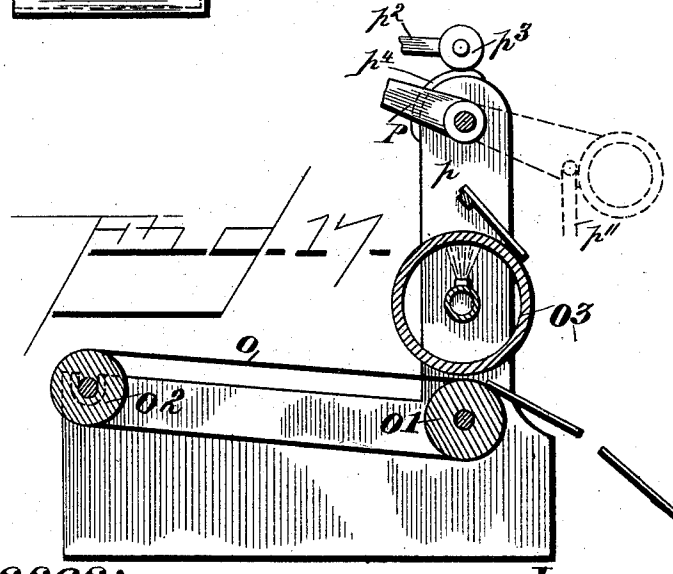

Fig. 17.

Witnesses:
H. G. Dieterich
C. W. Sommers.

Inventor:
Robert Millis:
By Henry A. Wise
Atty.

THE NATIONAL LITHOGRAPHING COMPANY,
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R. MILLIS.

PAPER BAG MAKING MACHINE.

No. 513,519. Patented Jan. 30, 1894.

Fig. 18.

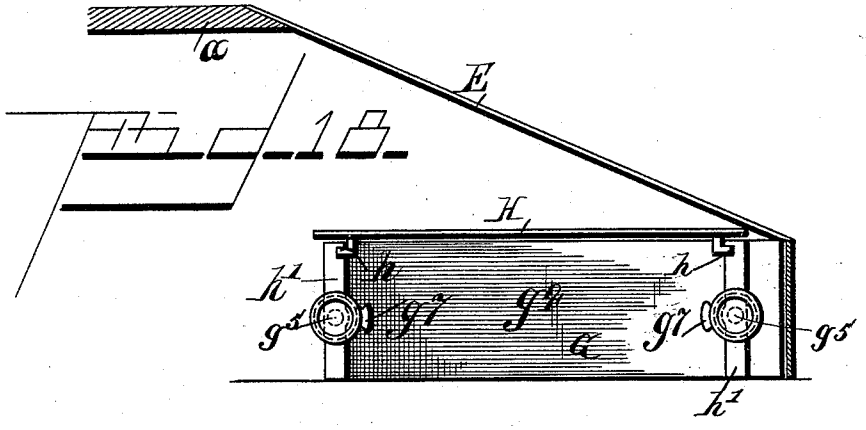


Fig. 19.

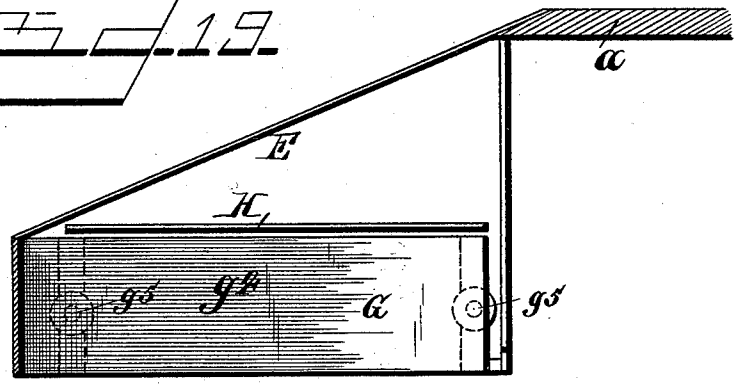
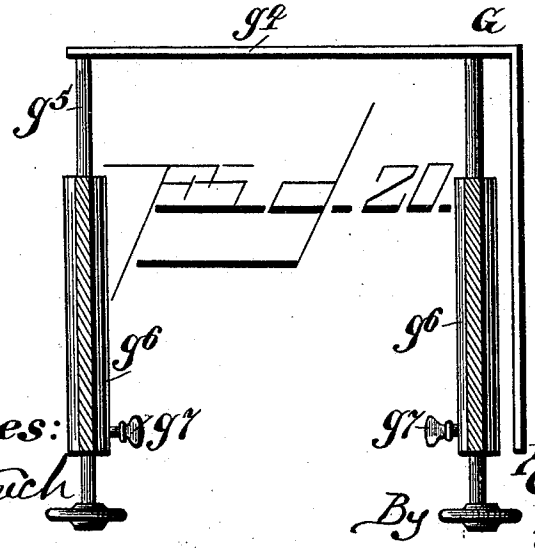


Fig. 20.



