S. DUERDEN.

PAPER BAG MAKING MACHINERY.

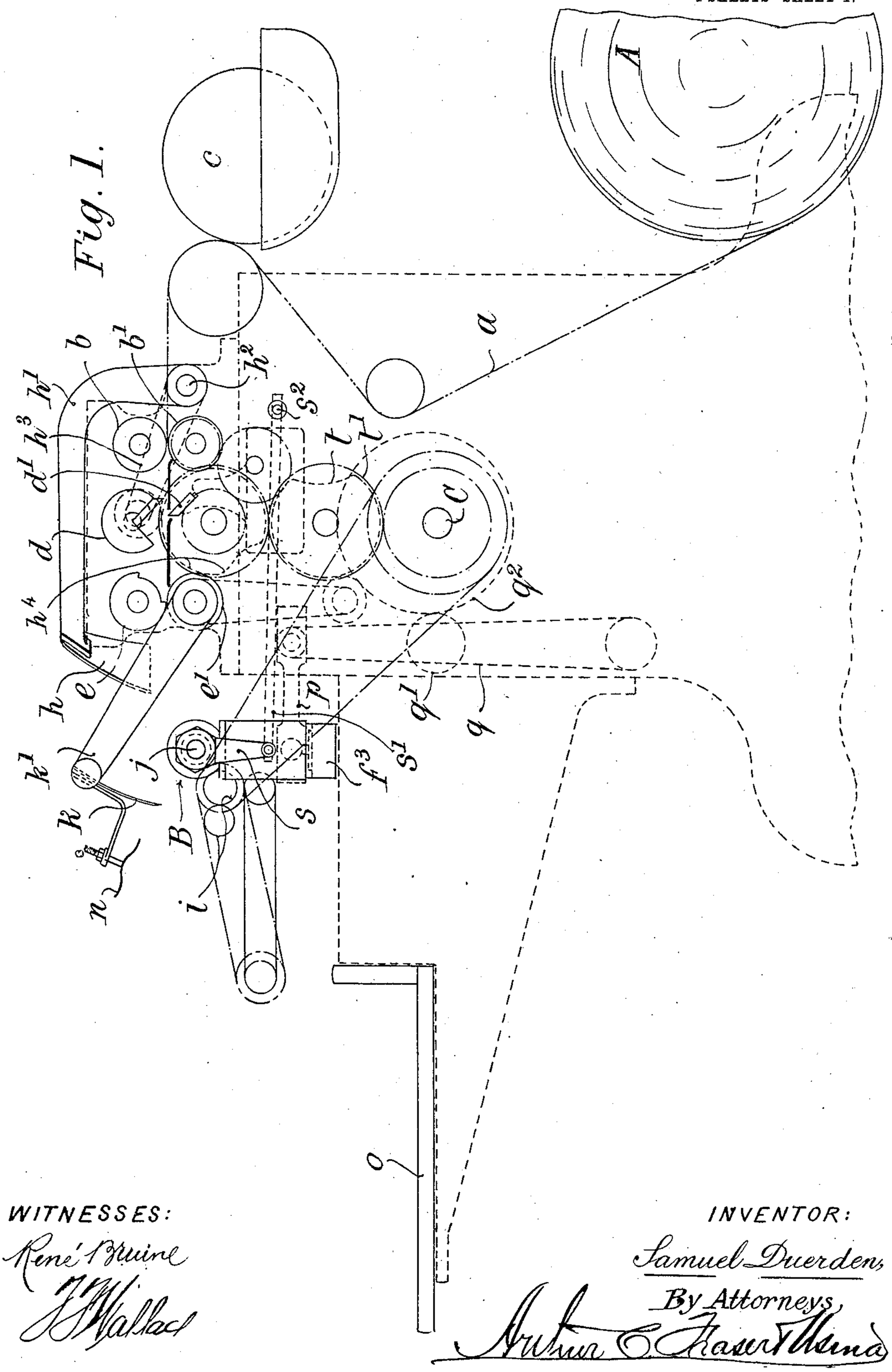
APPLICATION FILED SEPT. 4, 1908.

938,653.

Patented Nov. 2, 1909.

4 SHEETS—SHEET 1.

Fig. 1.



