(No Model.) 2 Sheets—Sheet 1.

J. W. WELLS.

BAG TURNING, FOLDING, AND PRINTING MACHINE.

No. 377,972. Patented Feb. 14, 1888.

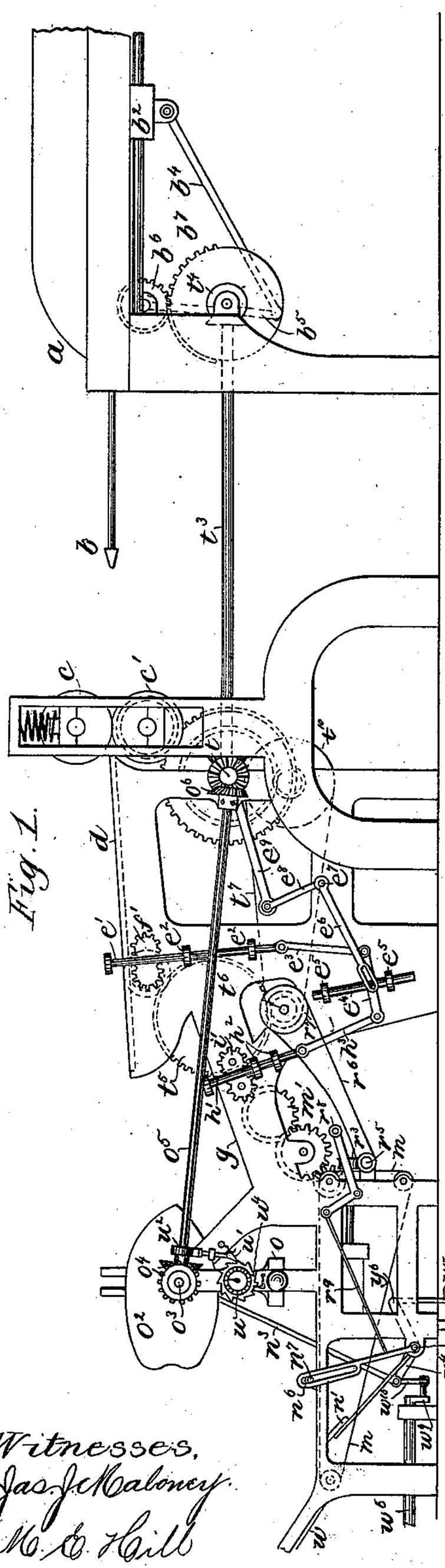

Fig. 1.

