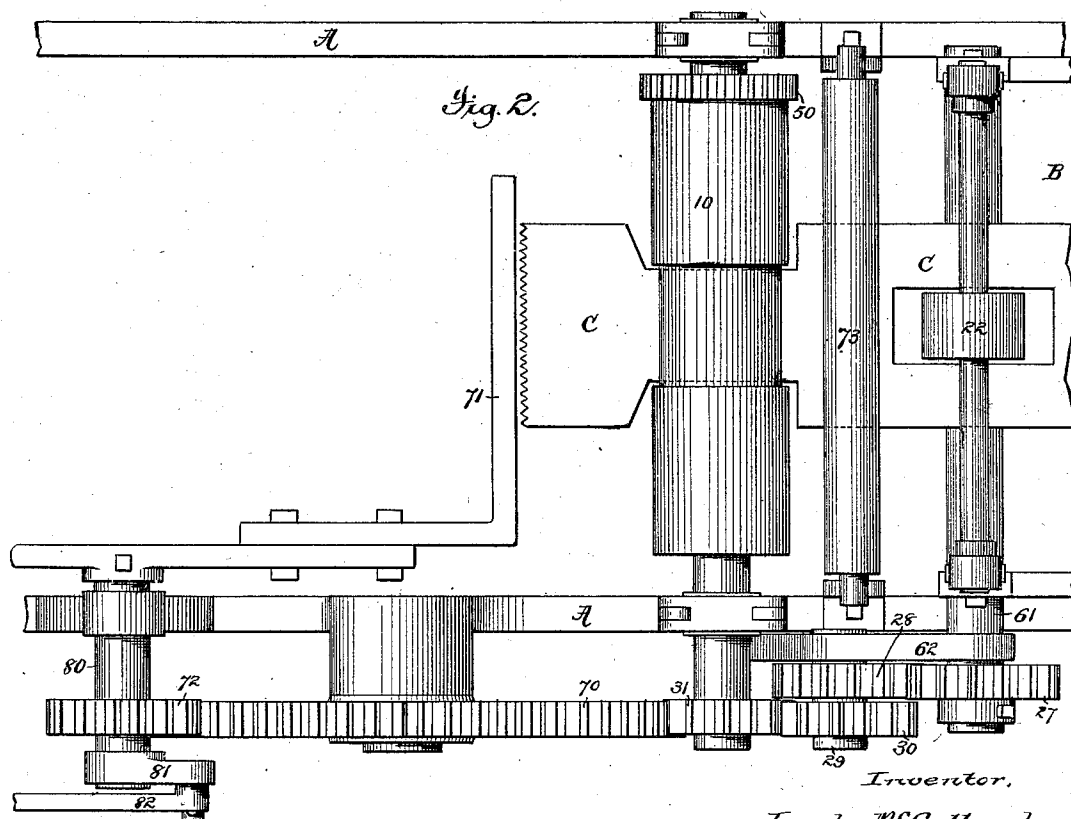


2 Sheets—Sheet 1.

Patented Mar. 21, 1882.



Inventor,
Joseph McCullough,
by Munson & Phillips
Attys.

(No Model.)

2 Sheets—Sheet 2.

J. McCULLOUGH.

PAPER BAG MACHINE.

No. 255,316.

Patented Mar. 21, 1882.

Fig. 3.

