Sheet 1. 2 Sheets.

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No. 12982. Patented May. 29. 1855

Fig. 4.

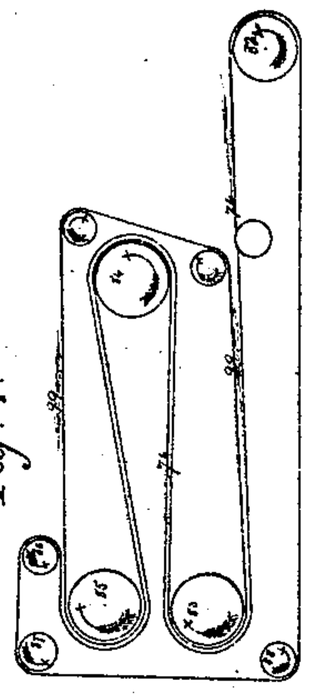

Fig. 5

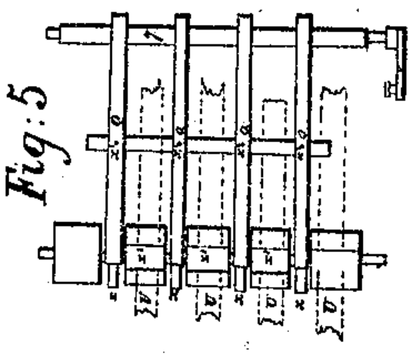

Fig. 1

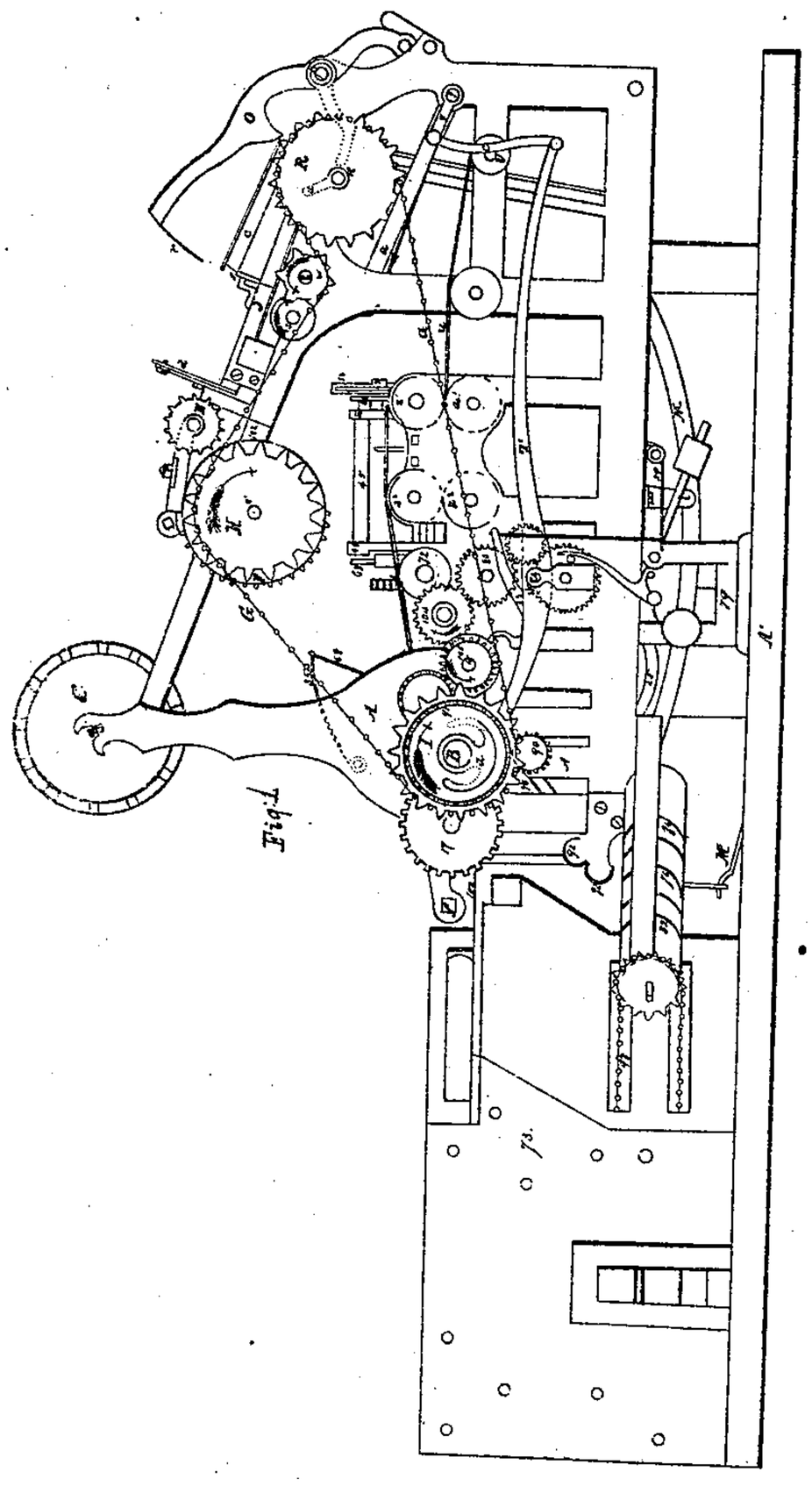

Fig. 2.

