4 Sheets--Sheet 1.

C. VAN HOOSEN.
Paper-Bag Machine.

No. 165,390. Patented July 6, 1875.

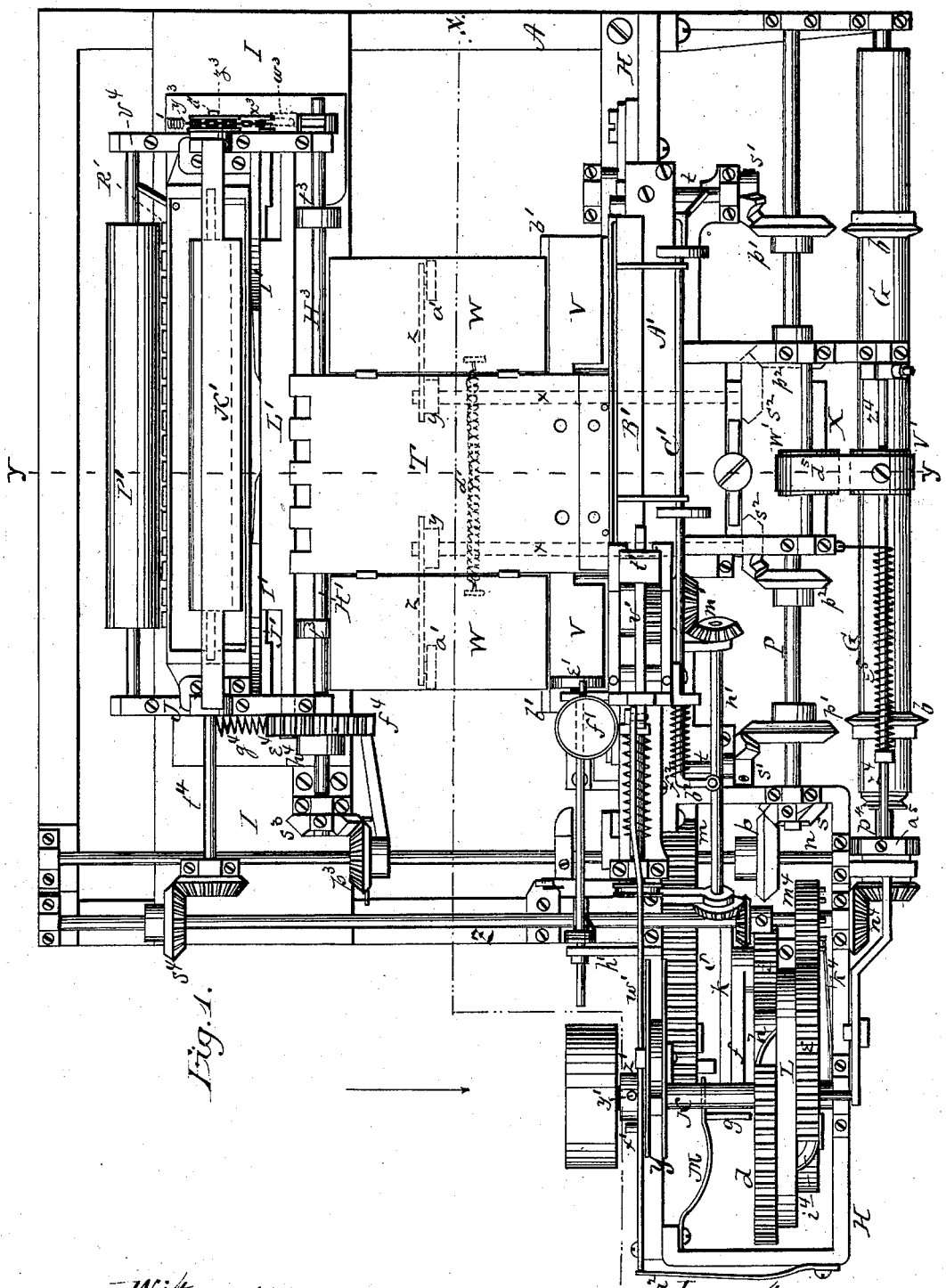

Fig. 1.