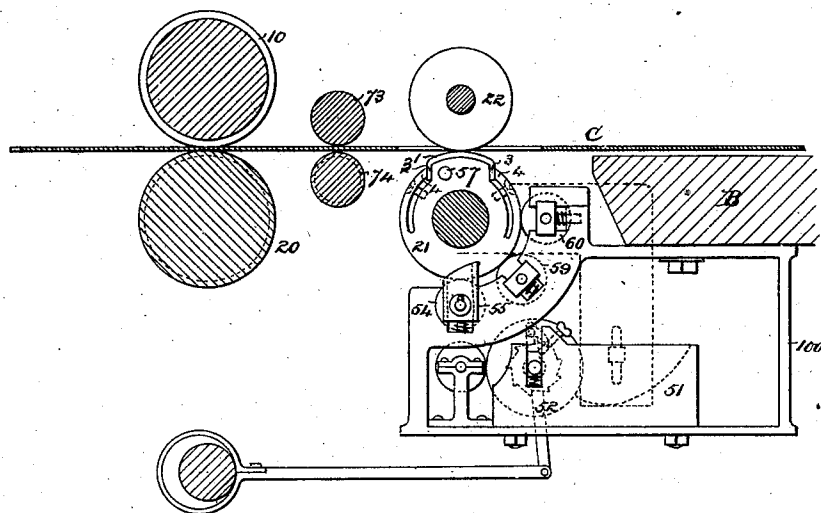
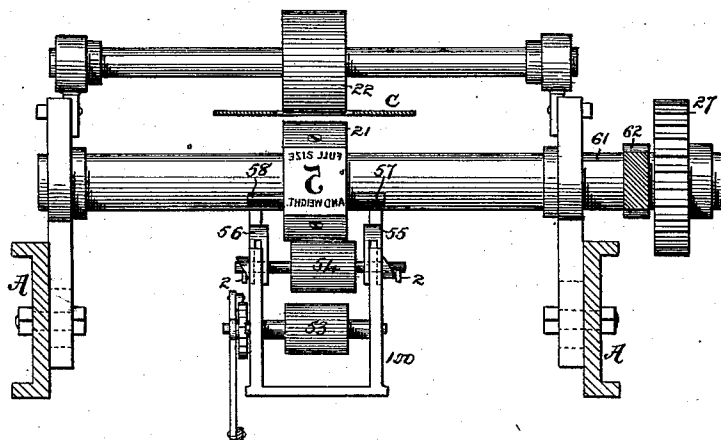


Fig. 4.



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UNITED STATES PATENT OFFICE.

JOSEPH McCULLOUGH, OF PHILADELPHIA, PENNSYLVANIA.

PAPER-BAG MACHINE.

SPECIFICATION forming part of Letters Patent No. 255,316, dated March 21, 1882.

Application filed July 16, 1881. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH McCULLOUGH, a citizen of the United States, residing in the city of Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Paper-Bag Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

The present invention relates more particularly and is applicable to that class of bag-machines wherein a web of paper is directed to and wrapped about a former, so that its opposite edges are laid one upon the other and united by a line of paste applied to one of said edges to form a tube, which tube is cut into bag-lengths by the operation of a severing device and presented to a folding or other suitable end-closing mechanism for converting such tubular bag-length into a bag.

The invention consists in combining with the former of such a machine and with the tube-feeding rollers thereof a rotating printing mechanism operating through an opening in the former, whereby each bag-length of tubing drawn over said former is appropriately printed upon; and the invention also includes a peculiar driving mechanism and means for adjustment, whereby when the severing mechanism is operated to produce bags of different sizes said printing mechanism may be properly actuated to print such bags, and thus be capacitated to print a number of sizes of bags produced by the same machine, so that the bags of all sizes shall receive their printed matter in the same relative position, as the top, bottom, or middle.

The invention further includes novel means for securing the type-form upon the carrier.

The construction of bag-machine made use of herein for the purpose of illustrating a practical application of my improvements is what is known as the "Union" bag-machine, the same being fully explained in United States Patents Nos. 30,191 and 38,452. So much of that machine as is necessary to an understanding of my invention is shown herein, and will presently be explained in connection with the

drawings; but it is to be understood that this invention is applicable to any bag-machine in which a web is converted into a tube upon and advanced or conveyed over a former to severing devices that divide it into short or bag lengths.