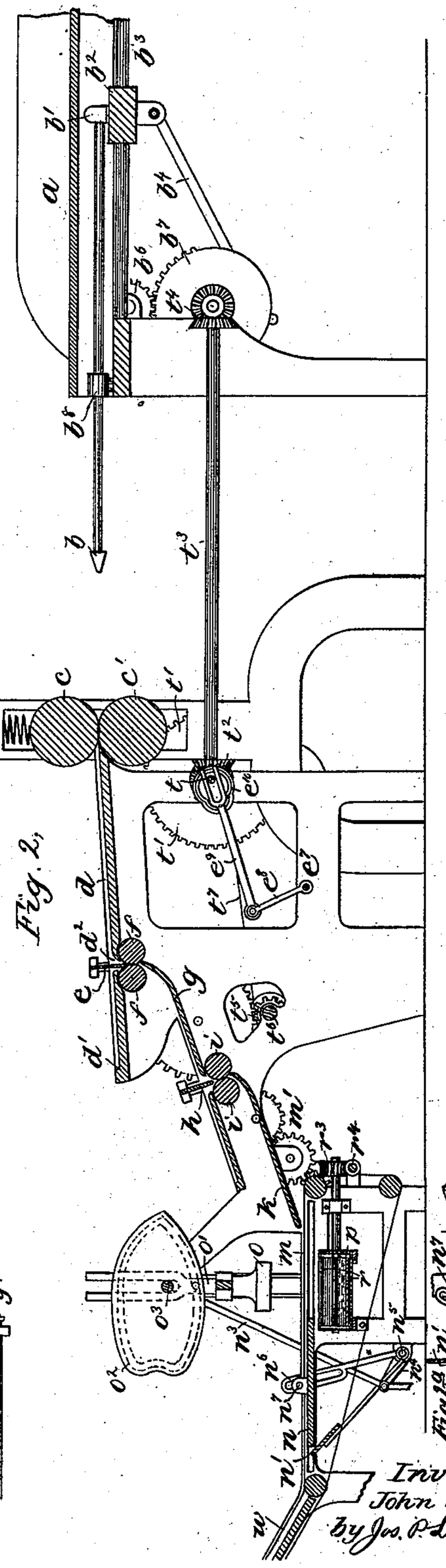

Fig. 2.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

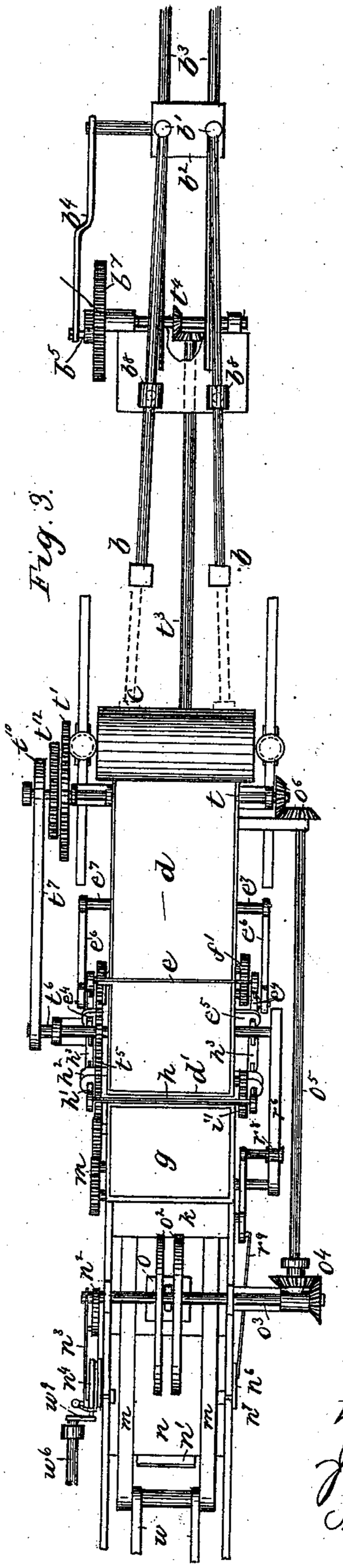


Fig. 7.

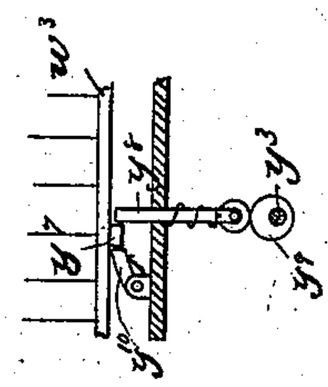


Fig. 6.