Witnesses:
John Tyler
Arthur L. McIntire

Inventor:
Casper Van Hoosen
By atty Wm. C. Curtis

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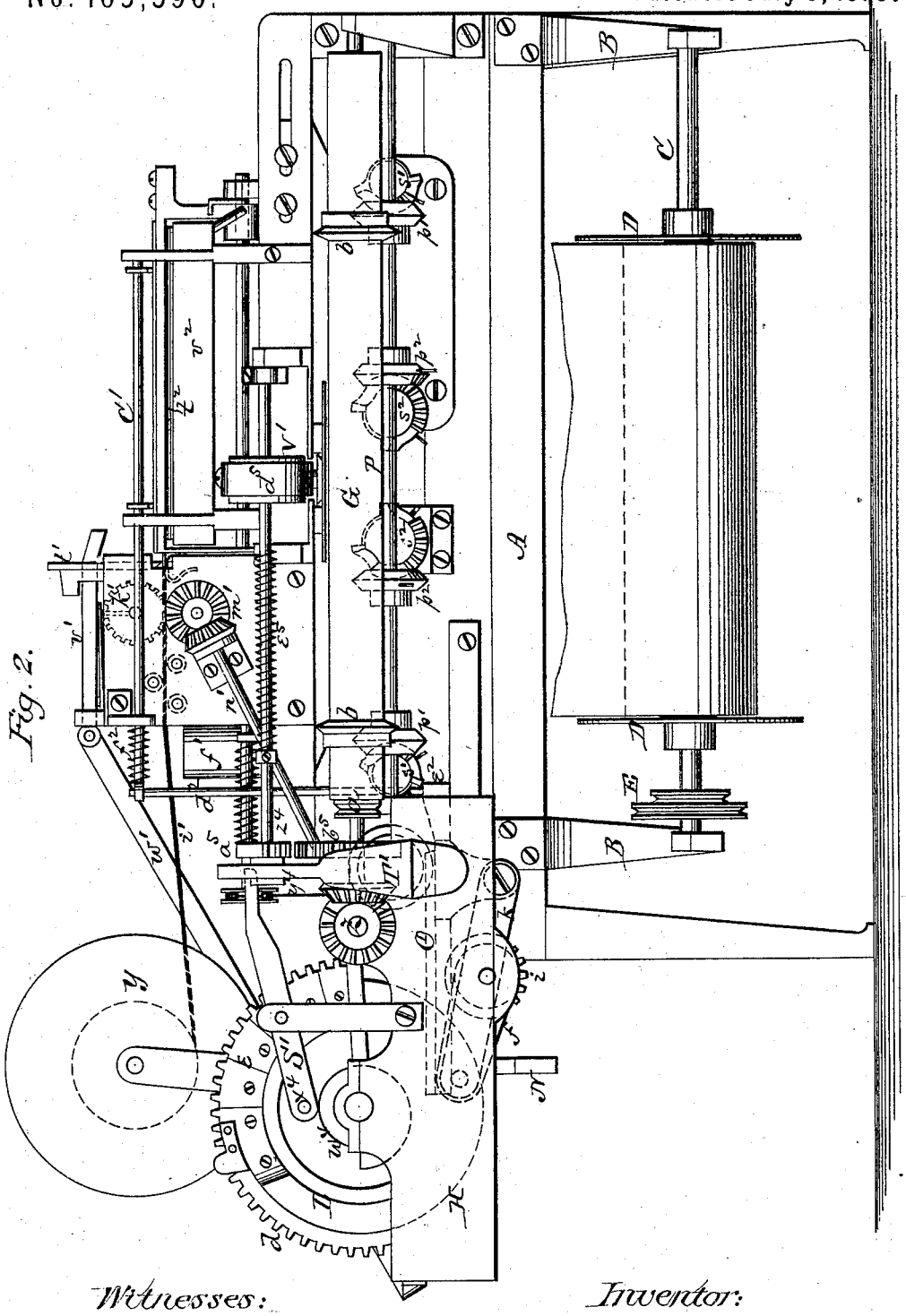

Fig. 2.