In said drawings, Figure 1 is a side elevation of a bag-machine, showing principally the tube-former, the feeding-rolls for advancing the tube, and the rotating striker for dividing said tube into bag-lengths, with my improved printing mechanism combined therewith. Fig. 2 is a plan view thereof. Fig. 3 is a longitudinal sectional elevation of the mechanism on a central longitudinal line of Fig. 2. Fig. 4 is a cross-sectional elevation of the mechanism, showing the printing devices in elevation.

The said Union bag-machine is provided with a frame, A, whose bed B supports by a suitable bridge one end of a former, C, which is a long, thin, and narrow plate, usually of metal, having a width equal to that to be given to the bag-tube, which former is provided with lapping devices that operate to lay the sides of the tube (one of which is pasted) in succession onto its upper surface, and thus form a tube by lapping and uniting one edge of the folded web to the other edge. It extends forward beyond the feed-rolls 10 20 and terminates in front of them in a serrated edge, said rolls being cut away centrally to allow the former to pass between them and their end portions to be in contact, and thus operate to nip the outer portions of the bag-tube and advance or feed it onward within range of action of the severing device or breaker 71, that divides it into bag-lengths, which bag-lengths, when severed, are delivered to and acted upon by end-closing devices, all of which is more perspicuously set forth in the aforesaid patents. In such machines the feed-rolls 10 20 are constantly driven at the same surface speed by suitable gearing from the driving-shaft of the machine, (which, being well understood, is not shown herein,) and hence the quantity of tubing that is drawn from the former is always the same.

The length of the bag-tube is determined by

the relative speed at which the breaker 71 is rotated, and this breaker is moved faster or slower, as the size of the bag to be made requires, by suitable change gear-wheels provided on the shaft of the lower feed-roll, 20, by which the breaker is driven. These feed-rolls 10 20 are geared together at one end, so as to run in unison by toothed wheels, only one, 50, of which is shown in Fig. 2, and at the opposite end the shaft of the roll 20 will receive one of the change-wheels, as 31. This wheel 31 communicates motion to the breaker 71 through an intermediate gear, 70, and a toothed wheel, 72, secured to the stud 80, upon which the breaker is secured, so as to partake of its rotary movement.

By a properly-proportioned change-wheel, 31, the speed of the breaker 71 may be timed relatively to that of the feed-rolls 10 20, so as to produce any desired length of bag-tube, and through the crank 81 and connecting-rod 82, driven by the stud 80, the operation of the finishing devices may be brought into proper timely co-operation.

The printing mechanism consists of a short roller, 21, mounted to revolve beneath the former C, and provided at one part of its periphery with a type or form carrier, the concentric surface of which coacts with an elastic-surfaced or blanketed impression-roller, 22, that is mounted upon a shaft above said former. These printing-rollers 21 22 are short, and occupy but a small portion of the widthwise extent of the former, which is cut away, as seen in Fig. 2, to admit the coaction of the type or form with the roller 22 in producing an impression upon the tube that passes between them in running over the former. The carrier 21 may be provided with type or any other printing-surfaces, as a cast-plate, secured thereto in any convenient manner; but that shown in Fig. 3 (found most preferable by me in practice) will be hereinafter explained, and the proper inking of such printing-surface may be effected by the devices shown herein for that purpose, or in any other suitable manner. These printing devices, which are all supported in a small frame, 100, that is secured to the under side of the bed B, consist in part of an ink-fountain, 51, in which a fountain-roller, 52, is revolved, from the surface of which fountain-roller the ink is taken by a conveying-roller, 53, and delivered by a spring-seated vibrating distributing-roller, 54, upon the main body of the carrier 55 or form-roller 21, which acts as an ink-table. This distributing-roller 54 is mounted in vertically-sliding boxes 55 56 in the frame 100, and is given an endwise motion by means of the cam-shaped projection on each side of the boxes 60 55 56, upon which cams pins 2 in the opposite ends of the shaft carrying the roller 54 act during its rotation, while in contact with the inking-surface of the roller 21, to distribute the ink thereon, said pins traveling on straight 65 surfaces of the cams during the passage of the form in contact with the said inking-roller.