Witnesses:
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B. W. Sommers.

Inventor.
Robert Millis
By Munn & Co
Attys.

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WASHINGTON, D. C.

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Fig. 21.

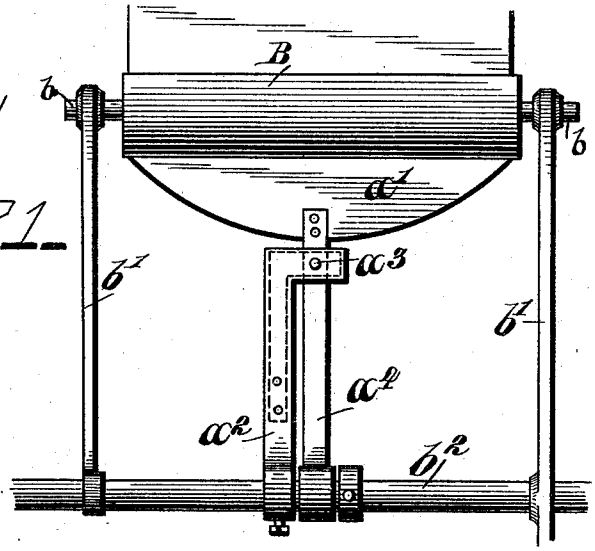


Fig. 32.

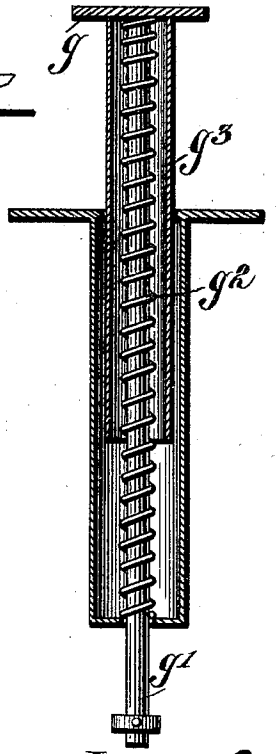
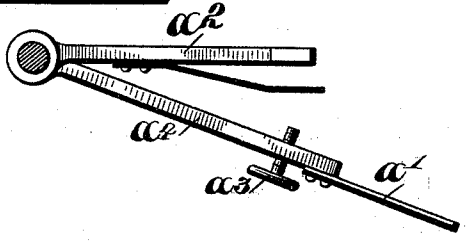


Fig. 21a.



Witnesses:
H. G. Dieterich
B. W. Sommers.

Inventor:
Robert Millis:
By Henry Orth
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THE NATIONAL LITHOGRAPHING COMPANY,
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R. MILLIS.

PAPER BAG MAKING MACHINE.

No. 513,519 Patented Jan. 30, 1894.

FIG. 22.

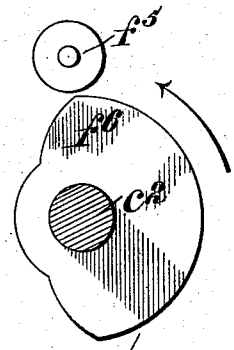


FIG. 23.

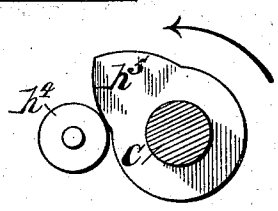


FIG. 24.

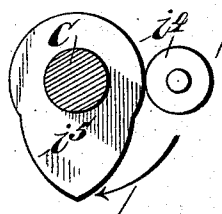


FIG. 25.

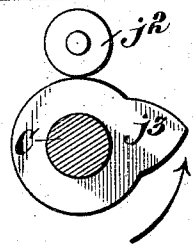
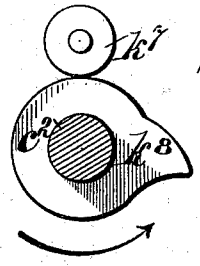


FIG. 26.