Witnesses:
John Tyler
Arthur L. McIntire

Inventor:
Casper. Van Hoosen
By Atty Wm. C. McIntire

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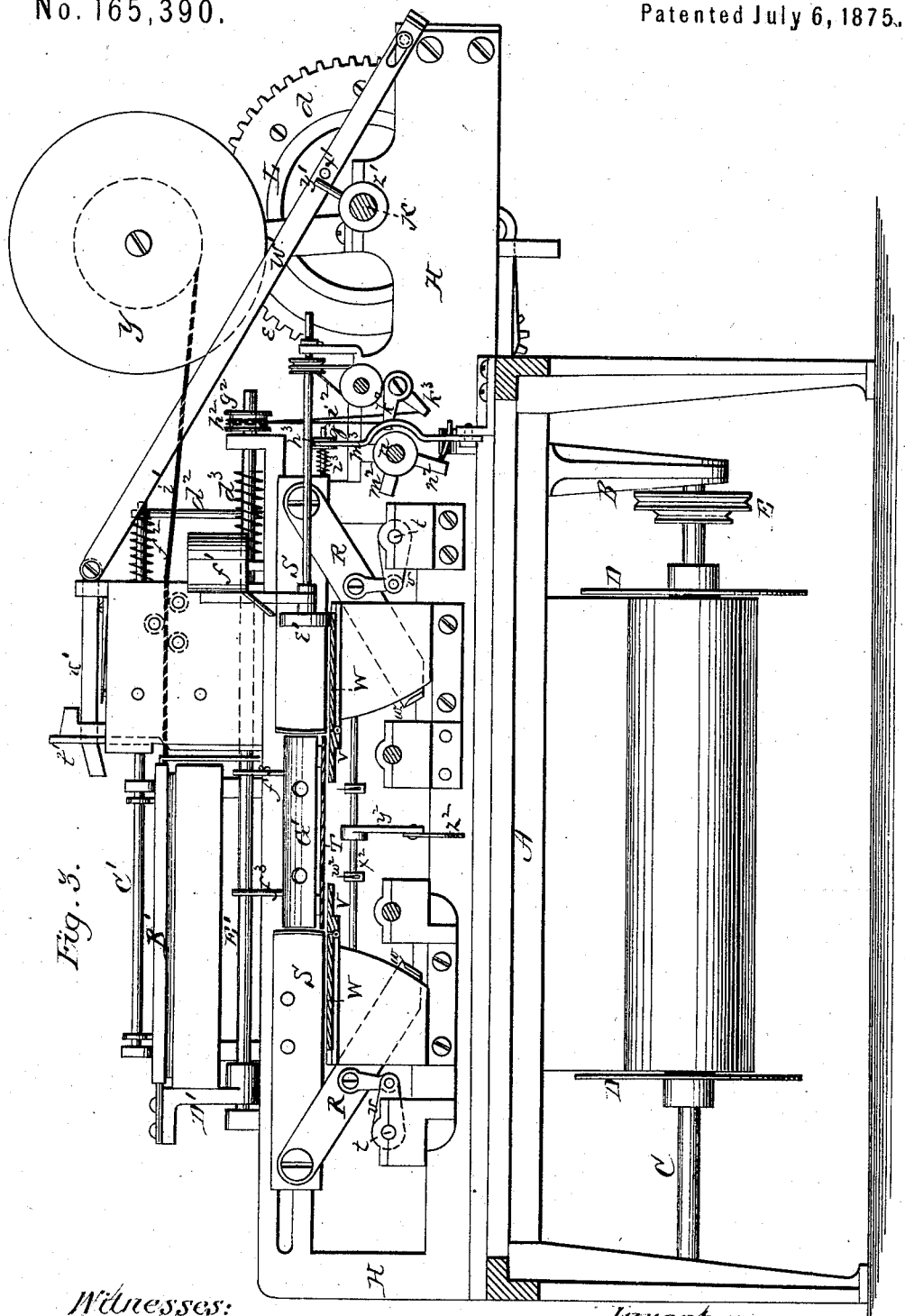

Fig. 5.

Witnesses:

John Tyler

Arthur C. McEntire

Inventor:

Casper Van Hoosen

By atty. Wm. C. McEntire

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Fig. 4.

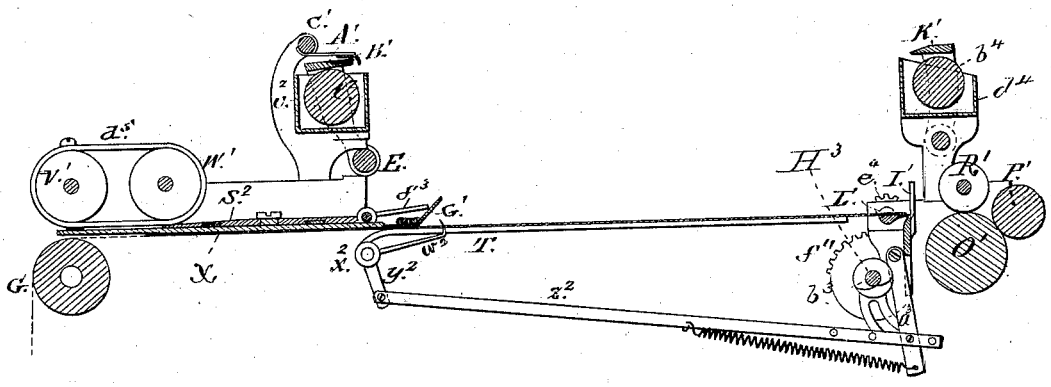


Fig. 5.

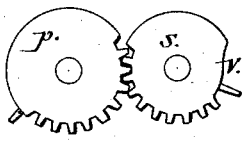
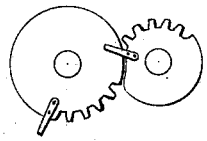


Fig. 6.