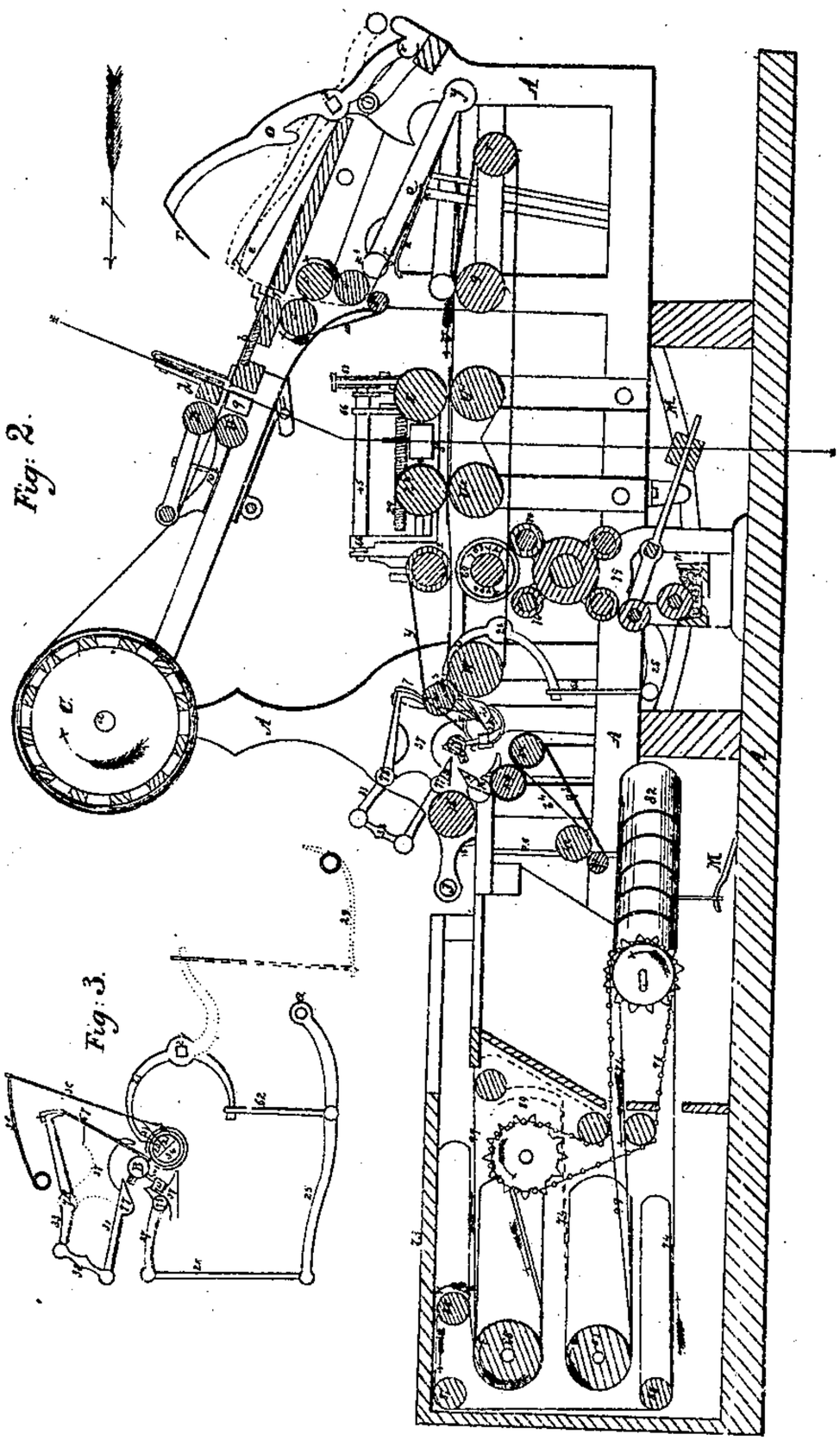

Fig. 3.

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Fig. 8

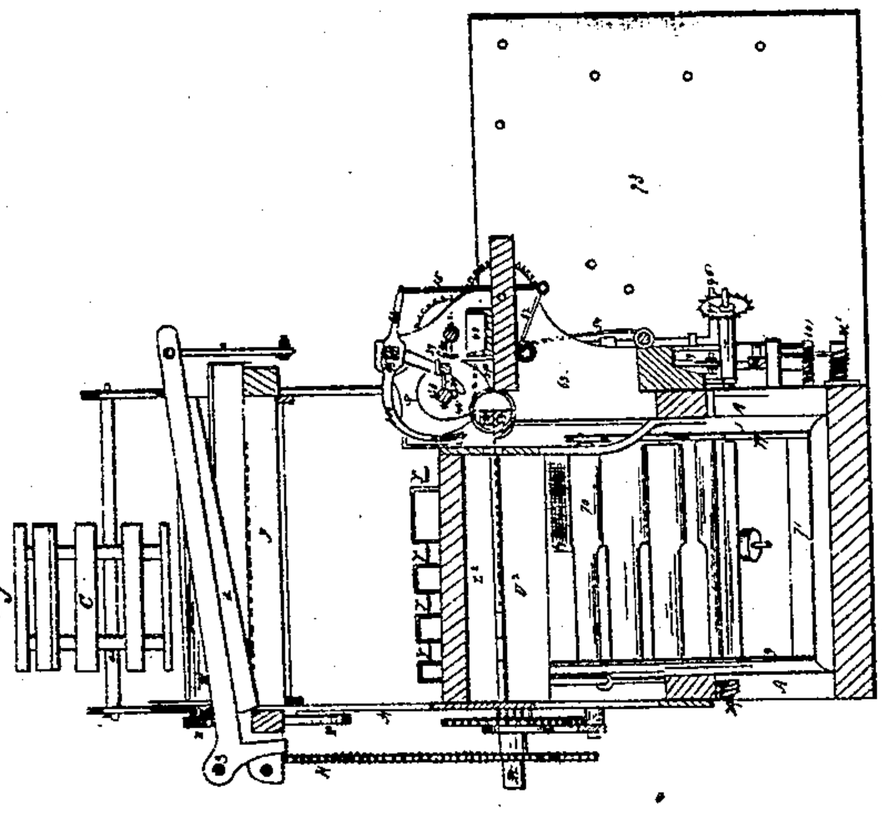


Fig. 9.