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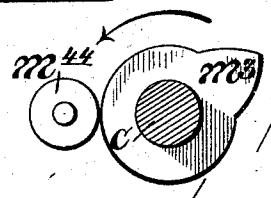

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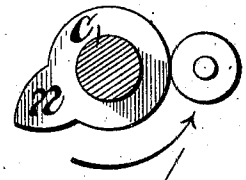


FIG. 29.

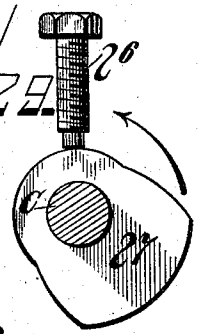


FIG. 30.

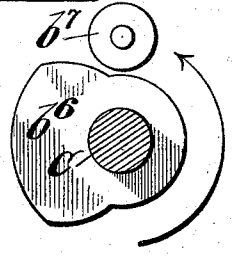
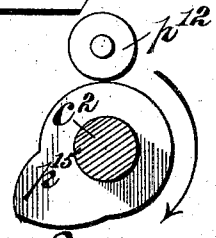


FIG. 31.



Witnesses:
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B. W. Sommers.

Inventor:
Robert Millis:
By Munn & Co
Attys.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ROBERT MILLIS, OF DUNEDIN, NEW ZEALAND.

PAPER-BAG-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 513,519, dated January 30, 1894.

Application filed December 7, 1891. Serial No. 414,312. (No model.)

To all whom it may concern:

Be it known that I, ROBERT MILLIS, printers' machinist, a subject of the Queen of Great Britain, and a resident of Dunedin, in the British Colony of New Zealand, have invented an Improved Paper-Bag-Making Machine, of which the following is a specification.

The object of my invention is to provide a machine which will perform all the operations necessary for manufacturing square bottomed paper bags, with a side or center seam, from printed or other sheets of paper.

According to my invention, I have devised a machine which first pastes one edge of the uppermost sheet of a pile of sheets of paper, and which then, after said uppermost sheet has been placed in position by the operator, drives or carries said sheet down by means of a square-shaped blank or male die (of a size corresponding to that of the bag to be made) into a mold or female die in such a manner that the two edges of the sheet of paper project up from between the sides of said male and female dies. Then two horizontally sliding folder blades are moved one after the other in such a manner as to fold first the unpasted side of the sheet of paper over the top of the male die or blank, and then the other side, so as to fold the pasted edge of the paper over the opposite edge and cause it to adhere thereto. While the sheet of paper is being formed into a square tube, a vertically sliding plate, or what I term the bottom end folder, is raised so as to fold in the lower part of the end of said tube, and immediately afterward a paste roller, having previously been moved forward by a suitable cam arrangement, delivers a small quantity of paste along the underneath part of the top edge of the end of said bag, and then another vertical plate, or what I term the top end folder, is lowered, and folds in said pasted part of the end of said bag over the lower part, after which two more sliding plates or folders are moved so as to turn in the two remaining peaks or sides of the end of said bag, the effect of turning said peaks in being to cause them to contact with the paste roller above referred to, so that a certain quantity of paste is delivered on to them and they are thus caused to adhere to the bag bottom, thus completing the manufacture of the bag, which is then removed from the blank or male die upon which it has been formed, and is placed in position in front of a traveling roller and endless traveling apron, when a small roller supported upon a pair of arms above it is caused to move down so as to form a fold across the bag near the bottom, and the movement being continued, a straight blade or knife comes down and completes the fold in the bag, which is then guided to between said traveling apron and roller; the square paper cylinder or bag having the block bottom is thereby compressed into a flat shape, which is very convenient for packing the bags in cases or other receptacles for delivery.

Referring to the accompanying drawings, Figure 1 is a perspective view of a paper bag making machine, constructed according to my invention, while Fig. 2 is a side elevation, and Fig. 3 is a front elevation thereof looking from the left hand side of Fig. 2. Fig. 4 is a plan of said machine. Fig. 5 is a horizontal section on line 5 5, Fig. 3. Fig. 5^a illustrates the cam shaft and mechanism controlled thereby or co-operating therewith. Figs. 5^b and 5^c are sectional views illustrating the devices for operating some of the folding devices from the cam shaft. Figs. 6 to 13 are diagrammatic views, illustrating the operation of the various folding contrivances above referred to, while Figs. 6^a to 13^a are diagrammatic views, showing the bag in various stages of manufacture, each view being shown alongside the mechanism employed to effect the change in the bag. Figs. 14 to 17 are diagrammatic views of part of the machine, illustrating the contrivances used for folding or flattening down the completed bag. Figs. 14^a to 16^a are diagrammatic views, showing the completed bag in the various stages which it undergoes while being folded or flattened down previous to being rolled or compressed. Fig. 18 is a side elevation of the inclined table or platform upon which the sheet of paper to be made into a bag is placed, showing the arrangement whereby the width of the female die is varied to suit different sized bags. Fig. 19 is a similar view to Fig. 18, but looking from the inside of the die. Fig. 20 is a plan of the adjusting plate forming the side of the female die and its connections.

