

Witnesses:

Albert H. Hook  
James F. Hughes

*Inventor.*

John James Greenough

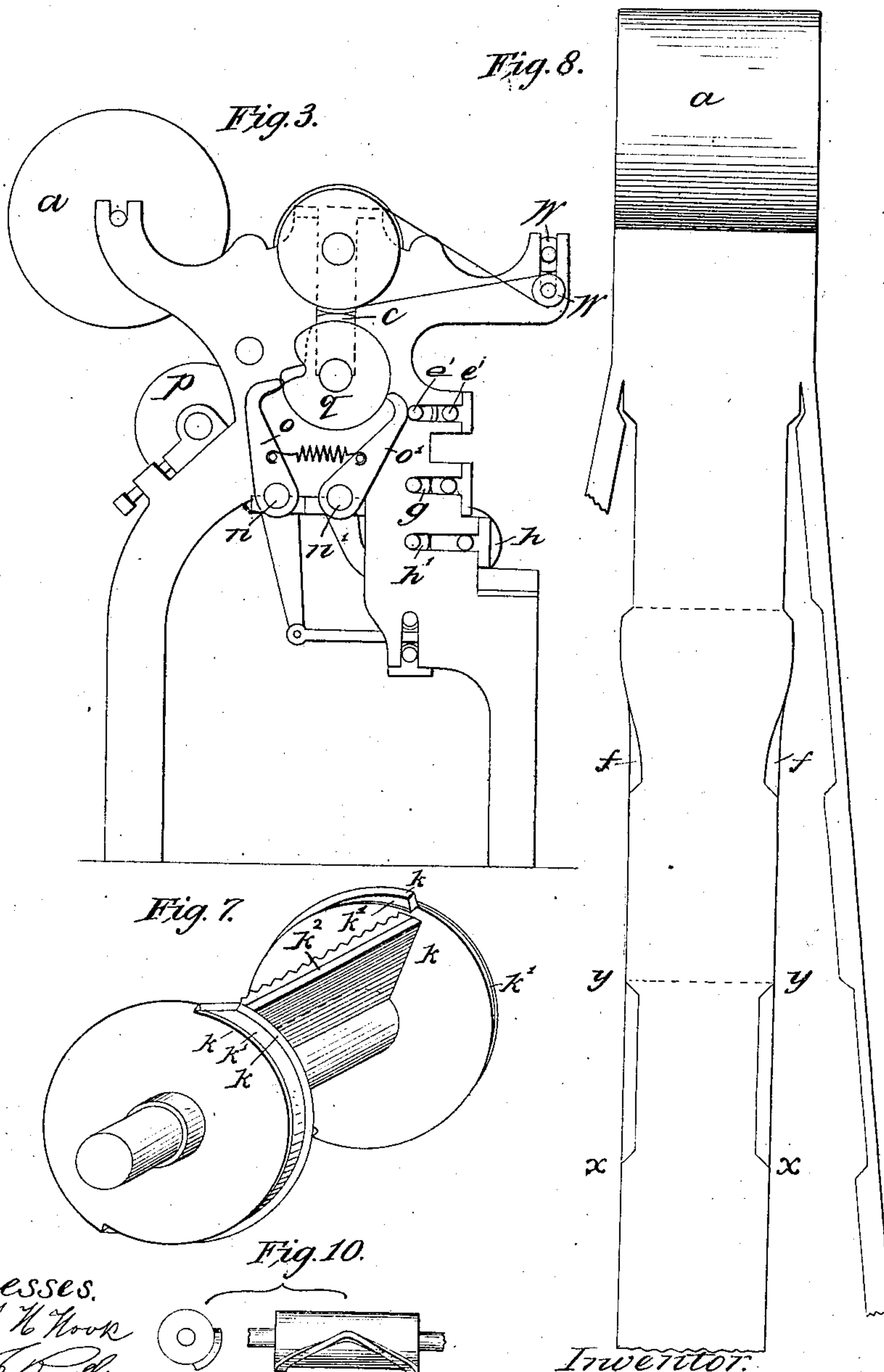
J. J. GREENOUGH.

2 Sheets—Sheet 2.

Paper Bag Machine.

No. 37,573.

Patented Feb. 3, 1863.



Witnesses.  
Albert H. Hook  
James F. Ruffe

Inventor.  
John James Greenough



# UNITED STATES PATENT OFFICE.

JOHN JAMES GREENOUGH, OF NEW YORK, N. Y.

## PAPER-BAG MACHINE.

Specification forming part of Letters Patent No. 37,573, dated February 3, 1863.