These boxes 55 56 are furthermore provided with inclined top ends, (see Fig. 3,) which are engaged by studs 57 58, projecting from either end of the roller 21, to vibrate the distributing-roller 54 once during each revolution of the roller 21 into contact with the conveying-roller 53, and thus to take or become charged with a small quantity of ink, which, when the studs have passed the inclined ends, is applied to the inking-surface of said roller 21 by the action of the springs of the roller 54 restoring it into contact with the carrier 21. The ink distributed upon the ink-table portion of the roller 21 is taken up on the form-rollers 59 60, which, like the roller 54, are constantly pressed into contact with said roller 21 by their spring-seated journals, and are thus caused to travel over the form in its rotation and apply ink thereto, all of which ink-rollers are driven by frictional contact from the roller 21. The carrier or roller 21 of the printing mechanism is fast upon a shaft, 61, that is driven by means of an eccentric gear, 27, secured to said shaft 61, and the impression-roller 22 is frictionally driven by contact with the moving bag-tube.

Motion is communicated to the eccentric-gear 27 by an intermediate eccentric-gear, 28, that is mounted upon a short stud, 29, which is fast on an arm, 62, that is hung upon the shaft 61. Said arm 62 is provided with a depending portion, 63, that has a bolt, 64, whereby it may be fixed and adjusted to the side frame. The stud 29 also carries a toothed wheel or intermediate, 30, that is fast to the eccentric-gear 28, which is engaged by the gear-wheel 31 on the shaft of the feed-roll 20, and thus transmits motion through the eccentric-wheels 23 and 29 to the form carrier or roller 21.

The wheel 31, as shown at Fig. 1, is supposed to be of a size and suitably driven to cause the severing mechanism or breaker 71 to rotate with a speed appropriate to the length of tube to be severed, and as the printing mechanism is to operate upon such tubing and in unison with the severing device it is desirable that said printing mechanism should impart impressions to the tubing in such a relation to the severing device that each bag-length divided thereby will have received one impression at some predetermined point, and hence the printing-form must only rotate turn and turn with the severing device in order to impart one printing to each bag produced. To effect this result, and to readily adjust the printing mechanism to appropriately print upon the tube for various sizes of bag-lengths, and to cause the printing-form to travel at the same speed as the feed-rollers in order to impart the impressions in a proper manner without blurring, I have provided the printing-roller shaft 61 with the adjustably-secured eccentric-gear wheel 27, as before described.

It will now be observed that, when the speed of the severing device is altered to move faster or slower, by changing the gear 31 to a larger or smaller size, the printing-form, through

its eccentric connections, would rotate with a different surface speed with respect to that of the feed-rollers, either fast or slow; and the perfect action of the printing-form is obtained by adjusting the eccentric-gear 27 either to the right or left of a fixed point on its shaft, so that its printing-form will rotate with the same surface speed as that of the feed-rolls at the time it imparts an impression to the bag-tube, or, in other words, so that the printing-form shall at the time of imparting an impression move with the same speed as the bag-tube.

The gears 27, 28, 30, and 72, being all of the same diameter, run turn for turn with each other, whatever be the change in size of the gear 31; and in changing said gear the only adjustments necessary other than that before explained will be to change the location of the intermediate 70 so as to gear with the wheel 31, and to swing the arm 62 either up or down according to the size of the gear 31. This latter adjustment is accomplished by loosening the bolt 64 and swinging the arm 62 until the gear 30 is brought into mesh with said gear 31.

73 74 are a pair of rollers, one above and the other below the former C, that revolve by frictional contact from the bag-tube as it is drawn over said former by the feed-rolls, and serve to straighten out the tube before coming into the bite of said rolls, the lower one acting to partially support the former.