Fig. 21 is a plan of the paper, hold fast and pasting roller; and Fig. 21^a is a side elevation of the hold-fast. Figs. 22 to 31 are diagrammatic views, showing the arrangement of the various cams on the cam shafts, illustrating them in their different relative positions at the commencement of the operation. Fig. 32 is a sectional view showing the hold-fast used for retaining the sheet of paper in position in the female die.

The same letters of reference indicate the same parts in all the figures.

A Figs. 1, 2, 3 and 4 represents a pile of sheets of paper from which the bags are to be manufactured, said sheets being cut to the required size and laid one above the other upon the paste table *a*.

Referring to Figs. 1, 2, 3, 4, 21 and 30 these sheets of paper are retained in position upon said table by means of a hold-fast a' which is arranged to press down upon the edge of the top sheet of the pile so as to prevent it shifting, while said top sheet is being pasted as well as to prevent it from lifting with the pasting roller B when the latter is moved upwardly in order to get a fresh supply of paste as hereinafter described. The spindle *b* of this pasting roller is mounted in the ends of a pair of arms b' which are rigidly secured at their other ends to a rock shaft b^2 mounted in bearings in a small frame secured to the paste table *a* as shown.

a^2 represents a stop arm which is adjustably fixed upon the rock shaft b^2, and is arranged to come into contact with a set screw a^3 passing through the arm a^4, which is connected with the hold-fast a', when the paste roller B is brought down to paste the edge of the uppermost sheet of the pile of paper as hereinafter described. By this means the weight of the paste roller B is thrown on to the hold-fast a' so as to cause it to hold the paper down firmly while the uppermost sheet is being pasted, and after the roller has been raised out of contact with said upper sheet to still retain a certain pressure on the paper so as to prevent it from being carried up by said paste roller. The paste is deposited upon the upper sheet of paper about one-eighth of an inch from the edge, this one-eighth of an inch being required for the hold-fast to bear upon. After the paste roller has been raised, the uppermost sheet of paper can be removed by the operator, and be placed in position for the subsequent operations as hereinafter described, the next sheet being then in position to be pasted, and so on.

b^4 represents a roller which rotates partly within the paste hopper b^5 and whose periphery takes up a certain quantity of paste from within said hopper and delivers it to the paste distributing roller B, when the latter is brought into contact with it. This result is effected by means of a cam b^6, Figs. 2 and 3, secured upon a cam-shaft C driven by bevel gearing c' from countershaft c^2, which is driven by spur gearing c^3 from the main shaft c^4 of the machine, said main shaft being fitted with a fly-wheel c^5, and fast and loose pulleys c^6 which enable it to be driven by a steam engine or other convenient source of power. The cam b^6 is arranged to act upon an anti-friction roller on a lever b^7 which is fulcrumed at b^8 upon the frame D of the machine, and whose other end is connected by a rod b^9 with the rear end of one of the arms or levers b' carrying the paste distributing roller B. The spindle of the paste roller b^4 is provided with a small grooved pulley b^{10}, driven from one groove of the three grooved pulley b^3, which runs loose on the rock shaft b^2, and is driven from a pulley upon a countershaft b^{12} mounted in bearings upon the side of the frame of the machine and driven from a pulley b^{13} upon the main shaft c^4 of the machine. The paste distributing roll B carries a pulley b^{24} driven from a third groove of the aforesaid pulley b^3.

E represents an inclined table upon which the sheets of paper are placed one by one by the operator after one of their edges has been pasted by the roller B. This table is formed with an opening *e* in its center, as illustrated in Figs. 1 and 4, and over this opening a sheet of paper is laid in a certain definite position, which is determined by experiment, small stops or pins e' (Fig. 4) being fitted on said inclined table E in order that each sheet of paper may readily be laid in the required position in a similar manner to the arrangement used on printing machines for the same purpose.