*To all whom it may concern:*

Be it known that I, JOHN JAMES GREENOUGH, of the city, county, and State of New York, have invented a new and useful Machine for Making Paper Bags and other Envelopes; and I do hereby declare and ascertain my said invention, referring to the accompanying drawings, in which—

Figure 1 is a vertical longitudinal section of the machine, showing the course of the paper through the different processes. Fig. 2 is a front elevation. Fig. 3 is a side elevation. Fig. 4 is a folding-knife in action; Fig. 5, the folding-guide enlarged; Fig. 6, rollers for side-flap fold; Fig. 7, cutters for forming the blank (enlarged;); Fig. 8, roll of paper with a portion passing through the machine, showing the different stages of cutting and folding, (the paper in all the figures is shown by red lines;); Fig. 9, modified form of envelope, blank; Fig. 10, "gummer" for curved edges.

Heretofore the machinery for making paper bags and other envelopes, &c., has been complex, involving a series of varied motions liable to derangement, which, together with the diversity of the operations, retard the rapid manufacture and produce uncertainty and imperfection that is wholly avoided in my device.

By my invention I have rendered the making of paper bags, &c., of any size simple, cheap, and rapid by passing the paper through a continuous series of rollers without stopping, by which the whole operation for completing the article for the market is performed.

To render machinery for making paper bags or envelopes of any practical use they must be formed with great rapidity. This makes the relative position of various parts of the machine a matter of great importance in order to insure accurate work at such high velocities; and in fact in this machine the order in which some of the operations are performed determines the possibility of properly performing them.

It may be proper to add that while many of the devices herein used are not new *per se*, they have either new functions to perform or are combined with other devices so as to cause a more rapid execution of the work or a more perfect article of manufacture.

I shall first describe the machine represented in the drawings, and then add thereto a description of some of the principal modifica-

tions contemplated to adapt it to various purposes.

In the description of the machinery I shall follow the course of the paper from the roll to the perfected article. The several rollers and other parts are arranged in a suitable frame in the relative positions shown in the drawings or in any other found most convenient to perform the successive operations herein described. A roll of paper, *a*, is placed in the machine, as seen at Figs. 1 and 3, supported on a proper axis resting in bearings on the frame, so as to revolve to allow the paper to unwind. This may have friction applied to its surface to keep it smooth and tight. From the roll the paper is carried down around a small roller, *b*, which may be covered with india-rubber or otherwise, and presses against the cutting-cylinder *c*. The paper passes between said roller *b* and the cylinder *c*, as seen in Fig. 1, and is drawn tight over the cutting-cylinder, passing under the cutting-knives *k*, where its two sides are cut into the proper shape to form the sides of the bag properly, (see Fig. 8,) which form can be varied, as seen at Fig. 9. The knives *k k* revolve, and are made to fit the cutting-cylinder at their edges. They are affixed to proper disks, *k'*, and their edges revolve in contact with the cutting-cylinder *c*. This cutting apparatus should be of a circumference exactly equal to one or more of the articles to be made. A straight or other formed knife, *k<sup>2</sup>*, runs across from one side cutter to the other in a line parallel to the axis or such curve as the form of the work requires, so as to cut the paper across where the bag or other article is to be separated. I prefer to make the edge of this knife *k<sup>2</sup>* serrated, so as not to cut the paper entirely off, that it may be properly directed through the succeeding apparatus. The cutt is shown enlarged in projection at Fig. 7. To cause the knife *k<sup>2</sup>* to act properly a piece of india-rubber, or its equivalent, *c'*, is inserted into a groove in the cylinder *c*, opposite the said knife *k<sup>2</sup>*. This is essential to its perfect action if no radial motion is given to the knife, as may be done. From the cutting cylinder *c* the paper blank, properly cut into form, passes onto the side-creasing or "flap" rollers *e e'*, while the waste strips cut from the sides are conveyed off between rollers *w w* out of the machine as the paper form descends between the rollers *e e'*. This



insures the separation of the waste portion from the form or blank if the cut is not perfectly made. Between the rollers *e e'* the side flap is turned and creased by means of an enlargement on each end of the roller *e* that projects beyond the roller *e'* at any convenient and sufficient angle to turn and crease the projecting edge of the paper that forms the side fold or flap. This is clearly represented in Fig. 6, which is a plan of said rollers. The paper blank next passes between the guides *f*, (see Fig. 5,) which turn the flap or side fold inward, as represented at *f f*, Fig. 8. The fold is then pressed flat by passing between the plain rollers *g*. The paper thence passes down to the gumming-disks *h*, that dip into a reservoir, *h<sup>2</sup>*, containing proper adhesive material, and convey it to the paper as it passes between them and the rollers *h'*. These disks are of plain thin metal, but may be covered with rubber or other material, if desired. It is necessary to have a scraper or doctor to regulate the quantity of gum elevated by the disks; but as all this kind of apparatus is so well known in conveying size, gum, ink, and like substances to paper, no description thereof is necessary. After the paper has descended far enough to bring the line *x x* (see Fig. 8) opposite the point *x*, Fig. 1, the folder *i* strikes it with a quick motion and folds it between two rollers, *z*. (See Fig. 4.) This brings together the two surfaces upon which the gum or paste has been put, and the pressure of these rollers *z* causes the gummed surfaces to adhere, which finishes the article. The surfaces of these rollers and the preceding ones may be covered with india-rubber.