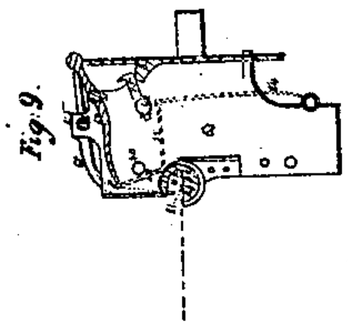


Fig. 10

Fig. 12.

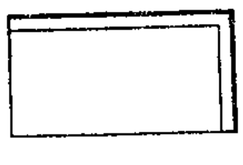


Fig. 11

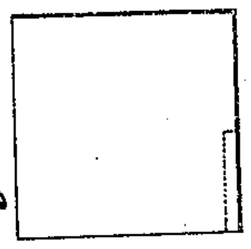


Fig. 6.

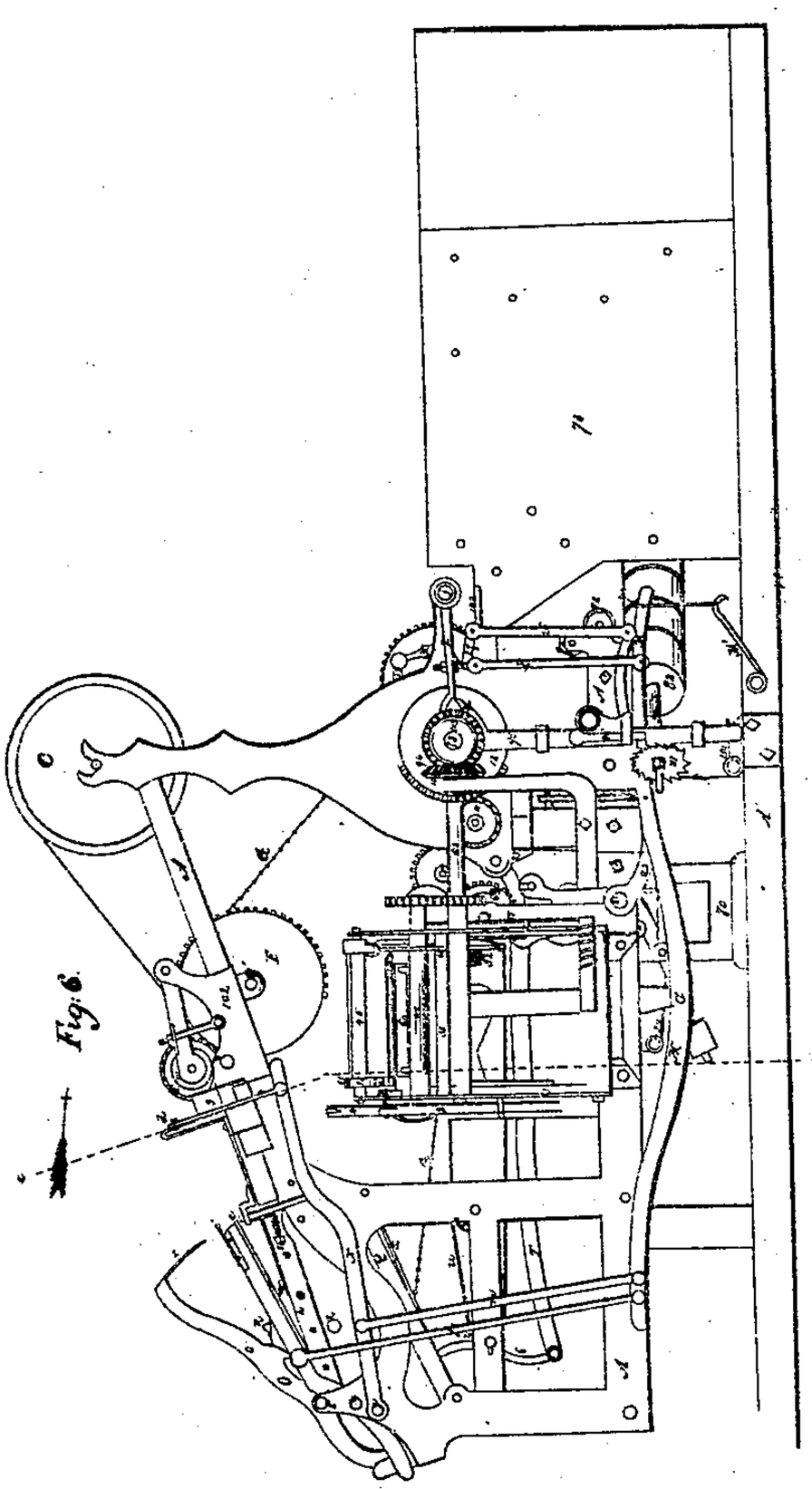
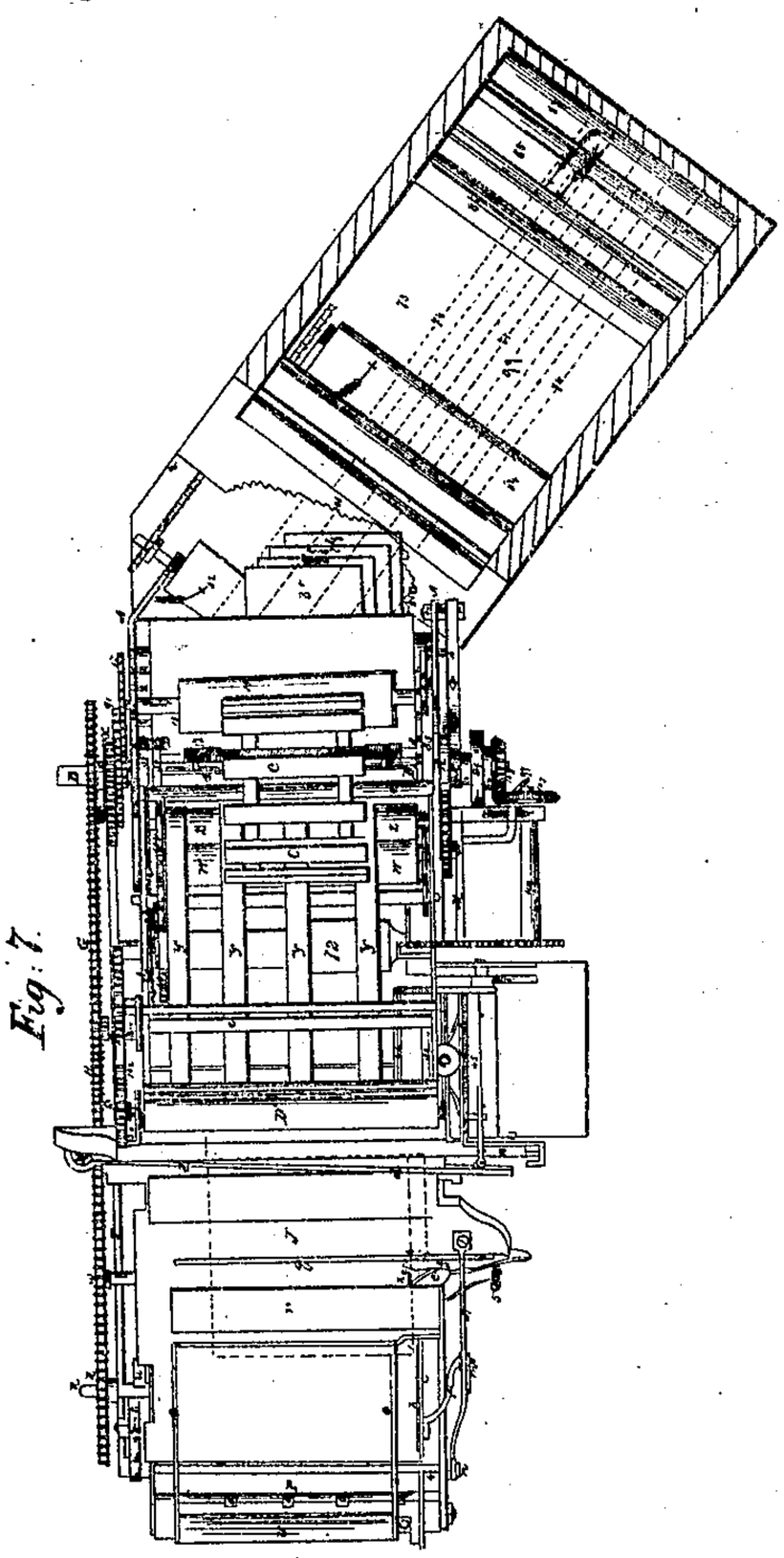