Witnesses:
John Tyler
Arthur L. McEntire

Inventor:
Casper Van Hoosen
By atty. Wm. C. Whittemore

UNITED STATES PATENT OFFICE.

CASPER VAN HOOSEN, OF NEW YORK, N. Y.

IMPROVEMENT IN PAPER-BAG MACHINES.

Specification forming part of Letters Patent No. **165,390**, dated July 6, 1875; application filed March 31, 1874.

To all whom it may concern:

Be it known that I, CASPER VAN HOOSEN, of New York city, county, and State, have invented certain new and useful Improvements in Paper-Bag Machines; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of my invention consists in the construction and arrangement of a machine for making paper bags, which machine is composed of, or divided into, two distinct systems of mechanisms and movements, receiving motion alternately through and by one main driving-wheel, and the bags produced by the machine are made self-fastening by being provided on one side of the mouth with a piece of wire fastened to the bag, which wire is to be used for fastening the folds when the bag is in use.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawings, which form a part of this specification, and in which—

Figure 1 is a plan view of the entire machine. Fig. 2 is a side elevation of the same; and Fig. 3 is a longitudinal vertical section through the line *x x*, Fig. 1. Fig. 4 is a transverse vertical section through the line *y y*, Fig. 1. Figs. 5 and 6 show the construction of certain gear-wheels in the machine.

A represents the frame or stand of my machine, upon one side of which are hangers B B, provided with suitable bearings for a horizontal shaft, C, to revolve in. This shaft is provided with two adjustable disks or flanges, D D, between which, upon the shaft, is placed the roll of paper from which the bags are to be made. By moving one or both of the disks D, paper of any suitable width may be used to produce bags of the desired size. At one end of the shaft C is secured a two-grooved band-wheel, E, to turn said shaft and slack the paper off the roll, if necessary, by passing a slack-belt around said pulley or wheel, and up over a similar wheel, *a*, on the end of the roller-shaft G. The paper from the roll on the shaft C is carried vertically up and over the roller G, between adjustable guide-collars *b* thereon, and from thence horizontally into the operating mechanism for forming the bags, as will be hereinafter described.

To one side of the main or bed frame A is secured an upright head-frame, H. I is a movable bed, carrying the tail-frame J, and which may be moved back and forth on the side rails of the main frame, and secured by clamps or other suitable means at any point desired, for the purpose of adjusting the machine to make bags of different lengths. K is the main shaft, to be provided at one end with a belt-pulley for receiving motion from any suitable power employed to run the machine. On this shaft is secured the main driving-wheel L, which is provided with two toothed or cogged segments, *d* and *e*, firmly secured to it, one on each side. M is a spring, secured at one end to the head-frame H, and the other end, when the spring is at rest, projects over and above the end of a crank, *f*. The spring is also provided with a horizontal pin, *g*, the end of which rests against the side of the driving-wheel L. As this wheel revolves an inclined cam, *h*, secured thereto at the advanced end of the segment *d*, passes under the end of the pin *g*, and thereby forces the end of the spring M inward, away from the wheel, so as to release the end of the crank *f* in advance of the segment *d*, the motion of said crank having been previously checked by said spring. This operation is repeated for each revolution of the driving-wheel. As the segment *d* advances its teeth engage with those of a pinion, *i*, a space sufficient to give said pinion one full revolution. The crank *f* is secured to this pinion *i*, and is carried with it, and, at the moment when the pinion and crank have completed one full revolution, the segment *d* disengages from the pinion, leaving the crank held between the spring M and a spring-catch, N, shown in Figs. 2 and 3. At the end of the crank *f* is a wrist-pin, connected by a pitman, *k*, with a pin upon a projection from a sliding rack-bar, O, which moves upon suitable grooved ways secured to the frame H, and receives a reciprocating motion, making one movement back and forth for each revolution of the crank *f*. In the rack O meshes a pinion, *m*, upon a shaft, *n*, so arranged that the advance movement of

the rack will give nearly a full revolution to the pinion *m* and shaft *n*, and the reverse movement returns the rack, and through its connections, as described, with the mechanism for operating the cutting, pasting, and folding devices, returns them all to their normal positions, ready to again come in use after the (alternate) feeding mechanism has been effected. On the shaft *n* is also secured by a set-screw a partly-toothed beveled wheel, *p*, which engages with a similar wheel, *s*, on the end of a shaft, P. In the machine there are several sets or pairs of wheels like the wheels *p s*, which all operate in the same manner; therefore the description of the first set will answer for all. The construction of these wheels is shown particularly in Figs. 5 and 6. The wheel *p* has as many spaces cut in its periphery as there are cogs in the wheel *s*, which spaces and cogs are of sufficient number to give the required movement. The remaining part of the periphery of the wheel *p* is left full and smooth. As shown in Fig. 5, the wheels are supposed to be at rest, and as the wheel *p* is revolved, it turns the wheel *s* in the opposite direction a distance equal to the number of teeth thereon, after which the wheel *s* ceases its motion while the wheel *p* continues till it has made nearly one full revolution, its full smooth surface passing through a depression, *r*, made in the surface of the wheel *s*, immediately beyond the last tooth thereon. The wheel *p* then commences its return motion, first passing through the depression *r*, and then a long cog on said wheel engages with a similar cog on the wheel *s* to turn the same and insure the proper meshing of the cogs of the two wheels, and, as the movement continues, the wheels finally arrive at their original position and come to a full rest.