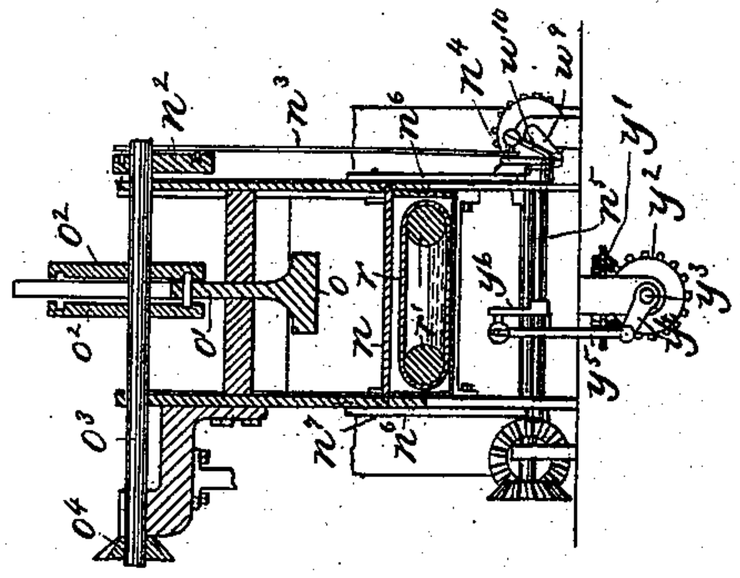
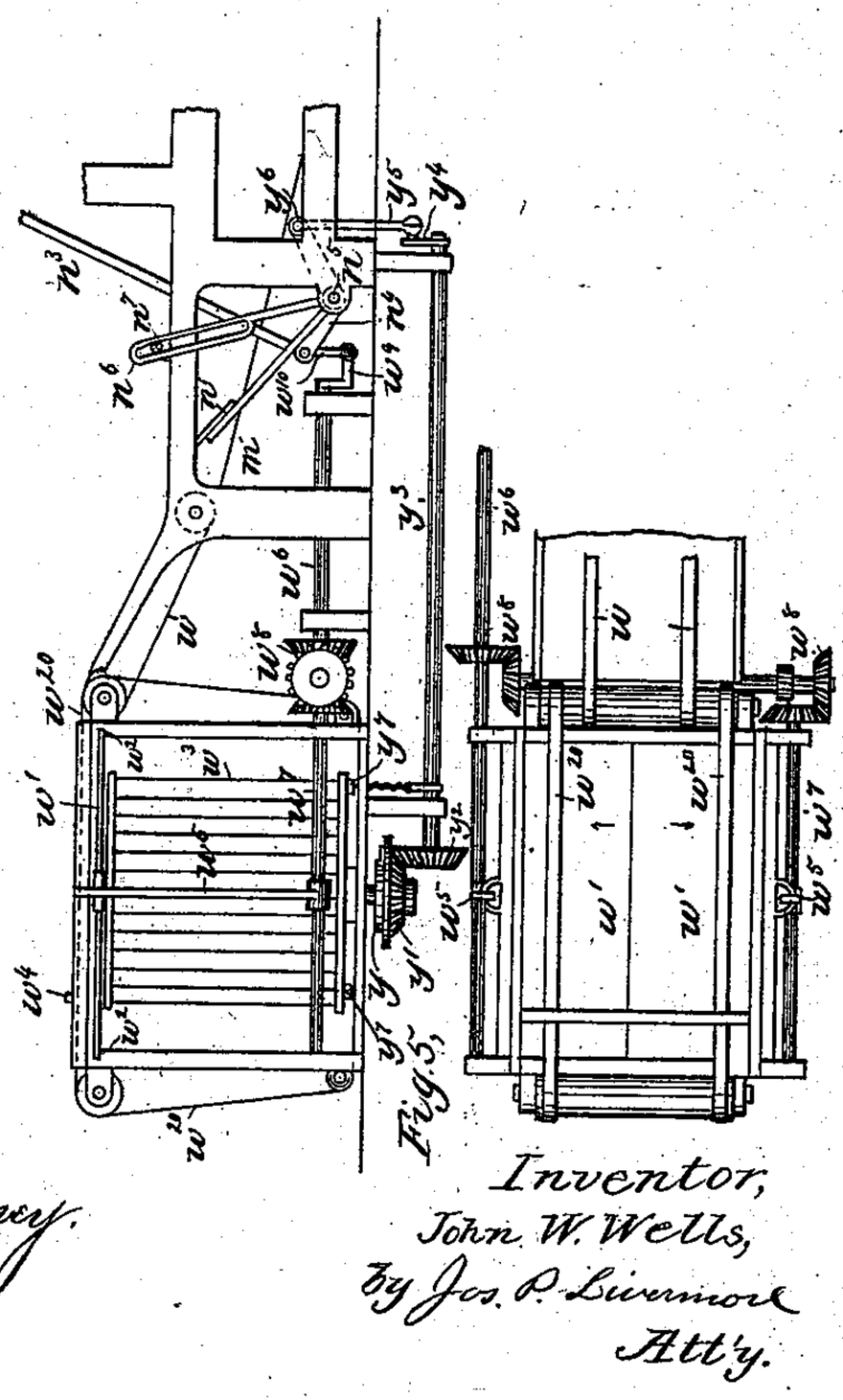


Fig. 4.



Witnesses,
Jas. J. Maloney.
M. C. Hill.