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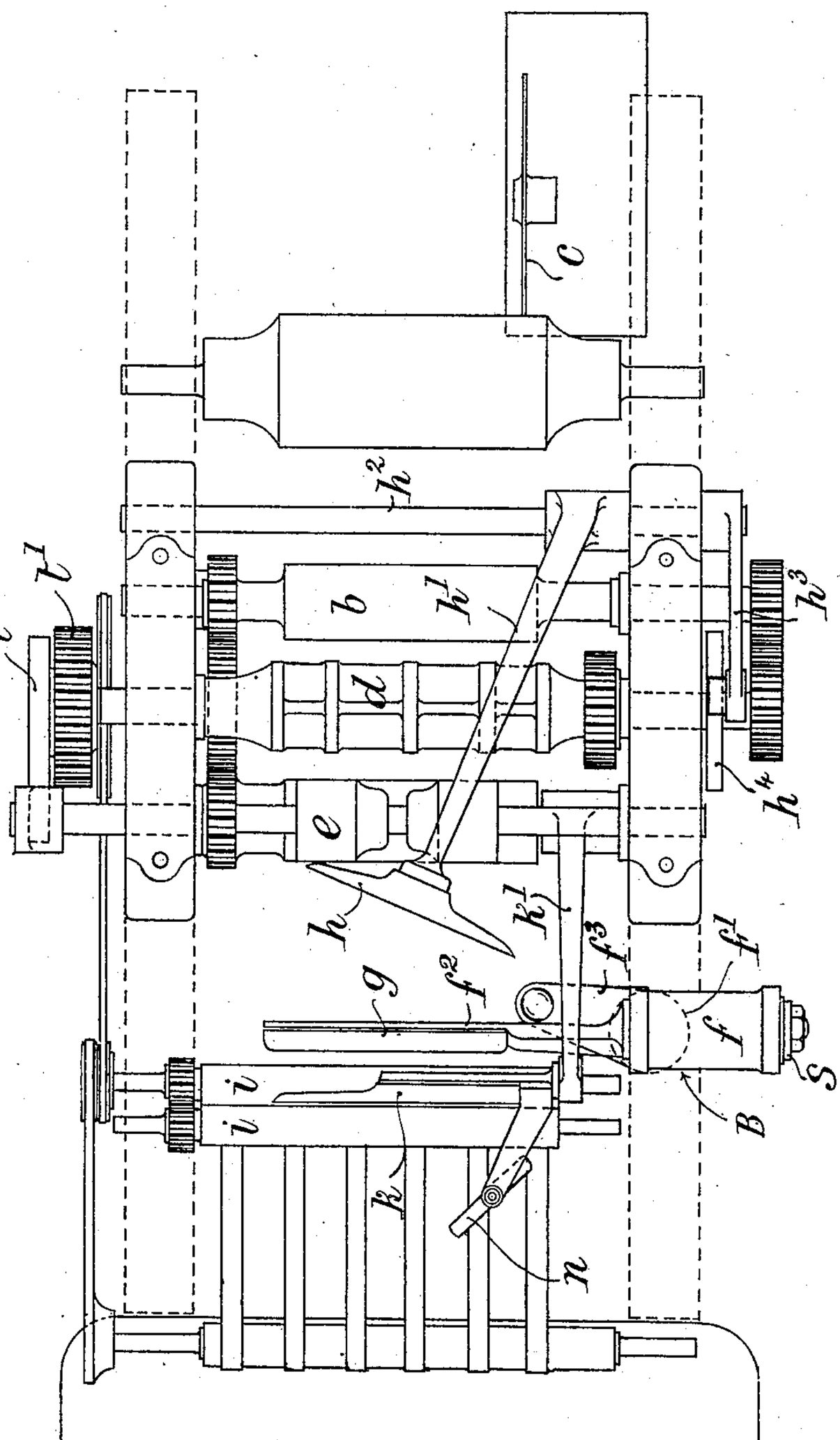
4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

Fig. 3.