On the shaft P are secured four other wheels, p^1 p^1 and p^2 p^2, the two former of which communicate motion to wheels s^1 s^1 on the shafts *t t*, said shafts standing at right angles with the shaft P. On the inner ends of the shafts *t t* are secured crank-arms *v v*, which connect, by means of links, with the moving shear-blades R R, the stationary blades S S of said shears being secured to the head-frame H. The moving blades R have at their outer ends short cutting-lips *w*, standing at right angles with the main blades. The stationary blades S are also provided with similar cutting-lips at their ends, so that when the shear-blades close there will be made in the paper previously passed between them two principal incisions, of a length from the edges inward equal to one-quarter of the width of the sheet; and at the inner ends of these cuts the cutting-lips *w* will form short incisions at right angles with those made by the shear-blades. This cutting forms a large flap on each side of the sheet, which is to be folded over on the upper surface of the bag-forming plate T, it being understood that the paper, after passing over the roller G, passes horizontally inward and under said bag-forming plate T.

The mechanism for folding the flaps is constructed as follows: The wheels p^2 on the shaft P turn corresponding wheels s^2 and their shafts *x x*, at the inner ends of which are secured crank-arms *y y*. Upon the end of each crank-arm *y* is an adjustable arm, *z*, standing at right angles with the crank-arm, and carrying a roller, a^1. These cranks or folding arms *y* turn inward in opposite directions, and one of them is arranged to turn faster than the other by the construction of the gear-wheels p^2 s^2, so as to complete its movement in advance of the other. Under each side of the forming-plate T is an L-shaped frame, V, supported upon standards attached to the head-frame H and movable bed-frame I. The short arms of the frames V extend outward from the forming-plate, and are level with the upper surface thereof, their inner edges being close up to the working shear-blades R, while their other edges have rabbets or shoulders b^1 formed on them, as shown in Fig. 1. On each side of the forming-plate T is a folding wing, W, the upper surface of which is level with the under surface of the forming-plate. These wings are hinged to the frames V, and their inner ends rest on the shoulders or rabbets b^1. The wings W are connected on their under sides by means of a spiral spring, d^1, which serves to unfold the wings after they have been folded by the folding-arms *y*.

The forming-plate T may be made of any suitable sheet metal, and of a size corresponding with the size of bag to be made, a different plate being used for each size bag, and the machine adjusted throughout to correspond therewith. This plate is held projecting in a horizontal position from the head-frame H, it being fastened to the bottom surface of a flat beveled-edged bar, X, which slides in a dovetailed groove in a bracket on the head-frame H, thereby permitting said forming-plate to be moved longitudinally backward and forward.

The paper as it passes into the machine receives paste along one edge by passing under the paste-roller e^1, the face of which is continually smeared with paste from the paste-box f^1. The face of the roller e^1, in turning, travels a little faster than, but in the same direction with, the sheet of paper. The paste-roller e^1 is revolved by means of a cross-band, k^1, as shown. The folding-arms *y* turning upward, the rollers a^1 carry the wings W with the flaps of paper resting thereon up and over, so as to fold the flaps of paper on the upper surface of the folding-plate T, and as one of said arms moves quicker than the other its flap will first come down on the folding-plate. This flap should extend beyond the center of the forming-plate, and as soon as this has been folded the other flap with its pasted edge comes down on it and is pressed down, thus completing the seam side of the bag.

i^1 represents the metallic strip or flat wire wound upon a reel, Y. This strip or wire is introduced between two gear-wheels, k^1, the