Inventor,
John W. Wells,
By Jos. P. Livermore
Att'y.

UNITED STATES PATENT OFFICE.

JOHN W. WELLS, OF MANCHESTER, NEW HAMPSHIRE.

BAG TURNING, FOLDING, AND PRINTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 377,972, dated February 14, 1888.

Application filed January 22, 1887. Serial No. 225,067. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. WELLS, of Manchester, county of Hillsborough, State of New Hampshire, have invented an Improvement in Bag Turning, Folding, and Printing Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention relates to a machine for turning bags after the mouths of the bags have been hemmed, which is done when they are wrong side out, and for folding the bags and printing upon them the usual trade-mark, the bags leaving the machine ready for baling and shipment.

The machine embodying the invention comprises in its construction a pair of turning devices consisting of slide-rods, the ends of which have a to-and-fro movement, and in their forward movement also have a lateral movement, so that at the end of the forward movement, in which they have carried the bottom or closed portion of the bag forward through the open mouth of the bag, thus turning the same, they are separated to the full width of the bag, and remain in this position while the bag is drawn off from the turning devices by a pair of rolls that form the next element in the machine. The turning devices thus operate to spread the bag as it is carried forward by the rolls upon a table provided with a transverse slit, through which the bag is forced by a reciprocating blade into the bite of a pair of folding-rolls, which thus fold the bag once across. As shown, in this instance the machine is constructed to fold the bag twice across, and from the first pair of folding-rolls it is fed upon another similar table provided with a transverse slit, through which the bag is carried by another blade into the bite of another pair of folding-rolls, from which it is fed upon a sliding table or platen. While on this platen it is acted upon by the printing device, which prints any desired mark or title upon the bag, after which the platen moves from beneath the printing device, carrying the bag with it. The bag is then deposited on a suitable receiver, while the printing device descends below the level of the platen upon an inked surface and is inked ready for the next impression. The printed bags are then automatically piled with the alternate bags in reversed position relating to those between them ready for baling.

The various appliances thus far described are organized into a single machine having actuating mechanism, by which the different devices have their movement properly timed with relation to one another, and the various operations are performed upon the bags one after another without interruption, there being a number of bags in the machine at a time, and the consecutive operations being performed on the series of different bags simultaneously.

Figure 1 is a side elevation of the main portion of a machine for turning, folding, and printing bags embodying this invention; Fig. 2, a longitudinal section thereof. Fig. 2^a is a detail hereinafter referred to; Fig. 3, a plan view thereof with the bag-supporting table removed; Figs. 4 and 5, a side elevation and plan view of the bag-piling devices; Fig. 6, a transverse vertical section of the printing devices, and Fig. 7 a detail to be referred to.

The bags to be turned may be placed in a pile upon a suitable table or support, *a*, shown as placed directly over the turning devices *b*, which consist of a pair of rods pivoted at *b'* (see Fig. 3) upon a reciprocating carriage, b^2, that travels on guides b^3, being actuated by a pitman, b^4, and crank b^5 on a shaft provided with a toothed gear, b^6, meshing with a mutilated gear, b^7, which causes the carriage to dwell or remain stationary in its forward position for a sufficient time to permit the bag to be drawn off from the forward end of the turning devices by a pair of rolls, *c c'*.

The rods or shanks of the turning devices *b* travel in swiveled guides b^8, which are wider apart than the pivotal points *b'* of the said rods, so that the forward ends of the rods move apart in their forward movement, as will be understood from the full and dotted line positions, Fig. 3, where the rods are represented in dotted lines in the extreme forward position.

Generally the bags will be fed to the machine by hand, being placed in a pile upon the table *a*, wrong side out, and with their mouths at the forward end of said table, and the operator will pick up a bag before the turning devices *b* are retracted or drawn back from the rolls *c c'*, and will spread its mouth, and then,

when the said turning devices are drawn back, will hold the bag so that its body will be caught by the turning devices and carried forward through the mouth of the bag, which is held open for this purpose by the operator, the folding devices then being near together and passing readily with the body of the bag through the open mouth thereof. The operator will hold back the mouth, so that the turning devices in their forward movement pass clear to the bottom of the bag, and at the end of their forward movement they will be spread the width of the bag, thus stretching it or laying it out flat at the bottom and carrying the bottom into the bite of the rolls *c c'*, which may revolve continuously and which draw the bag off from the folding devices while the latter dwell in their extreme forward position, so that the latter spread the entire body of the bag flat as it enters the rolls, which latter have sufficient pressure to smooth the bag. After a bag has thus been drawn off from the turning devices the latter move backward and forward to turn the next bag, which has been picked up in the meantime by the operator.