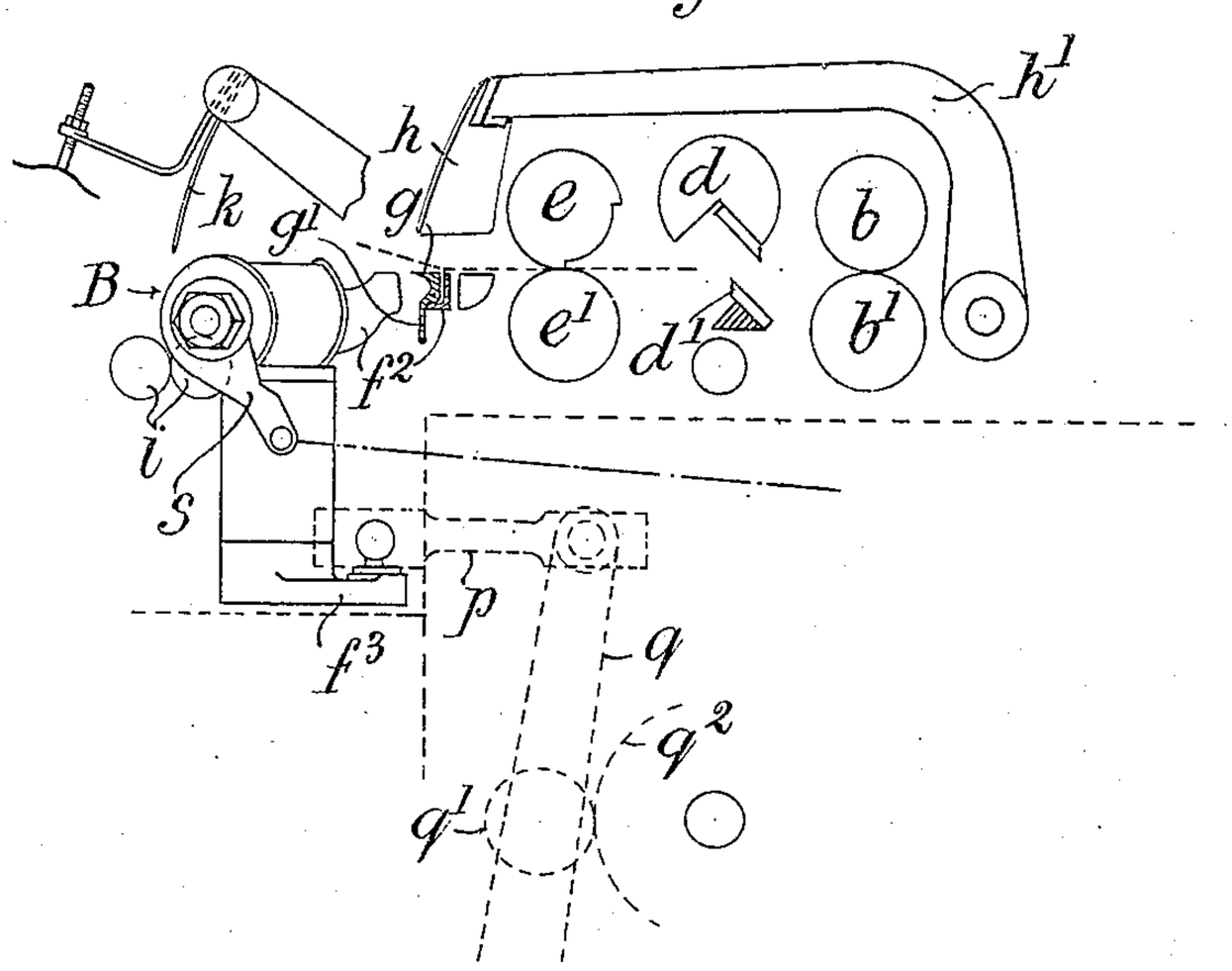


Fig. 10d

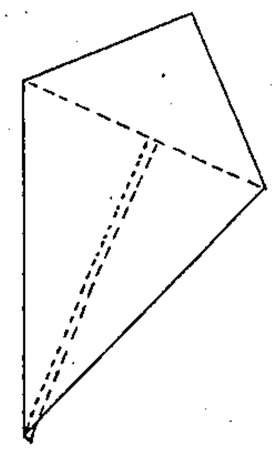


Fig. 10c

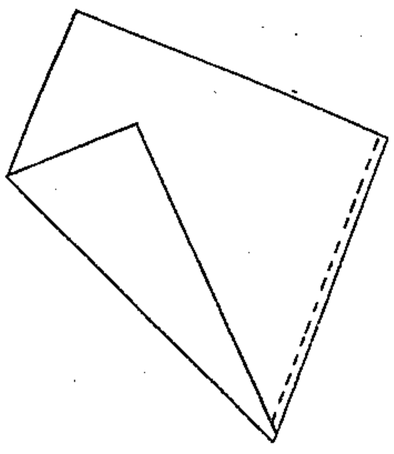


Fig. 10b

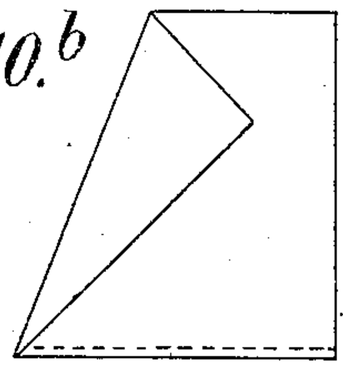
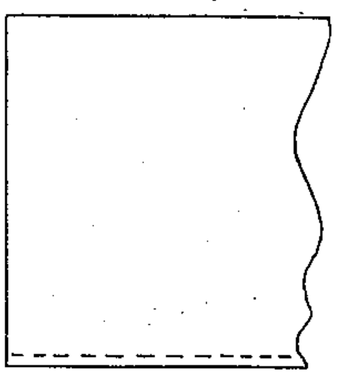