F represents a male die, blank or shape, which is secured upon the end of an arm or rod *f* mounted or pivoted in bearings f' carried by the frame D of the machine and having a shorter arm f^2 connected to a bell-crank lever f^3 fulcrumed on a rod f^4 and provided at its opposite end with an anti-friction roller f^5 working upon and operated by a cam f^6 on counter shaft C^2 Figs. 2, 3 and 22.

G represents a female die or space into which the male die F is lowered, said female die or space being more clearly shown in Figs. 6 to 13, and 18 to 20. Said female die is situated immediately below the opening *e* in the inclined table E, and can be fitted with adjustable sides to enable various sized bags to be made in the machine as hereinafter described.

g (Figs. 2, 3, 4 and 32) represents a small spring hold-fast, having a downwardly projecting spindle g' surrounded by a spiral spring g^2 contained within a casing g^3 which serves to retain said spring in its place and acts as a guide. The tendency of the spring is to always keep said hold-fast in its raised position, so that when the blank or male die F is lowered, said spring hold-fast *g* will press the paper tightly against said male die and retain it in position, and at the same time will automatically adjust the depth of the female die or mold.

H and I Figs. 1, 2, and 5^c represent two horizontally sliding folder plates arranged

one on each side above the level of the female die G. Each of these folder plates is arranged to slide in grooves (such as h Figs. 1, 2 and 18) formed in brackets or supports h' secured to the framing of the machine. The folder plate H is connected by means of a rod h^2 to a vertically arranged lever h^3, whose lower end is provided with an anti-friction roller h^4 arranged to be operated upon by a cam h^5 on the shaft C, Figs. 5, 5^c and 23. The second folder plate I is similarly connected by a rod i^2 to a lever i^3 whose lower end is provided with an anti-friction roller i^4, acted upon by a cam i^5 arranged upon said shaft C alongside the cam h^5. These two cams, h^5 and i^5, are so timed as to cause the folder-plate H to travel forward, so as to fold over one side of the sheet of paper, as illustrated in Fig. 8, and then to cause the second folder plate I to travel forward so as to fold the second edge of the sheet of paper over on to the first edge, and cause its pasted side to adhere to the other turned over edge of the sheet, so as to form a tube as will be hereinafter more particularly described, and as illustrated in Fig. 9^a.

J is a vertically sliding folder plate which is used for the purpose of doubling in the the lower part of the projecting end of the paper cylinder upon the blank or male die F, as hereinafter described with reference to Fig. 10. This sliding folder plate works in suitable guides j secured to the framing of the machine, and is connected to a rod j' whose lower end is fitted with an anti-friction roller j^2 operated upon by a cam j^3 secured upon the shaft C, said cam being timed to cause said folder plate J to double in the lower part of the end of the said paper cylinder, as illustrated in Fig. 10^a, while the folder plates H and I are in operation forming the paper cylinder.

K represents the top end folder plate which serves to double in the upper part of the end of the paper tube, said folder plate K being secured upon the end of an arm or rod k which is pivoted upon a bracket k' projecting upwardly from the rod f which carries the male die or blank F Fig. 2. A spring k^2 is secured to this bracket k' and always tends to hold the top folder plate K in its raised position. The short-projecting arm of the rod k is, however, fitted with a small pin k^3 which projects sidewise from said rod and is adapted to be operated upon by a pusher rod k^4 which is passed through suitably arranged guides k^5 on the frame of the machine, and is connected at its lower end to an arm k^6 mounted loosely upon the shaft f^4 Figs. 4 and 5. An anti-friction roller k^7 on the lower end of this pusher rod k^4 is operated upon by a cam k^8 upon the shaft c^2 Figs. 5 and 26.

L Figs. 2 and 4 represents a paste roller which works partly within a paste hopper l supported against said roller by means of a bracket l' projecting from a pair of arms l^2, projecting upward from a shaft l^3 mounted in bearings l^4 in the frame D. An arm l^5 is rigidly secured to and projects forwardly from the shaft l^3 and is provided with a set screw l^6 which is operated upon by a cam l^7 secured upon the cam shaft C, said cam being timed to cause the paste roller L together with its paste hopper l to move forward into the position illustrated in Fig. 11. This occurs just previous to the top folder plate K coming into operation as hereinafter described. The spindle l^8 of this roller L is fitted with a small grooved pulley l^9 in gear with one of a pair of pulleys mounted loosely upon the shaft l^3 and driven by a belt from a pulley l'' secured upon the main shaft c^4 of the machine.