The bag which has just been turned is carried forward by the rolls *c c'* upon a folding-table, *d*, inclined slightly downward from the said rolls, so that the bag readily travels along it when fed from behind by the rolls. As soon as the bag has come fully on the table *d* it has the first fold applied to it by means of a reciprocating folding-plate, *e*, (best shown in Fig. 2,) which in this instance acts on the bag at about one-third the distance from its lower end and carries the body of the bag through a slit, d^2, in the table *d* into the bite of a pair of rolls, *f*, which fold the lower third of the bag back upon the middle third and deposit the bag thus folded once across upon the second folding-table *g*.

As one bag is drawn off from the table *d* and folded once across and deposited upon the table *g* another bag has been turned by the devices *b* and deposited on the table *d*, and while this latter bag is being folded by the rolls *f*, as has just been described, the bag previously folded and deposited on the table *g* is folded a second time at a point about one-third the distance from upper end by a similar folding mechanism, consisting of a blade, *h*, and pair of rolls *i*, which deposit the bag folded twice across upon an inclined slide, *k*, from which it proceeds by the action of gravity, assisted by continuously-moving tapes *m*, upon a platen, *n*, where it is acted upon by the printing device *o*. A stop, *n'*, at the front end of the platen *n* stops the bag in its forward movement, produced by the tapes *m*, in the proper position to receive the impression, and after the impression is made the platen *n* moves forward and the stop *n'* is removed from in front of it, as shown in the drawings, and the printed bag is removed from the platen, as will be hereinafter described, and while said platen is in its forward position the printing device *o* descends below the level of the platen into an ink-receptacle, where it receives a supply of ink for the next impression.

The various devices thus far described may all be actuated at the proper times by any suitable or usual train of mechanism. As herein shown, the power is supplied to a main shaft, *t*, near the rolls *c c'*, and provided with suitable gearing, *t'*, by which the said rolls are actuated with a continuous uniform rotary movement. The said shaft *t* is connected by beveled gearing t^2 with a shaft, t^3, connected by beveled gearing t^4 with the shaft of the mutilated gear b^7, before mentioned, by which the turning devices are actuated with an intermittent movement, dwelling in their forward position, while the bag is drawn off from them, as before described.

The pairs of folding-rolls *f f* and *i i* are geared together at one end, as represented at *f' i'*, Fig. 1, and are actuated with a continuous rotary movement by suitable gearing, t^5, from a shaft, t^6, driven by a belt, t^7, and suitable pulleys from a shaft, t^{10}, driven from the main shaft *t* by gearing t^{12}.

The folding-blades *e* and *h* are connected with rods *e' h'*, respectively working in guides e^2 h^2 on the frame-work, and connected by links e^3 h^3 with a carriage, e^4, working in guides e^5 at either side of the machine, and each actuated by an arm, e^6, on a rock-shaft, e^7, having another arm, e^8, which is connected with a rod, e^9, forked at its end to embrace and be guided by the actuating-shaft *t*, and provided with a cam projection entering a groove in a cam, e^{10}, (see Fig. 2,) on the main shaft, by which the said rod e^8 is caused to make a to-and-fro movement at each rotation of the main shaft, raising the blades, while the bags are fed along the table, into the position beneath them, and then depressing the blades to fold the bags into the corresponding pairs of rollers.