Fig. 10a



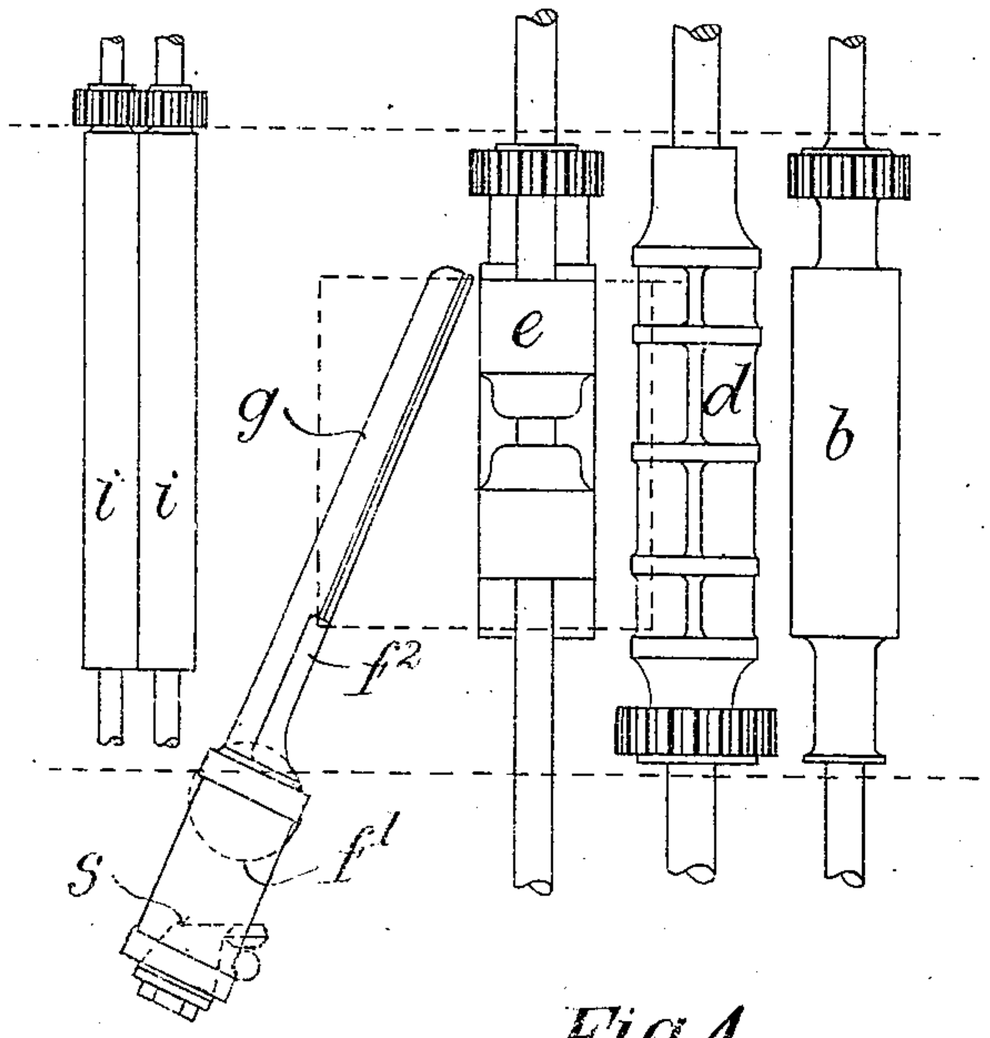


Fig. 4.