To insure an accurate speed upon all the revolving parts and cause the paper to move with equal velocity at every stage of the process, which I deem best, they should be geared together. This gearing is seen at *s s*, Fig. 2, and is also indicated behind the frame by blue dotted lines. A greater number of carrying or pressing rollers can be added, especially in giving pressure to the finished bag, if found necessary. As soon as the fold or double at *x* is drawn firmly between the rollers *z* a short distance the separator-plate *l* strikes the paper at *m* (see Fig. 1) and separates the bag from the other paper at the dotted line *y y*, Fig. 8. The folder *i* and separator *l* are affixed to arms that project from the shafts *n n'*. (Clearly seen in Figs. 13.) They are held clear of the paper by arms *o o'* (see Fig. 3) that rest against revolving disks or cams *q*, affixed to the shaft of cutting-cylinder *c*, in the edge of which cams there is a notch that the said arms *o o'* fall into, actuated by a spring or other equivalent device, as shown in Fig. 3.

If the bag or envelope is to be printed, I apply a printing-cylinder, the position of which may be varied, so that it be done while the paper is stretched tight at both ends between two sets of rollers. This is necessary in order to print clear while the paper is moving with the rapidity essential for the expeditious man-

ufacture desired, as it would otherwise slur and render the printing indistinct; but I prefer that shown in Fig. 3, in which *p* is the type cylinder.

I do not show an inking apparatus or describe it, as it is in common use and well known in a variety of forms in the card and job presses, as well as in larger printing machines.

If the bags, &c., are to be embossed in any way, it may be done at any convenient point, like the printing, by placing embossing rollers in the machine and passing the paper, either before or after it is folded, between them.

I propose to make a line of embossing along the seam of the bag or other envelope, which will serve to retain the adhesive material and unite the edges more perfectly, the irregular surface of the embossing serving as a receptacle for the gum, &c., and concealing the seam.

Other modifications of this machine may be made that would readily suggest themselves to a competent mechanic. The order of the folding may be changed by doubling the paper at the line *x x* before the side folds are made, which brings the side folds outside. Again, in making envelopes for letters, &c., if it is desired to make the side fold broad, as seen at Fig. 9, the disk for applying the gum is made waved on its periphery, as seen at Fig. 10. Where the gum is to be applied in any other line than a straight one parallel with the course of the bag through the machine, the conveyer of the paste or gum must conform thereto; but in these curved or irregular pasters it is better to elevate the gum from the reservoir by means of a broad roller, from which the gum is delivered onto the irregular surface.

I propose to add a "counter" to this machine, which shall be thrown into action by the finished bag as it passes the finishing-rollers. The counting device is like those used for analogous purposes, and needs no further description.

Having thus fully described my improvements, what I claim as my invention, and for which I desire to secure Letters Patent, is—

1. Forming a paper bag or other envelope by cutting the form or blank therefor from a strip or roll by circular knives, as herein described, and then folding the same between a series of rollers without stopping the paper to perform either of the functions, the whole being combined and arranged substantially as and for the purposes set forth.

2. Cutting the edges of the paper in an irregular line to shape the form or blank by the cylindrical cutters, in combination with folding machinery for making bags, &c., by a continuous operation, as above specified.

3. The combination of the waste-rollers *w*, or their equivalent, for insuring the separation of the parts and removing the waste from the machine with the cutters, substantially as described.

4. Printing or embossing the paper while it



is stretched and held tight on both sides of the printing apparatus while being printed, as herein described, when the same is connected with machinery for making bags and envelopes, for the purposes specified.

5. Conveying the form or blank for a bag or envelope through the preliminary operation of forming the envelope and before severing the same from the strip of paper from which it is cut, substantially as and for the purposes set forth.

6. Embossing the line of the seams of bags or other envelopes where they are joined by adhesive material for the purpose of cementing the

seams more perfectly and concealing the joints, as set forth, when the bag is formed by passing the material through a series of rollers, substantially such as is herein set forth.

7. Turning the side fold of the blank, cut as herein described, before the bottom fold, so as to bring the side fold on the inside of the bag or envelope, and securing the same to the cut lap, or side, by which a neater joint is made.

JOHN JAMES GREENOUGH.

Witnesses:

ALBERT H. HOUK,  
JAMES F. RUGGLES.