The shank or stem *o'*, that supports the printing device *o*, (see Figs. 2 and 6,) is provided with a cam-roller actuated by a cam, o^2, on a shaft, o^3, connected by beveled gears o^4 with a shaft, o^5, connected by beveled gears o^6 with the main shaft *t*, so that the cam-shaft o^3 revolves once at each revolution of the main shaft, the cam-groove being so constructed, as best shown in Fig. 2, to first raise the printing device to its highest position, (which takes place while a bag is passing upon the platen *n* from the folding-rolls *i*,) and to then depress the printing device far enough to force it upon the folded bag, and then raise the printing device to permit the platen and printed bag to be withdrawn from beneath it, and then to depress the printing device into an ink-receptacle, *p*, (see Figs. 2 and 6,) below the platen, when the cam preferably gives the printing device a short additional up-and-down movement to bring it a second time in contact with the inked surface, and then raises it to its highest position while the platen returns to its position beneath the printing device, and the next bag is deposited on the said platen.

The platen n is actuated from the shaft o^3 by a cam, n^2, engaging a projection on a rod, n^3, connected with an arm, n^4, on a rock-shaft, n^5, provided with an arm, n^6, having a slotted or forked extremity that engages a projection, n^7, from the platen, causing it to move backward and forward at the proper times with relation to the movement of the printing device before described.

The stop n' is connected with an arm on the rock-shaft n^5 in such position that when the platen is moved back beneath the printing device the arm carrying the stop n' will be about perpendicular, and the stop will consequently project above the platen, as shown in Fig. 2ª; but when the said platen is moved forward after the impression has taken place the stop n' will drop below the level of the platen, as shown in Figs. 1 and 2, leaving the bags free to be carried forward by the tapes m, the rollers of which are actuated by gearing m', driven from the driving-gear of one of the rollers i.

The inking mechanism consists, essentially, of an endless apron, r, mounted upon rolls r' in an ink-reservoir, the shafts of the said rolls extending out through the side of the reservoir, and being provided with worm-gears r^3, actuated by worms r^4 on a shaft, r^5, driven by a belt, r^6, from a pulley, r^7, actuated from the shaft t^6. The belt r^6 is made slack and controlled by an idler, r^8, operated from the rock-shaft n^5 by a rod, r^9, connected with the arm n^6, the idler being raised to slacken the belt when the platen is moved forward and the printing device is being moved down upon the inking-apron r, so that the said apron does not move while the impressing device is in contact with it, and is thus relieved from the wear which would otherwise take place. When the impressing device is raised and the platen moved back, the belt r^6 is tightened, causing the apron to travel again, so as to be thoroughly coated with ink.

Counting mechanism is preferably provided, shown as consisting of a ratchet-disk, u, having a number of teeth equal to the number of bags commonly packed in a single bale or parcel—for instance, fifty or one hundred—said ratchets being actuated by a pawl, u', moved by an eccentric, u^2, on the shaft o^5, and the ratchet-disk is provided with a projection, u^4, which at the end of a revolution will actuate a bell or other signal, notifying the attendant to remove the pile of bags.

The bags are delivered from the machine and automatically piled in the proper condition for baling or boxing by the mechanism best shown in Figs. 4 and 5, which is a continuation of the machine beyond the parts shown in the other figure.

As a bag when folded is thicker at one side than the other, it is necessary, in order to produce a uniform pile, that the alternate folded bags should be turned in opposite directions. This is accomplished automatically by turning the pile of bags half-way around immediately after each additional bag is dropped upon it and before the next one is dropped.

The bags are carried by tapes w w^{20} from the tapes m (by which they are carried forward and delivered from the platen n) onto a table, w', made in two parts movable laterally toward and from one another, as indicated by the arrows, Fig. 5, in guides w^2. (See Fig. 4.) The said table or movable support w' is placed over a basket, w^3, of suitable shape to receive the folded bags within it. A stop, w^4, arrests the folded bag when in proper position to drop the bag directly down into the basket w^3, and immediately after the bag has been carried forward onto the table w' by the tapes w w^{20} the parts of the said table are separated or moved apart, permitting the bag to drop down into the basket. The tapes w^{20}, by which the bag is carried along the table w' to the stop w^4, engage the folded bag near its edge, so that they will not support it when the table is moved from beneath. The parts w' of the table are operated by arms w^5, connected with rock-shafts w^6 w^7, themselves connected by gearing w^8, so that both move simultaneously, the shaft w^6 being operated by a crank, w^9, (see Fig. 4,) connected by a link, w^{10}, with the arm n^4, before mentioned as a part of the platen-actuating mechanism.