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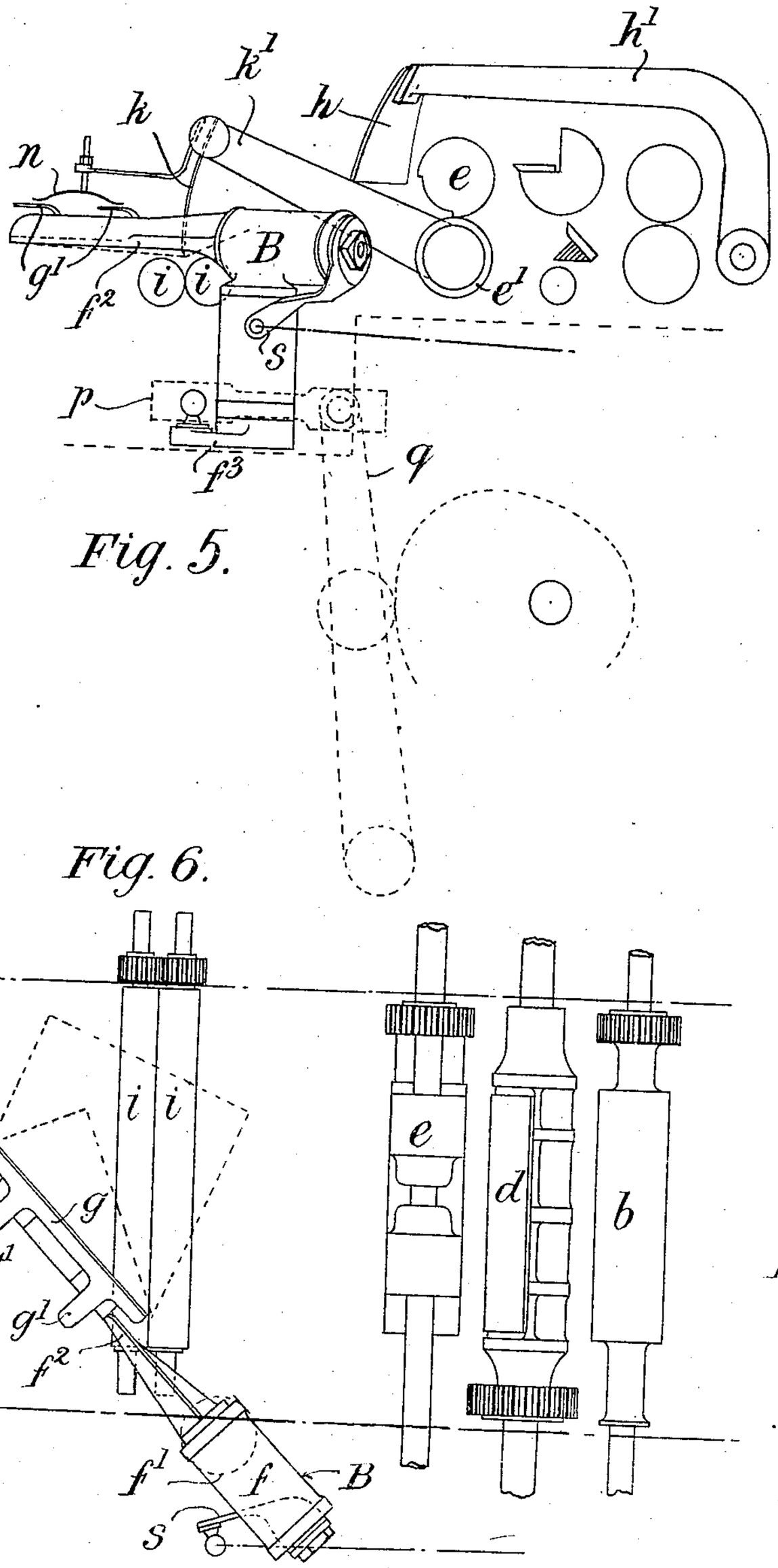

Fig. 5.

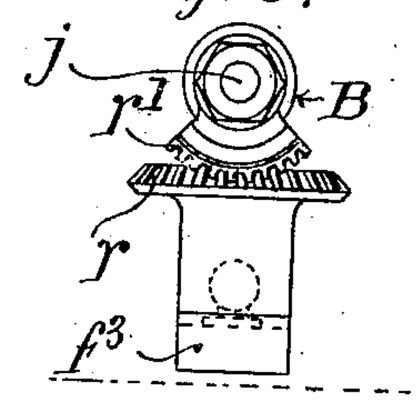

Fig. 8.

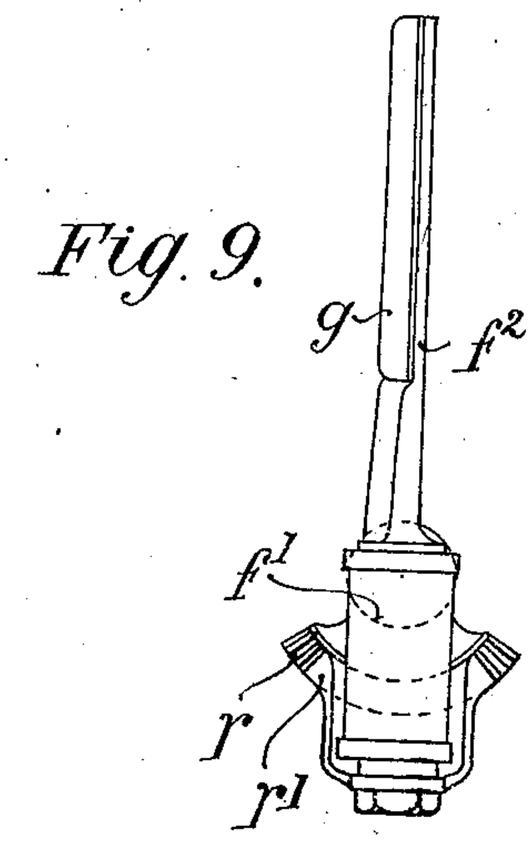

Fig. 9.