bottom one of which is turned by beveled gears m^1, and these in turn by an inclined shaft, n^1, turned by bevel-gears from a shaft, Z. The strip or wire i^1 is grasped by the wheels k^1, and drawn in from the reel y, and shoved forward between the wire-cutters and through a groove in a bar or wire carrier, A′. After the wire has been placed in said grooved carrier, the portion therein is severed by the descent of the moving blade t^1 of the wire-cutters. This blade t^1 is moved by means of a bar, v^1, the end of which is bent at an angle and passed through a slot in the blade. The bar v^1 is drawn backward to force the blade down by means of a connecting-rod, w^1, provided near its other end with a pin, x^1, which is operated upon by means of a pin, y^1, projecting from a collar, z^1, on the main shaft K, and as soon as the pin y^1 has cleared the pin x^1, a spring, a^2, operating against the end of the connecting-rod w^1, throws the bar v^1 forward again, thereby raising the blade t^1. Above the wire-carrier A′ is a long narrow metal strip, B′, the forward edge of which is bent downward at right angles in front of the thin and grooved edge of the wire-carrier A′, and serves as a side door to the open side of the long groove therein. The strip B′ is by suitable arms connected to a shaft, C′, which turns in bearings in brackets on the head-frame H, and has a crank-arm, b^2. In an eye on the end of this crank-arm works the upper end of a rod, d^2, the lower end of which rests on an inclined cam, e^2, secured to the end of the sliding rack-bar O. As the rack-bar commences its movement, the cam e^2 allows the rod d^2 to drop, thereby permitting a spiral spring, f^2, wound upon the crank-arm b^2, to turn the shaft C′ and the strip B′, and lift the latter sufficiently to give room for the carrier A′ to pass forward.

The wire-carrier A′ is secured at one end to a strong crank-arm, D′, which is securely fastened to a shaft, E′, resting in bearings on the head-frame H, both the carrier and shaft being horizontal. On the end of the shaft E′ is a chain-wheel, g^2, around and attached to which is a chain, h^2, having on either end a long open link, i^2. These links pass around and may slide on pins at the ends of levers k^2 k^3, working on a stud in the frame H, as shown in Fig. 3.

The lever k^2 is up and k^3 down when the carrier is at rest to receive the metal strip or wire. On the reciprocating shaft n are secured three cam-arms, two of which, m^2 n^2, operate successively the levers k^2 k^3. The shaft turning in one direction brings the cam-arm m^2 in contact with the lever k^2, which by means of the chain h^2 turns the shaft E, carrying the bar A downward in a circle. The instant the bar A′, which carries in its groove the flat wire as above described, arrives at the mouth of the bag and touches the upper surface of the folded flaps of paper, it rests for a moment until a narrow folding-wing, G′, is turned over and upon the under or inner surface of the carrier A′, folding the mouth-flap over the same. The folding-wing G′ is hinged at the inner end of the forming-plate T, and is held back in its position by a spring, and has two holes through it. The mouth-flap carried by this folding-wing is the one cut by the lips w on the shear-blades R S, as above described. The inner surface of the carrier A′ is smeared over with paste before the forward movement above described, by its passing over the surface of the paste-roller t^2 in the paste-box v^2. While the carrier A′ is resting for a moment at the side of the mouth of the bag, the wire being in the groove and paste on the surface, the folding-wing G′ lays the narrow mouth-flap over on the pasted surface, and also the following operations performed almost simultaneously. w^2 w^2 are two curved sharp-pointed hooking-rods secured to a shaft, x^2, which is provided with an arm, y^2. To the end of this arm is pivoted a connecting-rod, z^2, the other end of which is pivoted to a lever, a^3, and this lever pivoted to a bracket on the frame. The lever a^3 is thrown back by a cam, b^3, so as to pull the rod z^2, and thereby moving the hooks w^2 upward through holes in the forming-plate T, piercing the paper on both sides thereof, and through slots in the front or thin edge of the wire carrier A′, which slots are cut across the groove containing the wire. The hooks w^2 thus pass behind the wire in the carrier A, through the mouth-flap and through the holes in the folding-wing G′, and remain in this position sufficiently long to retain and hold the wire snugly under the fold of the mouth-flap while the carrier A′ is being withdrawn in returning to its former position. The arm n^2, on the shaft n, engages with the lever k^3, and through the medium of the chain, chain-wheel, and shaft, returns the carrier A′ to its former position, it being assisted by a spring, d^3, on the shaft E′. Thus when the wire-carrier is withdrawn the wire is pulled from the groove therein and retained in the fold of the mouth-flap by the hooks, and said flap, having received paste from the pasted surface of the carrier, is fully folded and pressed down by the wing G′, thus fastening the wire to one side of the mouth of the bag, after which the hooks w^2 are withdrawn by the action of a spring, e^3, on the connecting-rod z^2.