M Figs 2 and 3^b represents a horizontally sliding folder plate, which is provided for the purpose of turning down the right hand peak which is left standing after the two folders J, K have done their work. This sliding folder plate M is connected by a rod m with an arm m' on a rock shaft m^2 worked by a cam m^3 on the shaft C acting upon an arm m^4 on said rock shaft, said arm preferably provided with an anti-friction roller m^{44}, Figs. 3 and 27.

N represents another horizontal folder plate corresponding to M and connected by a rod n^2 to a lever n' fulcrumed to the framing at m^2, the arm n^4 of said lever carrying an anti-friction roller n^{44} operated upon by cam n on cam shaft C, Figs. 3, 5, 5^b and 28, the cams m^3 and n being timed to move the folder plates M and N simultaneously. After the bags have been manufactured they are removed by the operator from off the male die or blank F and are placed in position opposite the folding and pressing contrivances, which I will now proceed to describe.

O Figs. 1, 2, 3, 4, and 14 to 17, represents an endless traveling apron working on a pair of rollers O' and O^2, while O^3 represents a hollow roller which is heated by a gas jet burning inside same. The rollers O' and O^2 are mounted in bearings in a frame or pair or brackets secured to the main frame of the machine, and the roller O' from which the apron receives its motion is connected by spur gearing O^4 with the hollow roller O^3. The roller O' is driven from a pulley on the main shaft of the machine as illustrated.

Referring to Figs. 1, 2, 3, 4, 5, and 14 to 16, inclusive, P represents two levers or arms which are fulcrumed in the upper part of a small frame composed of two upright brackets p, and which are connected at their ends by a spindle p' passing loosely through bearings formed in the ends of said arms or levers. From this spindle p' extends an arm p^2 whose end is fitted with a roller p^3 arranged to work against the curved surface of a guide p^4 secured upon the side of the frame or bracket p. The spindle p' on the end of the arms P has a folder plate p^5 secured to it as shown, so that said plate is free to vary its position relatively with the arms P, but is guided or kept at the requisite angle or inclination by the roller p^3 being held against the cam p^4 by the spring

p^6 which is attached to the upper part of said plate at one end, and to some fixed part of the apparatus at the other end as shown. A frame b^7 is arranged to slide in bearings p^8 on the folder plate p^5, and carries at its lower end two rollers p^9, p^{10} extending across from side to side of said plate and arranged to come into contact with the bag to be folded so as to make the first part of a fold, which is afterward completed by the folder plate p^5. The levers P and folder gear may be counterbalanced as shown, and are connected by a rod p^{11} with a rocking lever p^{12} fulcrumed at one end as illustrated at p^{13} upon some fixed support and provided with a roller p^{14} at about the center of its length, said roller being acted upon by a cam p^{15} upon the shaft c^2.