Fig. 7.



UNITED STATES PATENT OFFICE.

FRANCIS WOLLE, OF BETHLEHEM, PENNSYLVANIA.

MACHINE FOR MAKING PAPER BAGS.

Specification of Letters Patent No. 12,982, dated May 29, 1855.

To all whom it may concern:

Be it known that I, FRANCIS WOLLE, of the borough of Bethlehem, in the county of Northampton and State of Pennsylvania, have invented new and useful Improvements in Machines for Making Bags of Paper or other Suitable Materials; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same.

This invention consists in a novel arrangement, and combination of shears for cutting the paper or material to the required form, in certain means of conveying the paper after it is cut and folded, to the apparatus by which it is to be pasted, and formed into a bag; in certain means of pasting the parts which require to be united, and of lapping the said parts; in certain apparatus for drying the pasted parts of the bags; and in certain combinations of cutting, folding, conveying, pasting, printing and drying apparatuses and a combination of the whole of the said apparatuses, whereby a machine is produced, which takes in a roll of paper, or other suitable material, and delivers bags in a finished state, dried, and having printed upon them any desired trade mark, or other device, or inscriptions.

The accompanying drawings making a part of this specification, represent a machine embracing all the features of my invention.

In Sheet I Figure 1, is a side elevation, and Fig. II is a longitudinal vertical section, seen looking in the same direction as Fig. 1. Fig. III is a sectional view of the side pasting and lapping apparatus, for pasting the side of the bag, taken looking in the same direction as in Fig. II but having the framing omitted in order to show the parts distinctly. Fig. IV is a sectional view of the aprons, and rollers which carry the bags through the drying apparatus. Fig. V is a plan of the conveyer which conveys the paper from the folding apparatus to the aprons, which carry it to the pasting and lapping apparatus. In Sheet 2 Fig. VI is an elevation of the opposite side of the machine to Fig. I. Fig. VII is a plan of the whole machine; Fig. VIII is a transverse vertical section, taken in the line of Figs. 2, and 6, looking in the direction of the arrow 7; Fig. IX is an end view of the bottom pasting and lapping apparatus, for pasting the bottom of the bag, taken looking in the same direction as in Fig. 8. Fig. X is a longitudinal view of the paste brushes; Fig. XI exhibits the shape of the piece of paper from which a bag is made; Fig. XII exhibits the piece folded, but not yet having the edges lapped.

Similar letters of reference indicate corresponding parts in the several figures.

The working parts of the machine, with the exception of the printing and drying apparatuses, are all supported by two side frames A, A which are made partly of wood and partly of iron, but which may be made wholly of wood or iron; these are erected upon a suitable bed A^1, and the movements of all the parts are derived from the main shaft B, to which continuous rotary motion is given by any suitable means in the direction of the arrow (30) shown in Fig. 1.