The diameter of the type-roller, considering the face of the type or printing form as a common periphery, is equal to that of the feed-rolls, and hence as the feed-rolls control the movement of the tube, and the other must move in unison with the tube it is to print, the form-carrying portion of the periphery of the carrier 21 must therefore be adjusted with respect to its actuating driving-eccentric whenever the gear on the feeding-roller is changed to make a larger or smaller bag. If such gear is replaced by a smaller one in order to make a larger bag by operating the striker so that it shall move more slowly while the feeding-rollers maintain their normal speed, thus feeding more tube forward to the action of less strokes of the striker, the type-roller will also move more slowly, or in concert with the striker. It will then be necessary to cause the type-carrying portion of its periphery to travel with the same speed as the feeding-rolls and the paper they feed at the point where the printing is done. To accomplish this it is only necessary to loosen the set-screw 5, that screws the hub of the eccentric-gear 27 to the shaft 61 of the printing-form carrier 21, and move the type-roller until the center of the type-form stands at an appropriate point of said eccentric-wheel 27, when said wheel is again secured. This point of appropriate correspondence of the type-form and its actuating eccentric-wheel may be predetermined and indicated by graduated lines upon said hub and a

pointer upon the shaft 61, if desired, or it may be determined by the eye and slight running of the machine.

It will be apparent from the well-known action of one eccentric-wheel driven by another, which results in an increasing movement for the other half-revolution of the shaft thus driven, that the printing-form carried by and with a driven shaft may be so adjusted with respect to said shaft as to be given a surface movement at the time of contact with the paper or web which is like that of the feeding-rollers, which are the prime movers or controllers of the paper or web to be printed upon, and that this effect may be produced no matter what the size of the change-gear 31, that transmits motion to the striker and printer, may be.

From this construction of devices it follows that a single printing mechanism may form a permanent portion of the bag-machine, and be readily adapted by slight adjustment to print various-sized bags.

Of course, with slight adaptation this invention may print upon an unfolded web, and thus produce printed sheets of a number of sizes, a suitable cutting apparatus for single web cutting being employed.

In order to prevent any offset from the printed impression upon the roller 74 and the feed-roll 20, they may be provided with suitable grooves of a width a little larger than the impression.

As shown in Fig. 3, the carrier 21 is provided with a cast plate or printing-surface, as 1, having two depending flanges, 2 3, which are held in slots running widthwise of said carrier, and secured therein by jaws 4, which constantly clamp the flanges 2 3 against the side of the slots by the aid of screws, as is clearly shown, which, when the screws are loosened, allow the jaws 4 to spring away from the flanges 2 3, to release the plate 1 when desired.

What is claimed is—

1. The combination, with the former and rolls for advancing the paper, of an impression-roll, a type or form carrier, and eccentric toothed wheels geared to and driven from the feed-roll shaft, substantially as described.

2. The combination, in a bag-machine, of a former, rolls for advancing the paper or tube, a rotating striker for severing the tube into lengths, an impression-roll, and co-operating type or form carrier or roll, eccentric toothed wheels for actuating the latter, and gearing driving said eccentric toothed wheels and the striker, substantially as described.

3. The combination, in a bag-machine, with a slotted former, over which the paper is drawn, feeding-rolls for advancing the paper, and a striker or cutting apparatus for severing the paper into lengths, of an impression-roll and co-operating type or form carrier, eccentric toothed wheels for actuating the said carrier, the driven eccentric toothed wheel having means for adjusting it with relation to the type or form, and an interchangeable gear for con-

certedly driving the striker and type or form carrier, all substantially as described.

4. The combination, with the slotted former C, of rolls 10 20, roll 22, type-carrier 21, adjustable eccentric toothed wheels 27 28, wheel 30, swinging frame 62, striker 71, wheels 72 and 70, and interchangeable wheels 31, substantially as described.

5. The combination, with the former and 10 rolls for advancing the paper, of a type or form

carrier and eccentric toothed wheels for driving said carrier, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOSEPH McCULLOUGH.

Witnesses:

GEO. H. GRAHAM,
T. H. PALMER.