The operation of my invention is as follows:—The sheets of paper to be fashioned into bags having been cut to the required size and printed with any matter it may be required to place upon them they are laid one upon the other in a pile upon the pasting table a as clearly illustrated at A Fig. 2. The paste roller B is raised by the cam b^6, so that it comes into contact with the roller b^4 revolving in the paste hopper b^5, and is thereby coated with a small layer of paste. As the cam b^6 continues to rotate, this paste roller is allowed to fall onto the edge of the uppermost sheet of paper A, and thus pastes one of the edges of said sheet as will be well understood, the holdfast a' meanwhile retaining the sheets of paper in position. This sheet having been pasted is removed by the operator and placed upon the inclined table E in a certain definite position which is determined by the stops e'. This is done while the male die F is in its raised position. Said male die is then lowered by means of the cam f^6 through the medium of the connections f^3, f^2, and presses down the sheet of paper into the form illustrated in Figs. 7 and 7ª. The horizontally sliding folder plate H is then moved forward by its cam h^5, and folds over one of the upwardly projecting edges of said sheet of paper as illustrated in Figs. 8 and 8ª. The opposite horizontally sliding folder plate I is then moved forward by its cam i^5 and turns down the other edge of the sheet of paper as the folder H is drawn back, and said folder I continues to fold down the remaining edge of the sheet until it has pressed its pasted edge upon the turned down side of the sheet of paper, as clearly illustrated in Figs. 9 and 9ª, thus forming an open ended square shaped cylinder as shown in said Fig. 9ª. The lower end folder plate J is meanwhile moved up by its cam j^3 and is caused to fold in the lower projecting end of the paper cylinder, as illustrated in Figs. 10 and 10ª, leaving the other three projecting parts of the cylinder still standing. The paste roller L is them moved forward by its cam l' until it occupies the position illustrated in Fig. 11. The upper end folder plate K is then moved down by reason of its cam k^8 operating upon the pusher bar k^4 and therefore raising the free end of the lever k by engaging with the projecting pin k^3 thereon, thus causing the opposite end of said lever k carrying the folder plate K to descend over the edge of the blank or die F, the effect being to fold in the top projecting part of the paper cylinder, as illustrated in Fig. 12ª, at the same time causing the edge of said top projecting part of the cylinder to contact with the surface of the paste roller L, so that when the top projecting part of said paper cylinder comes in contact with the lower part which has been previously folded down it will adhere thereto as will be well understood. The side folders M and N are then moved forward by their cams m^3 n and are caused to fold down both of these projecting peaks at the same time, the effect being to cause said peaks to contact with the pasting surface of the roller L so as to coat them with a layer of paste, which will cause them to adhere to the other parts of the paper cylinder, when they are pressed down into contact therewith, as illustrated in Fig. 13ª, thus completing the formation of the bottom of the bag. The bag being now completed as regards its manufacture, is removed by the operator off the die or blank F which is timed so that it is free to rise after the sliding folder plates M and N have done their work, and the bag thus removed is placed in position opposite the pressing roller o^3 upon the endless traveling apron O, as illustrated in Fig. 14. In due course the cam p^{15} raises the lever p^{12} and through the medium of the rod p^{11} and lever P, causes the folding arrangement to descend. The roller p^3 at the end of the arm p^2 sliding against the guide p^4, causes the creasing roller p^9 to move in a circular path as it descends and directs it on to the top of the bag near the end thereof, the effect being to partially double up said bag as illustrated in Fig. 15ª, the traveling apron meanwhile serving to keep the lower front edge of the bag extended forwardly. The downward movement of the creasing roller p^9 is continued until the stop roller p^{10} comes in contact with the roller o^3, when said creasing roller is prevented from any further movement. The folder plate or blade p^5, however, continues its movement, the frame p^7 carrying the creasing roller p^9 sliding up in its bearings on the folder plate. By these means the bag is folded down in the manner illustrated in Fig. 15ª, and is directed to pass between the roller o^3 and endless traveling apron O, whereby it is rolled and flattened as shown in Fig. 16ª, and is thus compressed into a convenient shape for packing. If it should be required to make smaller bags with my improved machine, it is merely necessary to reduce the size of the male die F, which is preferably built up with pieces of wood screwed on to a metal body which is itself secured by set screws to the arm f. These wood blocks are cut to special sizes corresponding to the size of bag to be made, and they are provided

with holes pierced in them to admit air and allow the bag to be easily drawn off the die when made. The folder plates K and J can be replaced with smaller ones corresponding to the width of the bag required, and the paste roller and hopper may be exchanged for smaller ones. The side plates g^4 of the female die and the top of the inclined table E are rigidly fixed to each other, and are provided with two adjusting rods g^5 sliding in holes bored in brackets g^6 secured to or forming part of the framing of the machine, and adapted to be retained in position by means of set screws g^7 so as to hold the sides of the female die or mold at any required distance apart.

It will be readily understood by all persons who are acquainted with the art of manufacturing paper bags that with my invention it is possible to construct a bag having a side seam and to print upon the sheets of paper from which such bags are to be made, so that the printed matter will show upon the four sides of the bag without the seam interfering with it, and the bag will be constructed with a block bottom and will be stronger and more convenient in use than these of ordinary construction.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In a paper bag machine, appliances for pasting one edge of the paper blank, comprising a support for the paper, a paste hopper, a paste delivery roll partly contained in the hopper, a paste distributing roll, a rock shaft, and means for imparting a rocking motion to said shaft and rotary motion to both rollers, and a hold-fast for the pile of paper, said rock shaft adapted to impart a vibratory motion to the paste distributing roll toward and from the paste delivery roll and paper support, and press the hold-fast onto said support.

2. The combination with the table A and a paste delivery roller above said table, of a rock shaft, a hold fast as a' secured to an arm loose on said rock shaft and provided with an abutment, a radial arm fast on said rock shaft and adapted to contact with said abutment, and a paste distributing roller below the delivery roller having its bearings in arms secured to said rock shaft, substantially as and for the purpose set forth.