The paper from which the bags are made, which is represented in brown color, in Fig. 2 of the drawing, is in a roll of a width suited to the depth of the bags, and is wound upon a reel C, whose axle (*a*) turns freely in suitable bearings in the upper part of the framing near one end of the machine. One end is led between the two feeding rollers D, D′, which are placed near the reel in suitable bearings, and receive an intermittent rotary motion, being caused during a part of each revolution of the main shaft, to make as many revolutions as are necessary to take off, or unwind from the reel a sufficient length of paper to form a bag, and then remaining stationary till the revolution of the main shaft is concluded.

The feeding rollers receive their motion in the following manner:—The roller D^1 is furnished at one end (see Fig. 1), with a spur wheel E, which gears with a larger spur wheel F, which has teeth on a part only of its circumference, and is furnished with a sprocket wheel H, over which runs an endless chain G, from another sprocket wheel, I, on the main shaft. The shaft (*c′*) receives a constant rotary motion from the main shaft, and gives rotary motion to the roller D^1, while the toothed part of the circumference of the wheel F, is passing the wheel E, but ceases to do so, when that part having no teeth is passing. The roller D receives motion through the contact of the paper with the periphery, or, if thought desirable may be geared with D.

The paper which has been drawn between the feed rollers lies upon an inclined plane or table I on the upper part of the framing, as shown at (*b*) in Fig. 2; and as soon as the rollers have performed the necessary revolutions to deliver the paper for a bag and have become stationary, the three shear blades (*d*, *e*, *f*,) come into operation, the arm (*d*) cutting off the piece (*b*) from the roll, and (*e*) and (*f*) cutting away part of one edge, so that the remaining part of the same edge can, when the piece is doubled, be lapped over it, to make the joint or seam in the bottom of the bag. The form of the piece after it is cut is shown in brown outline in Fig. 7, the lines 1, 2, showing the form of the piece cut out by (*e*) and (*f*) but in order to show the form more distinctly Fig. 11 is given in which the dotted lines represent the part cut out by (*e*) and (*f*).

The shear blade (*d*) hangs on a pin (3) see Figs. 7 and 8, at one side of the machine, and cuts on the edge of a bar (*g*) in front of the feed rollers (*e*) hangs on a pin (4) see Figs. 2 and 6, and cuts on the side edge (*h*) of the lower part of the inclined plane I, which is made narrower than the upper part, in order that the part of the paper to be cut away may stand out beyond the edge (*h*). (*f*) hangs on a pin (5) (see Figs. 6 and 7) and cuts on the edge of a fixed strip of steel (*i*) which stands out from the table I at a right angle to the edge (*h*), where the point of the shear blade (*e*) meets it in cutting, as shown in Fig. 7. The edge (*g*) and the edge (*h*) are steeled, and the shear blades (*d*) (*e*) (*f*), may be steel bars, or wooden or iron bars, having strips of steel secured to them.

The shear blades are all caused to descend and make their cuts by means of a cam K on the main shaft B (see Fig. 6), which once, during every revolution of the shaft, comes into operation under and raises the end of short lever L, hung on a fulcrum pin (*j*) in the side of the framing. This lever L is connected by a strap or link K to one arm of a long lever M, which hangs on a fulcrum pin (*l*) in the framing; the other arm of the said lever connecting, by a rod (*m*), with another lever N on a fulcrum (*n*), and the said lever N by a rod (*o*), with the shear arm (*d*). The lever M is connected also by a rod (*p*) to the shear arm (*e*).

By the action of the cam K on the lever L, the shear blades (*d*) and (*e*) are brought down and caused to pass the edges (*g*) and (*k*), and as (*e*) descends, its end being suitably formed for the purpose, as represented at (e^1) in Figs. 6 and 7, presses on the end of (*f*) and forces it down past the edge of (*i*); thus it will be seen that all the shear blades operate at the same time. They are all raised after the projection of the cam K, which operates on the lever L, has passed that lever and ceased to operate upon it, by the agency of a spring M^1, attached to the framing and to the end of the lever M, as shown in Fig. 6, or by means of a weight attached to the end of the lever M. A piece of paper is now supposed to be cut to the proper form for a bag, and the next operation is that of folding it.

By referring to Figs. 2 and 7, it will be seen that there is a narrow slot (*g*), extending from the edge (*h*) of the inclined plane I, nearly all across it. This slot is immediately above the points of the shear arms (*e*) and (*f*) and its lower side forms a continuation of the edge of the strips of steel (*i*), on which the shear arm (*f*) cuts. Over the lower part of the inclined plane there are two levers (*o*, *o*) which vibrate on a shaft P, and which carry at their upper ends a blunt edged blade (*r*) so arranged as to be capable when it descends of passing through the slot (*g*). The slot is at such a distance from the line when the sheet is cut off by the shear arm (*e*) as to make that part of the piece of paper which is above the slot so much longer or deeper than the part below it as is required for the width of the lap for the side of the bag.

By the descent of the frame (*o*, *o*) as shown in red color in Fig. 2, the blade (*r*), which I term the folding creaser creases the sheet and folds it by driving the crease through the slot, rising as soon as it has driven the fold through far enough to be seized by a pair of rollers (*s*, *s*) which draw the folded piece through the slot.