The basket w^3 is supported on a pivot provided with a ratchet, y, (see Fig. 4,) and having a gear, y', loose upon it, and provided with a pawl that engages the said ratchet, so as to turn the shaft in one direction only. The said gear y' meshes with a gear, y^2, on the shaft y^3, provided with a crank, y^4, connected by a link, y^5, with an arm, y^6, from the rock-shaft n^5, before mentioned, so that the said gear y^2 is oscillated back and forth at each movement of the platen, being so arranged that the backward movement, which does not produce any movement of the basket, takes place at the time when the parts of the table w' are separated, and the forward movement, that turns the basket half around, takes place while the parts of the table are closed and after the bag has dropped into the basket. A stop, y^7 y^8, arrests the basket when it has turned to the right position, the said stop being operated by the shaft y^3 in such manner as to release the basket when the shaft is turned back, thus leaving the basket unlocked when the shaft begins its forward movement that turns the basket.

As shown in Fig. 7, the movable member of the stop is a bolt that engages a projection, y^7, at the end of the side of the basket, said bolt being operated by a cam, y^9, on the shaft y^3, which permits the said bolt to be withdrawn from the path of the projection y^7, when the basket-actuating gear y' is turned back, ready to begin its forward movement, by which the basket is turned. At the end of this forward movement the projection y^8 is again brought into the path of the projection y^7 at the other side of the basket, which stops the basket when

it is turned just half round, the backward movement or recoil of the basket being prevented by a retaining-pawl, y^{10}.

I claim—

1. The combination of the reciprocating turning devices, and rolls that draw the turned bag therefrom, with the folding-table that receives the bag from said rolls, and folding devices operating upon the bag on said folding-table, and actuating mechanism, substantially as described, common to said turning and folding devices, whereby their operations are timed with relation to one another, substantially as set forth.

2. The combination of the reciprocating turning devices, and rollers that draw the turned bag therefrom, and the folding-table that receives the bag from said rolls, and folding devices operating upon the bag on said folding-table, with a platen or support that receives the folded bag, and a printing device that operates on said folded bag, and actuating mechanism, substantially as described, common to all said devices.

3. The combination of the turning devices having a to-and-fro and lateral movement, and actuating mechanism, substantially as described, that produces the said to-and-fro movement and causes the turning devices to dwell in their forwardmost separate position, with a pair of rolls that receive the turned bag and draw it off from the turning devices while in their forward position, substantially as described.

4. The combination of the turning devices having a to-and-fro and lateral movement, and actuating mechanism, substantially as described, that produces the said to-and-fro movement and causes the turning devices to dwell in their forwardmost separate position, and a pair of rolls that receive the turned bag and draw it off from the turning devices while in their forward position, and a folding-table that receives the bag from said rolls, and folding devices, whereby the bag is removed from said table and folded while another bag is being turned and fed upon the table, substantially as described.

5. The bag-receiver pivoted on a shaft, as described, combined with actuating mechanism, substantially as described, by which the said receiver is intermittingly rotated on its shaft, for the purpose set forth.

6. The combination of the folding devices and movable platen, on which the folded bags are delivered therefrom, with a printing device above and an ink-receptacle below the said platen, tapes for conveying the bags onto and off from the said platen, and a movable stop for arresting the bags on the platen while being printed, and actuating mechanism, substantially as described, common to all the said devices, whereby the operations of folding, printing, and delivering are performed at the proper times, substantially as described.

7. The combination of a movable platen and printing device above and ink-receptacle below the said platen, with a movable ink distributer or apron in said receptacle, and actuating mechanism, substantially as described, therefor, governed by the movement of the platen, as described, whereby the said ink-distributer is in motion while the platen is beneath the printing device and has its motion cease when the platen is removed from beneath the printing device, and the latter descends upon the ink-distributer, substantially as described.

8. The combination, with a receiver or basket capable of rotation, with a separable two-part support or table above said basket, of actuating mechanism, substantially as described, for the said table and basket, whereby the latter is turned while the table is closed over it, and the table is then separated to drop the article supported on it into the basket, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN W. WELLS.

Witnesses:
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ARTHUR H. HALE.