The narrow folding-wing G′ is carried over by means of arms f^3, secured to a shaft, g^3, which is turned by means of a chain or link passing over a pulley, h^3, on its end, and this chain coupled to a lever, m^3, whose lower end is pivoted to a bracket on the frame. This lever is operated by the third cam n^3 on the shaft n, so as to turn the shaft g^3, and operate the wing G′. When the cam n^3 disengages with the lever m^3, a spiral spring, i^3, on the shaft g^3 returns it to its original position. Simultaneously with the placing and securing of the wire, as just described, the cutting, pasting, and folding of the paper to form the bottom of the bag are being accomplished in

the following manner: On the shaft n is secured a partly-toothed bevel-gear wheel, p^3, communicating, through a similar wheel, s^3, motion to a shaft, H^1, upon which are secured two scroll-formed and forked or slotted cam-arms, t^3. In these slots or forks work pins attached to rods v^3, which are pivoted to the two moving shear-blades I′, and these are pivoted to a stationary blade, J′, secured to the tail-frame J. The moving blades I′ are set so as to cut over or past each other, and are operated to open and close by the movement of the scroll-shaped forked cam-arms t^3. By these shears the narrow neck of paper crossing between them is cut, thus severing the previously-made bag from the end of the still unused continuous web of paper. By this cut a narrow flap of paper is still left at one side of the mouth of the bag, thus providing a thumb-flap, and so completing the bag by its severance, and at the same time leaving a narrow flap of paper at the end of the continuous web, to serve for the bottom flap of the next bag to be made. At the outer end of the shaft H^3 is secured a cam-arm, w^3, which engages with a lever, x^3, pivoted to the frame J, and its outer end connected by a long link to a chain, y^3, passing over a wheel, z^3, the other end of the chain being attached to a reacting-spring, 1. The wheel z^3 is attached on a shaft, a^4, which carries at either end an arm for supporting the ruling-bar K′, having a thin tapering front edge. This ruling-bar, having its under or inner surface smeared with paste by passing over the paste-roller b^4 in the paste-box d^4, is carried downward until its front edge comes even with the end or bottom of the forming-plate T, and there rests on the surface of the paper, after it has been folded over said plate, as above described, where it rests for an instant, until it is met by the folding-wing L′, which brings the bottom flap of paper up and over on the under surface of the ruling-bar K′. The ruling-bar is then withdrawn, the paste thereon adhering to the bottom flap, which is then fully folded down on the previously-folded sides, thus fully finishing the bottom of the bag. The shaft of the folder L′ has at one end a pinion, e^4, in which meshes the teeth of a segment, f^4, placed loosely upon the shaft H^1. The segment f^4 is drawn back to its position of rest by a spring, g^4, but is carried forward by the clutch-collar h^4, secured on said shaft H^1. By these means the folder L′ is turned over the end of the forming-plate, as described.

All the movements so far described are made and completed by and during the first stroke of the crank f and the advance movement of the sliding rack-bar O. During the return stroke of said crank and the backward movement of the rack bar all the movements are reversed from first to last, bringing each and every part of the mechanisms described to the exact point of starting, where they are left in a state of rest. Thus a complete reciprocation of the movements is made to each revolution of the crank, or the engagement and passage of the segment d with the pinion i, which is repeated by each revolution of the shaft K and main driving-wheel L. The segment e, on the opposite side of the driving-wheel L, is made in sections of suitable size, and fastened by screws. One or more of these sections are used according to the length of the bag desired. This segment commences its work after the segment d is disengaged from the pinion i.

As the wheel L continues to revolve, an inclined cam, i^4, in advance of the segment e, passes under a projection on a spring, k^4—attached to the frame H—and forces said spring back from between pins projecting from the side of a cog-wheel, m^4. These pins are placed an equal distance apart, being a distance equal to the length of the sections of the segment e. The wheel m^4, and its shaft Z, are freed from their locked position when at rest, in which position they are while the wheel i is in motion, and vice versa. After the cam i^4 has unlocked the wheel m^4, a long cog at the advanced end of the segment e engages with one of said pins, and the segment engages with the wheel, turning it one or more revolutions, according to the number of sections of which the segment is composed. On the disengagement of the segment with the wheel the spring k^4 snaps into or between two of the pins on the wheel and locks it.

On the shaft Z is a bevel cog-wheel, n^4, gearing with a similar wheel on a shaft p^4, carrying the roller G. Another bevel-wheel, s^4, is also on the shaft Z, turning a similar wheel on a shaft, t^4, which carries the roller O′. Upon the roller O′—under the pressure of springs v^4—are two smaller rollers, P′ and R′, the former of which is continuous, and the latter made in sections corresponding in width with notches or recesses made in the outer or bottom end of the forming-plate T. The shaft Z, also, by the band h^1, communicates motion to the paste-roller e^1, and by gear-wheels to the shaft n^1, and through it and the gear-wheels m^1, to the wire feeding-wheels k^1, the speed of this latter being, however, one-third less than that of the rollers O′, P′, and R′.