The folding creaser is operated in the following manner immediately after the piece is cut out:—On one end of its shafts P, there is an arm (*t*) see (Figs. 1 and 7,) and on a shaft R, which is placed near to and parallel with the shafts P, and which receives a constant rotary motion through the endless chain G, running over a sprocket wheel R; on one end of it there is a cam (*u*), shown in dotted outline in Fig. 1, which strikes down the arm (*t*) once during every revolution, and thus brings down the folding creaser. As soon as the cam (*u*) passes the arm (*t*) the creaser is raised by a weight (*v*) which is secured to the opposite ends of the levers (*o*, *o*). As the sprocket wheel R′ is the same size as that, I, on the main shaft, the shaft R makes one revolution, for every revolution of the main shaft. The folded piece of paper is carried by the rollers (*s*, *s*), already mentioned, and two other rollers s^1, s^1, into a swinging frame Q, Q, which I term the conveyer, and by the conveyer is deposited upon an endless apron U, with that side of the fold which has the lapping pieces for the bottom and sides of the bag underneath, as represented in Fig. 12, and is then carried to the pasting and

topping apparatus. It is shown in brown color at (b^1) in Fig. 2, just entering the conveyer.

The conveyer consists of four, or five, or any suitable number of parallel wooden or metal arms Q, Q, attached to a shaft (y) which rests in the bearings in the side of the framing, and a number of lighter bars (x) of metal or wood attached, one to the under side of each arm. The bars (x) are attached near the shafts, and a small strip of wood or metal (x^1) is placed transversely between them and the arms Q, which serves at the same time to keep the bars far enough from the arms to allow room for the folded paper, and as a stop, to prevent the paper running too far. This strip should be secured by set screws (x^2). At the entrance to the conveyer the spaces between the arms are filled by rollers (x^3).

The conveyer receives a swinging movement, rising as high as the position shown in black outline in Fig. 2, and descending as far as the position shown in red outline, remaining for some time in either position, when in the former, it receives the folded paper, which is represented at (b^1) in brown color, in the last named figure, as entering it; when in the latter position, the paper is taken from it by motion of the apron U. This apron is composed of a number of tapes or bands, and there is space enough between them to admit the bars (x), so that the paper may be laid right down upon the apron, in which position it is held, while the tapes are at rest, by the friction rollers (x^3).

The movement of the conveyer is effected through an eccentric cam X shown in dotted outline in Fig. 1, and having its edge, shown in Fig. 7, on the main shaft, which operates upon one end of a lever T, which is attached by a fulcrum pin (26) to the side of the framing. The other end of this lever is attached by a rod (6) to an arm (8), secured to the conveyer shaft (y). During one portion of the revolution of the main shaft, the cam forces down its end of the lever, and keeps the other end raised to hold up the conveyer; but at the proper time for the conveyer to descend, the cam gently lets the lever free, and allows the conveyer to descend, by reason of its own weight, and deposit the paper upon the apron U.

When the paper is deposited upon the apron, the rollers (x^3) rest upon it just above a roller (g), which assists in supporting the apron; and the roller (x^3) and (g), all receiving motion from the apron, assist in taking the paper from the conveyer. The roller (g) is grooved to receive the bars (x^2), which would otherwise prevent the paper being laid upon the apron.

The movement of the rollers (s, s,) and s^1, s^1, is constant, and is given by the chain G, which runs under a sprocket wheel (w) (see Fig. 1), on the end of the shaft of one of the rollers (s, s). The other rollers may be geared with the first one, or may be caused to revolve by the contact of the paper. One of the rollers (s^1, s^1,) receives motion from the first roller s, by means of tapes (10), (see Fig. 2), which also assist in conducting the paper between them to the conveyer; the other receives motion through the contact of the paper.

The tapes or bands which constitute the endless apron U run around the rollers V and W, working in bearings in the sides of the framing, the latter of which receives an intermittent rotary motion by means of a spur wheel (11) on one end (see Fig. 6), which gears another spur wheel (12) on the driving shaft, which has teeth on a part only of its circumference (see Fig. 6). This causes the apron to receive one movement for every revolution of the driving shaft, and then to become stationary for a time. One of these movements of the apron serves to carry the folded paper from the conveyer to the bottom pasting and lapping apparatus, where the bottom of the bag is closed, and the next movement to carry it from the bottom pasting and lapping apparatus to the side pasting and lapping apparatus, where the side of the bag is closed.

The endless apron U is assisted in carrying the paper, and also in holding it still during the pasting and lapping operations, by another endless apron Y above. The latter endless apron runs around two rollers Z, Z^1, working in bearings in the sides of the framing, and receives the same motion as the frame one, in consequence of the rollers Z and W being geared together. Within the apron U are two rollers U^1, U^2, which work in bearings in the side framing; the former being placed immediately under the roller Z^1 and the latter under the roller Z^2, which is placed within the apron Y. The two lower rollers serve as a table for the folded paper to rest firmly upon when having the bottom pasted and lapped; and the two upper ones, which are allowed some vertical play, rest with all their weight on the paper, to hold it in place.

The apparatus for pasting and lapping the bottom of the bag, is at the side of the machine, and that which passes the side is near the center of the machine in the immediate neighborhood of the main shaft, in fact, has part of it attached directly to it.

The operation of that which pastes and taps the side can, perhaps, be more easily understood, and therefore I will proceed to describe that first, although it does not come into operation till after the other. It is shown best in Fig. 2; it consists of a paster, paste feeder, paste trough, creaser and lapping table. The paster (13) consists of a

brush, or a piece of wood or metal, with a strip of leather attached, and is of sufficient length, to paste the whole length of the lap at once, it is attached by two arms (14) to the main shaft B, with which it revolves, and once during every revolution comes in contact with the paste feeder (15) and is supplied with paste. This feeder (15) consists of a cylinder, which receives a constant rotary motion through a spur wheel (16) on the main shaft, gearing with another spur wheel (17) on its own axis. It revolves in the paste trough (18) and collects therefrom sufficient paste to supply the paster every time the latter passes it. The lapper consists of a straight square shaft (20), which lies along the edge of the lapping table (21) which is a narrow stationary table running across the framing; it has journals resting in bearings in the sides of the framing. The axis of its journals is precisely in the line of junction of the shaft with the edge of the table (21), and thus the shaft is eccentric, and is capable of moving from the front of the table (as shown in Fig. 2) to the top (as shown in Fig. 3). When in the former position, one of its sides is flush with and forms a continuation of the table, and in this position it remains, except during the folding over of the laps.