3. The combination with the table A and a paste delivery roller above said table, of a rock shaft, a hold fast secured to an arm loose on said rock shaft and provided with an adjustable abutment, a radial arm adjustable about the rock shaft and adapted to contact with said abutment, and a paste distributing roller below the paste delivery roller, having its bearings in arms secured to the rock shaft, for the purpose set forth.

4. The combination of the rock shaft b^2, a three groove pulley loose on said shaft, the paste distributing roller having its bearings in arms secured to the rock shaft and carrying a grooved pulley, and the paste delivery roller above said paste distributing roller, said delivery roller also carrying a grooved pulley and suitable connections between the pulleys on the rollers and that on the rock shaft, and means for imparting a rocking motion to the shaft and rotary motion to its pulley, substantially as and for the purpose set forth.

5. In a paper bag machine, a female die provided with a spring-actuated vertically movable hold fast constituting the bottom of the die and consisting of a tubular support for said hold fast, a tubular guide in which said support has vertical motion, a guide rod secured to the hold fast and having motion in the tubular guide with the support, and a coiled spring on said rod, the ends of said spring having bearing on the under side of the hold fast and the bottom of the tubular guide, substantially as and for the purpose set forth.

6. In a paper bag machine, the combination with a female die, of a male die, a vibratory lever to which said male die is secured, a folder plate, as K, its supporting lever fulcrumed to the male die lever and provided with a laterally projecting pin, a reciprocating actuating rod adapted to move the folder lever in one direction, and a spring adapted to move said lever in a reverse direction, substantially as and for the purpose set forth.

7. The combination with the inclined table E provided with an aperture e, a female die below the said aperture, and a spring-actuated hold fast or bottom for said die, of a two armed lever, a male die secured to the longer arm of said lever above the aperture in table E, a bell crank lever, one arm of which is pivotally connected with the shorter arm of the male die lever, and a revoluble cam operating upon the other arm of the bell crank lever, substantially as and for the purpose set forth.

8. The combination with the male die lever f, a bell crank lever one arm of which is connected with the short arm of said lever f, and a revoluble cam actuating said bell crank lever, of the folder plate lever k pivotally connected with lever f and provided with a laterally projecting pin, the pusher rod k^4 adapted to engage said pin, and a revoluble cam actuating the pusher rod, substantially as and for the purpose set forth.

9. In a paper bag machine, the combination with a bag folding plate, as p^5 and a vibratory lever to which said plate is pivoted, of a creasing roller and a support therefor, said support connected with and having motion on the folding plate, substantially as and for the purposes set forth.

10. In a paper bag machine, the combination with a bag folder, as p^5, a creasing roller, as p^9, a stop roller, as p^{10} and a support for said rollers connected with and having mo-

tion on the bag folder, of a drying roll and a cooperating compressing roll, said parts arranged and operating substantially as and for the purpose set forth.

11. The combination with the female die, the rock shaft l^5 provided with a radial arm, and a pulley loose thereon, a paste receptacle, a support therefor secured to shaft l^3, and a paste roller projecting from the front of said paste receptacle and carrying a pulley connected with the one on shaft l^3, of a revoluble cam operating on the radial arm of said shaft, the main driving shaft c^4, and a pulley connected with that on shaft l^3, substantially as and for the purpose set forth.

12. In a paper bag machine, the combination with a vibratory hold fast, as a', a vibratory paste roll, as B, a rock shaft common to both, said rock shaft adapted to intermittingly revolve the paste roll, a female die, a cooperating male die, and folding devices adapted to form three or four folds of the bag bottom, and an auxiliary paste roll adapted to apply paste to said folds; of a single cam shaft, and suitable cams adapted to impart the required motion at the proper time to said parts, and an independently operated folder plate connected with the male die and adapted to form one of the end folds of the bag bottom, said independently operated folder plate timed in its operation relatively to the other folding devices and the auxiliary paste roll, substantially as described and for the purposes set forth.

13. In a paper bag machine, the combination with a drying roll and an endless carrier cooperating therewith to compress the paper bags, of a folding plate adapted to fold the bags on the carrier longitudinally, a creasing roller and a stop roller connected with and having motion lengthwise of the folding plate, said creasing roller operating to form a crease across the bag near its bottom, and said stop roller adapted to limit the motion of both rollers along the plate by contact with the drying roller, a guide arm adapted to guide the creasing and stop roller on the folding plate, and a guide cam for said arm, said parts arranged in their operations substantially as and for the purpose set forth.

Dated this 2d day of October, A. D. 1891.

ROBERT MILLIS.

Witnesses:
JOHN MACKAY,
HENTON M. DAVEY.