Fig. 6.

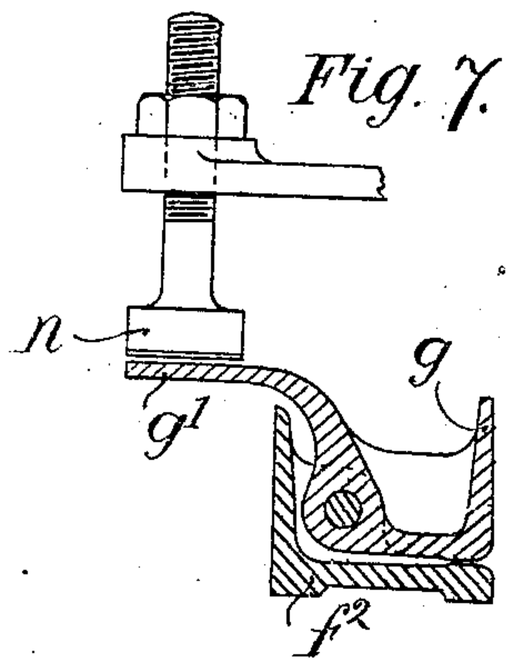

Fig. 7.

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UNITED STATES PATENT OFFICE.

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PAPER-BAG-MAKING MACHINERY.

938,653. Specification of Letters Patent. **Patented Nov. 2, 1909.**

Application filed September 4, 1908. Serial No. 451,733.

To all whom it may concern:

Be it known that I, SAMUEL DUERDEN, of Whitehall Iron Works, St. George, Bristol, England, mechanical engineer, have invented certain new and useful Improvements in or Relating to Paper-Bag-Making Machinery, of which the following is a specification.

This invention relates to machines for making kite shaped or cone bags.

According to this invention the paper blank after being pasted and cut from the strip is delivered to a carrier fitted with a gripper disposed at such an angle in regard to the blank that a dipper in pressing the blank into the gripper between the clamping bars thereof forms the first fold of the bag, the carrier with the partly folded blank in its grasp is then moved to position over a pair of folding or creasing rolls, the angular position of the parts being so arranged that a dipper in striking or pressing the blank between the folding or creasing rolls forms the second and final fold and the bag after being released from the gripper by suitable means passes through the folding rolls and is delivered therefrom complete. Means are provided for feeding forward the blanks to the said gripper on the carrier after being pasted and cut from the strip, and means are also provided whereby the blank is released from the feeding devices at or about the time it becomes firmly held in the gripper, and the blank is also released from the gripper at or about the time when it becomes held by the folding rolls—in this way the bag blank from its severance from the web until it has passed through the folding or finishing rollers is securely controlled by each succeeding device before being released by the preceding one.

The construction of one form of machine made in accordance with this invention is shown in the accompanying drawings in which—

Figure 1 is a diagrammatic elevation, Fig. 2 is a plan, Figs. 3 and 4 are part side elevation and plan respectively showing operation of the radial gripper arm, Figs. 5 and 6 are similar views to Figs. 3 and 4 showing the parts in different position. Fig. 7 is a detail. Figs. 8 and 9 are respectively elevation and plan of the preferred means for effecting the secondary rotation of radial carrier arm. Figs. 10^a, 10^b, 10^c, 10^d show the several stages from the blank to the finished bag.

From a roll of paper A mounted on a spindle and unwinding from it, a web of paper *a* is drawn away by a pair of draw rolls *b b'* one edge being pasted in transit by any suitable mechanism such as shown at *c*. The draw rolls *b b'* feed the strip forward through a rotary cutting device *d d'* (which may be of the ordinary serrated, or of the plain edge cutting type) into the grip of a pair of forwarding rolls *e e'*. Shortly after being gripped the cutting device *d* severs a bag length off from the end of the web, this bag length the forwarding rolls *e e'* pass forward until its leading end is over a pivoted oscillating carrier B. This oscillating carrier B comprises a horizontal member *f* pivoted at *f'* and provided with a horizontally pivoted arm or blade f^2 having a spring pressed jaw *g* hinged thereto so as to form a gripper for receiving the folded blank. Into this gripper a dipper *h* from above pushes an angular fold of the forward part of the bag blank. The gripper at this point stands with its mouth upward, and approximately at an angle in plan of $22\frac{1}{2}°$ (as shown in Fig. 4) with the cutter and forwarding rolls B. On the dipper *h* coming out of this gripper the carrier describes a forward motion on its pivot *f'* of some $67\frac{1}{2}°$ and brings the partly folded blank over a pair of folding rolls *i* which are parallel with the cutter and forwarding rollers, these rollers need not be parallel, but for convenience they are. In the journey the carrier B besides moving around on its vertical axis *f'* rotates some 90° on its horizontal axis *j* rolling as it were back and over toward the cutters or feed end of the machine, so that, when the carrier B reaches the end of its delivery stroke, the mouth of the gripper, instead of pointing upward, lies horizontally with the unfolded part of the blank in the rear as shown in Fig. 7. While the partially folded bag is in this position and in the

grasp of the gripper, a dipper or folding blade *k* moving downward from above strikes the bag blank into the pair of "folding rolls" *i* and forms the second fold and the rollers press and complete the bag. The carrier B returns to its original position. The carrier is always in front of the bag blank.