The paper is deposited by the aprons with the part, which is to form the lap on the top of the lapper, as represented by (b^3), in brown color in Fig. 2; and while it is in this position, the paster in passing pastes it, and immediately after this the creaser, which consists of a long blunt edged blade (22), attached by arms (23) to a rock shaft (24), comes down upon the line where the lapping commences which is close to the edge of the upper side of the bag, and holds it while the lapper commences turning over onto the top of the table. The creaser is withdrawn in time to escape the lapper, which turns over and turns the pasted lap over the edge of the upper part of the bag (as shown in Fig. 3), and then returns to its former position to allow the bag to be thrown out of the machine by the succeeding movement of the aprons. The creaser is caused to descend and perform its duty by means of a long lever (25), see Figs. 3 and 6,) which works on a fulcrum pin (61) outside the framing, and is attached by a rod (62) to one of the creaser arms (23). This lever is depressed every time it is necessary for the creaser to operate by means of a rod (26), which is attached to the longer end of another lever (27), which hangs on a fulcrum pin (76) within the framing, and has its shorter end moved by a stud (28) on the main shaft B once during every revolution. The creaser is raised after the stud (28) has passed the end of the lever (27), by a spring (29) attached to the frame, and connected by a rod with one of the creaser arms, shown in Fig. 1, and dotted in Fig. 3. The lapper is turned over to make the lap through the agency of the same stud (28) which actuates the creaser, the said stud raising one end of a lever (31), hung on a fulcrum (77) on the inside of the framing, the said lever (31) having its opposite end connected by a link (32) with the shorter arm of a lever (33), which works on a fulcrum (78) on the inside of the framing. The longer arm of the lever 33 has a strap (67) attached, which passes partly around a pulley (34), which is secured to one end of the lapper concentrically to its axis, and which by being drawn upward turns over the lapper on the top of the table. The lapper is returned or thrown down after the stud (28) passes the lever (31) by a spring (35), which is attached to the opposite side of the framing to the levers (31), (33), and connected by a cord or strap (68) with a pulley similar to 34, on the opposite end of the lapper, the latter cord or strap passing around its pulley in the opposite direction to the strap (67). The position of the spring (35) and the cord (68) are shown in dotted lines in Fig. 3.

To return to the bottom pasting and lapping apparatus at the side of the machine, I will first remark, that it is essentially the same as that which passes and laps the side of the bag, but its position requires it to be operated by somewhat different mechanism which will be best understood by referring to Figs. 8 and 9. The lapper (38) is similar to the other one, and is applied in a similar manner to its lapping table (58), opposite which the bag arrives when the aprons become stationary, and the pasting and lapping apparatuses come into operation. The position of the bag at this time is represented in Fig. 2 by (b^2) in brown color. The lapper (38), the paster shaft (40), the creaser shaft (45), and the paster feeder shaft (42), have their journals fitted to bearings in a side framing (63, 63,) which is attached to the main framing A, and they are all at right angles with the corresponding parts of the other pasting and lapping apparatus. The paster shaft (40) and the paste feeder shaft (42) are geared together, and receive a constant rotary motion by gearing from a shaft (41), which is driven by bevel gearing (103) from the main or driving shaft B, (as shown in Fig. 6). The paster feeder (60), instead of being a cylinder, like that (15), is represented as merely a segment, attached by arms to its shaft (42). This change is merely to show that either a segment or complete cylinder serves the purpose. It supplies the paster (39) from a trough (43) placed on a shelf on the side framing (63, 63). The creaser (44) is thrown

down into operation by the action of a stud (46), attached to the paster shaft (40), upon an arm (47) attached to the creaser shaft, and is raised after its operation by a spring (52) which is attached to the framing and connected by a rod (65) to the outer end of one of the creaser arms (66). The lapper (38) is thrown over upon the table (58), to make the lap, by a strap (48), which is attached by one end and passes partly around a pulley (49), (see Fig. 9,) placed on one end of it, the other end of this strap is connected to one end of a lever (50), which rocks on a fulcrum (51), and has its other end attached to an upright rod (53), which works in a guide on the framing. This rod has a step on its side, which is struck during every revolution of the paster shaft by a stud (75) on the said shaft, and is forced downward, thus raising the opposite end of the lever and turning over the lapper. The lapper is thrown back off the lapping table by a spring (54), which is attached to the frame, and to a cord (55), which is attached to a pulley, similar to the pulley (49) and passes around the said pulley in an opposite direction to that in which the strap (48) passes around the pulley (49). In order that the paper may not be impeded in its progress to and from the bottom pasting apparatus, the pulleys (49), see Fig. 9), have each a deep slot (81), through which the paper passes.

The pasters (13) and (39) have the arms (14, 14), by which they are connected to their shafts, B and (40), fitting so as to slide freely through the shafts. This is for the purpose of enabling them to receive an eccentric motion, in order to make them clear the edges of the paste troughs, and to prevent them pasting the aprons, meeting the creasers, or pasting too much of the paper. The mode of their attachment to their shafts is illustrated in Fig. 10. The arms (14) have nuts at their back ends to prevent the pasters being detached from the shafts; and the pasters, when in the position in which they paste the lap or feed themselves, are forced out as far as is allowed by the nuts, by means of springs (36), placed between them and the shafts; but after having passed over the lap and pasted it, and after having taken a new feed of paste, they are drawn toward their shafts, by their ends coming in contact with stationary eccentric ways (37), secured to the inside of the framing (see particularly Figs. 2 and 8).