On one side of the main driving-wheel L is a cam, w^4, which operates on a pin, x^4, projecting from the shorter end of a lever, S′, pivoted, as shown in Fig. 2. The other end of this lever rests on top of a journal-block, y^4, which rests on a spring underneath it in a post-bracket, T^1. In this journal-block one end of a shaft, z^4, has its bearing, the other bearing being stationary. On the shaft z^4 is secured a toothed segment, a^5, to be thrown in gear with a cog-wheel, b^5, on the roller-shaft n^4, by the lever s^1 pressing down on the journal-block y^4.

On the other end of the shaft z^4 is a belt-wheel, V′, connected by a belt, d^5, with a similar wheel, W′, in line therewith on a counter-shaft. The belt d^5 is fastened to the wheel V′, as shown, and also to the beveled-edge bar X,

to which the forming-plate T is attached. Around the shaft z^4 is a reacting spiral spring, e^5, one end attached to a collar on the shaft and the other to the frame.

The cam w^4 is so set on the main driving-wheel L in relation to the segment e that the cam shall have raised the short end of the lever S′ just before the engagement of the segment with the wheel or pinion m^4, this being the driving-wheel of the roller system of the machine. This causes the long end of the lever to force down the journal-block y^4, so as to throw the segment a^5 in gear with the cog-wheel b^5, and, through the medium of the devices just described, moves the forming-plate T forward until the notched bottom end thereof, covered by the paper of the bottom of the bag, is carried and pushed within the gripe of the main roller O′ and sectional roller R′, which, with the continuous roller P′, carry through and out the previously-made bag, and at the same time draw in the last made bag from off the forming-plate. This bag, being still connected with the continuous web of paper, draws with it a new supply of paper to be made into the next bag.

At the instant the forming-plate enters between the rollers O′ R′ the cam w^4 passes from under the pin x^4, releasing the pressure of the lever S′ from the journal-block y^4, allowing the spring thereunder to raise it up and disengage the segment a^5 from the wheel b^5. The spring e^5 then at once returns the shaft z^4, with all the devices connected therewith, to their original position.

It will thus be seen that in my machine I have combined two distinct and separate systems of mechanism—one for feeding and one for making the bag—operating alternately, the entire one system being at rest while the other is in operation, and vice versa.

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

1. In combination with the paper cutting, folding, and pasting mechanism, operating together as set forth, and the paper-feeding mechanism, which operates alternately with the former, each being at rest during the operation of the other, the wiring mechanism, substantially as and for the purpose set forth.

2. The combination of the rack O and pinion m with the crank f and pitman k and suitable driving-shaft, whereby the pasting, folding, and cutting mechanisms are brought into action during the advance of the rack and returned to their normal positions by the retreat thereof prior to the operation of the feeding-mechanism, substantially as and for the purpose set forth.

3. The combination of the driving-wheel L, toothed segment d with cam h, spring M with pin g, and crank f, substantially as and for the purposes herein set forth.

4. The combination of the spring M and spring-catch N, for locking and holding at rest the crank f, as herein set forth.

5. The folding wings W W on each side of the folding-plate T, and operated by means of the crank-arms y y, adjustable arms z z, and rollers a^1 a^1, substantially as and for the purposes herein set forth.

6. The spiral spring d^1, in combination with the folding wings W W, for the purposes herein set forth.

7. The combination of the wire-cutter t^1, angle-bar v^1, rod w^1, pins x^1 y^1, collar z^1, and spring a^2, all constructed substantially as and for the purposes herein set forth.

8. The combination of the wire-carrier A′ and L-shaped strip B′, for the purposes herein set forth.

9. The combination of the wire and paste carrier A′ with the forming-plate T and folding-wing G′, substantially as and for the purposes set forth.

10. The curved hooks w^1 w^1, in combination with the forming-plate T, wire-carrier A′, and folding-wing G′, for the purposes herein set forth.

11. The toothed segment e, made in sections and attached to the main driving-wheel L, substantially as and for the purposes herein set forth.

12. The combination of the segment e, cam i^4, spring k^4, and cog-wheel m^4, having pins on its side, all substantially as and for the purposes herein set forth.

13. The combination of the forming-plate T, plate X, belt d^5, belt-wheels V′ W′, and the intermittent reciprocating shaft z^4, substantially as and for the purposes herein set forth.

14. The combination of the continuous rollers O′ and P′ with the sectional roller R′, adapted to bite through the notched bottom end of the forming-plate, whereby the paper of the bottom of the formed bag is grasped to feed it out of the machine and pull forward the last formed bag and the web, to which it is still attached, substantially as and for the purposes set forth.

15. The combination of a paper cutting, folding, pasting, and wiring mechanism with a paper-feeding mechanism, when the same operate alternately, substantially as herein set forth.

CASPER VAN HOOSEN.

Witnesses:
JAMES H. HUNTER,
SAM. TRO. SMITH.