The angle formed between the folds of the bag is approximately 45°. If the bag blank is cut off other than square across the web, the angles formed by the two folds may be varied to suit.

In order to release the partially folded bag blank from the gripper B at the forming of the last fold, a tappet *n* carried on the second dipper *k* or otherwise suitably mounted strikes projections *g' g'* on the blade *g* and releases the bag blank.

After leaving the folding rolls *i* the completed bag can be passed to a receiving table such as *o* or bundling device, or printing apparatus as desired.

The angles mentioned in the description may be of course changed by appropriately arranging the position of the parts.

The forwarding rolls *e e'* may, in a machine to make one size of bag, be constructed with a top roll of a girth approximately equal to the length of the bag blank to be operated on, a longitudinal gap in its gripping surface being formed to liberate the bag blank at the required moment when the first dipper *h* strikes it.

In a machine to make several sizes of bags, *i. e.*, an "all-size" machine, interchangeable upper forwarding rollers of various and suitable girth may be used so that a proper length of paper is forwarded. The said non-gripping gap across the face of the rollers releases each bag blank at the desired time. Various other arrangements may be provided for adapting the machine to feed either one size or all sizes.

The draw rolls *b b'* which draw the web of paper from the roll A may be geared to the rotary cutter *d d'* either permanently or variably according as to whether only one length of paper requires to be drawn so as to make only one size of bag, or whether as in all "all-size" machine changes are required to be made from time to time to make various sizes of bags.

The carrier arm B is preferably mounted on the vertical pivot *f'* in order to give the oscillating movement required between the two folding devices, which movement is obtained by any suitable gearing for instance, as shown, the lower end of the pivot *f'* is provided with a lever f^3 which is connected by link *p* to the free end of a pivoted lever *q* having a friction roller *q'* adapted to bear upon and be actuated by a suitably shaped cam q^2 mounted upon the main shaft C.

The (already mentioned) part rotation of the carrier B on its horizontal axis is also obtained by suitable gearing. In the drawings two methods are shown, Figs. 8 and 9 show how the axial movement is obtained by bevel gearing. In this form *r* is a beveled toothed rack mounted on the bearing of the pivot *f'* adapted to mesh with a similar toothed rack *r'* carried upon the pivoted blade f^2. By this means it will be seen that as the carrier B oscillates about its vertical pivot *f'* the beveled rack *r'* will run over the rack *r* and will thus effect the rotary movement of the carrier B.

As an alternative among other methods, the horizontal turning of the gripper B, may be obtained (see Fig. 1) by a lever *s* fixed on the pivoted gripper blade f^2 the end of the said lever *s* being controlled by a connecting rod *s'* whose other end is held by a fixed pivot s^2.

The dipper *h* will be mounted on a suitable arm *h'* or on suitable guides so as to be reciprocated at the required times. In the form shown the dipping arm *h'* is pivoted at h^2 and is provided with a lever extension h^3 adapted to be reciprocated by cam h^4 which is in turn driven by suitable gear wheels from the main shaft C.

The dipper *k* which is mounted upon the pivoted lever *k'* is similarly actuated from the cam *t* mounted on the intermediate stud wheel *t'* and driven from the main shaft C.

The horizontal motion of the carrier arm on its vertical axis can be arranged to give the proper amount of rotation to the carrier arm in its horizontal axis.

Although the invention is described as applied to a machine having a continuously moving web of paper, yet it will be understood that the invention is equally applicable to a machine having an intermittently moving web using if desired the ordinary scissor like cutting device or shears instead of the rotary device shown.

What I claim and desire to secure by Letters Patent is:—

1. In machines for making kite shaped paper bags, means for giving to a blank a first fold, an oscillating carrier adapted to receive the once folded blank and to transfer it to a position at an angle to the receiving position, means for partially forming a second fold of the blank while it is held by said carrier, for receiving the bag from the carrier, finishing the folding and delivering the bag, substantially as set forth.

2. In machines for making kite shaped paper bags the combination of a carrier provided with a gripper disposed at an angle with regard to the bag blank when receiving the latter, a dipper for pressing the bag blank into the gripper to form the first fold of the bag, a pair of folding rollers, means for traveling the carrier with the blank in the gripper to another angular position over

the said folding rollers, a dipper adapted to press the blank from the carrier into the folding rollers to form the final fold, means for releasing the blank as it passes into the folding rollers substantially as set forth.

3. In machines for making kite shaped paper bags the combination of a carrier consisting of an arm adapted to move upon a pivot from one radial position where the blank is received and first folded to another radial position where the final fold is made, a gripper on said carrier, a dipper for pressing the bag blank into the gripper to form the first fold of the bag, a pair of folding rollers, means for traveling the carrier with the blank in the gripper to another angular position over the said folding rollers, a dipper adapted to press the blank from the carrier into the folding rollers to form the final fold, means for releasing the blank as it passes into the folding rollers substantially as set forth.

4. In machines for making kite shaped paper bags the combination of a carrier consisting of an arm adapted to oscillate upon a pivot from one radial position where the blank is received and first folded to another radial position where the final fold is made, a gripper on said carrier, means for turning said arm upon its longitudinal axis during its movement from one radial position to the other, a dipper for pressing the bag blank into the gripper to form the first fold of the bag, a pair of folding rollers, means for traveling the carrier with the blank in the gripper to another angular position over the said folding rollers, a dipper adapted to press the blank from the carrier into the folding rollers to form the final fold, means for releasing the blank as it passes into the folding rollers substantially as set forth.

5. In machines for making kite shaped paper bags the combination of a carrier consisting of an arm adapted to oscillate upon a pivot from one radial position where the blank is received and first folded to another radial position where the final fold is made, a gripper on said carrier, means for partly rotating said arm in a downward and rearward direction upon its longitudinal axis during its movement from one radial position to the other and whereby the carrier always precedes the blank during the forward movement, a dipper for pressing the bag blank into the gripper to form the first fold of the bag, a pair of folding rollers, means for traveling the carrier with the blank in the gripper to another angular position over the said folding rollers, a dipper adapted to press the blank from the carrier into the folding rollers to form the final fold, means for releasing the blank as it passes into the folding rollers substantially as set forth.

6. In machines for making kite shaped paper bags the combination of an oscillating carrier provided with a gripper disposed at an angle with regard to the bag blank, when receiving the latter, a dipper for pressing the bag blank into the gripper to form the first fold of the bag, a forwarding roller feeding the blank to the carrier and provided with a segmental gap, said gap serving to release the bag blank at or about the time when it is pressed into the gripper device, a pair of folding rollers, means for traveling the carrier with the blank in the gripper to another angular position over the said folding rollers, a dipper adapted to press the blank from the carrier into the folding rollers to form the final fold, means for releasing the blank as it passes into the folding rollers substantially as set forth.

7. In machines for making kite shaped paper bags the combination of a carrier consisting of an arm adapted to oscillate upon a pivot from one radial position where the blank is received and first folded to another radial position where the final fold is made, a gripper upon said carrier, a dipper for pressing the bag blank into the gripper to form the first fold of the bag, a forwarding roller adapted to feed the blank to the carrier provided with a segmental gap, said gap serving to release the bag blank at or about the time when it is pressed into the gripper device, means for turning said arm upon its longitudinal axis during its movement from one radial position to the other, a pair of folding rollers, means for traveling the carrier with the blank in the gripper to an angular position over the said folding rollers, a dipper adapted to press the blank from the carrier into the folding rollers to form the final fold, means for releasing the blank as it passes into the folding rollers substantially as set forth.

8. In machines for making kite shaped paper bags the combination of a carrier consisting of an arm adapted to oscillate upon a pivot from one radial position where the blank is received and first folded to another radial position where the final fold is made, a gripper on said carrier, a continuous web of paper and means for feeding the same to the machine, a rotary knife edged cutter device for severing the bag blank from the web with a clean edged cut, a forwarding roller feeding the blank to said carrier and provided with a segmental gap, said gap serving to release the bag blank at or about the time when it is pressed into the gripper device, means for turning said carrier arm upon its longitudinal axis during its movement from one radial position to the other, a dipper for pressing the bag blank into the gripper to form the first fold of the bag, a pair of folding rollers, means for traveling the carrier with the blank in the gripper to another angular position over the said fold-

ing rollers, a dipper adapted to press the blank from the carrier into the folding rollers to form the final fold, means for releasing the blank as it passes into the folding rollers, means for releasing the blank from the gripper device at or about the time when the blank is pressed between the folding rolls, substantially as set forth.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

SAMUEL DUERDEN.

Witnesses:
WILLIAM MONTAGU ROBERTS,
FRANK EDGAR MARSH.