The printing of the bag is performed, during its movement from the bottom pasting and lapping apparatus, to the side pasting and lapping apparatus, by means of a type cylinder (69) which has a shaft working in bearings in the sides of a light framing (79), erected on the bed plate, and which stands between the tapes of the apron M. This cylinder revolves at such a speed that the type moves with the same velocity as the bag. It receives motion through a spur wheel (80) at one end, which is geared through an intermediate wheel (104), with a spur wheel (105) on the shaft of the roller W. It is inked by means of inking rollers (70), which are supplied by rollers such as are commonly used from an ink trough (71). The inking apparatus is all driven by gearing from the type cylinder shaft. The pressure necessary to produce the impression is given by a pressure roller (72) above the type cylinder, the impression being given to the under side of the bag.

The drying of the bag is performed in a closet or chamber (73) at the end of the machine, next the side pasting and lapping apparatus. This closet is intended to have a current of air, either cold or heated, caused to circulate through it in the manner of the drying apartments for drying cloths. The bags are carried into it upon an apron, which is composed of a series of cords (74) represented in blue outlines in Figs. 2, 4, 7. These cords run around a series of rollers (82, 83, 84, 85, 86, 87, 88,) which turn in bearings in the sides of the chamber. These rollers are all parallel with each other, but stand in a position oblique to the rollers of the previously described aprons U, Y, as shown in Fig. 7. After the side is pasted and lapped, and the bag is finished, with the exception of being dried, the next movement of the aprons U, Y, carries it over the lapping table (21) and lapper (20) to a pair of rollers (89, 89,), one of which is furnished outside the frame with a spur wheel (90), which gears with and receives motion from the spur wheel (91) on the main shaft (see Fig. 1). These rollers seize the bag and with the aid of another pair of rollers, (92, 92,) and tapes (93), which pass around one of these and one of the former ones, carry it down, as represented at (b^4), in brown color, in Fig. 2, and deposit it upon the apron (74). After each bag is deposited upon the apron, the latter moves just so far, that when another bag is deposited upon it, the side lap of the former is left exposed or uncovered.

The oblique direction which is given to the apron, relatively to the position of the sides of the bags, will cause the bottom lap of such to be left uncovered by its successor; thus both the side and bottom laps are left exposed, as shown in Fig. 7, where some bags (b^5, b^6, b^7, b^8,) are shown in brown color.

The movements of the apron are produced by a cam (94) on the main shafts, (see Figs. 6 and 7,) which once during every revolution of the main shaft depresses a vertical

bar (95) (see Fig. 6) sliding in guides on the framing, and causes a spring pawl (96), attached to the said bar, to act upon and turn a ratchet wheel (97), which is secured to the shaft of the roller (82), the said bar (95) being raised after the ratchet is operated by a spring (101). The roller (82) gives motion to the apron by the contact of the cords with the several rollers of the series, and will it is presumed, be sufficient to communicate motion to the whole series of rollers around which they run, but should that not be sufficient, all or any number of them may be geared by chains and wheels. In order to illustrate this the roller (84) is represented (see Figs. 2 and 7) as being geared by a chain (98) with the roller (82). In order that the bags may be well dried, they are caused to move back and forth through the drying chamber several times; and in order to confine them to the apron (74), it is necessary to employ a second apron, formed of a series of cords (99) shown in red color (in Figs. 2, 4, and 7) arranged between the cords (74). The bags are thus held secure between the two series of cords, until they are severally deposited by the apron (99) upon a shelf (100) in front of the drying chamber, to be removed by an attendant, stationed there for the purpose. Their course through the drying chamber is indicated by arrows, in Fig. 4. The machine delivers one finished bag at every revolution of the main shaft; but, irrespective of those which are undergoing the drying process, there are always four bags in the machine under different stages of manufacture; for instance, at the time the paper for one is being cut out, the folded paper for another is being received by the conveyer to be deposited upon the apron U; a third is being pasted and lapped at the end, and a fourth at the sides. The main shaft may make thirty revolutions a minute, which would make eighteen hundred bags an hour. The width of the bags may be varied. It is increased by changing the feed rollers D, D[1], for larger ones, or increasing their movement, so as to feed a greater length of paper from the roll, and moving the shear arm (*d*) and the bar (*g*) farther from the slot (*g*); or it is decreased by employing feed rollers of smaller size, or having less motion, and bringing the shear arm (*d*) and bar (*g*) nearer to the slot (*q*).

The depth of the bag may be varied, by using a wider or narrower roll of paper. In order to facilitate the adjustment for varying the width of the bag, the bar (*g*), the shear arm (*d*) and the feed rollers D, D[1], are mounted in a small carriage (102), so that they may be all moved together on the upper part of the framing.

The machine is susceptible of various changes in the arrangement of the parts; for instance, the folding apparatus and the shears (*e*, *f*,) may be arranged at right angles to the position represented, and the width of the bags may be regulated by the width of the paper, and the depth by the quantity of paper given out by the feed rollers.

What I claim as my invention, and new improvement, and desire to secure by Letters Patent, is—

1. The conveyer, for conveying the folded paper to the apron, by which it is carried to the folding and lapping apparatus, substantially as herein set forth.

2. The construction of the lappers 20, and 38, and their connection with their respective lapping tables 21, and 58, as herein shown and described.

3. The arrangement of the drying chamber, and the aprons which convey the bags through it, as herein described, so that the bags are severally delivered to the aprons with their sides in a position oblique to the direction in which the aprons move, and thus as they are successively deposited have the wet laps of their sides and ends left uncovered by their successors.

4. The general arrangement and construction of the whole of the machinery herein described, whereby a piece of paper of suitable length, is cut from a roll, cut out to the proper shape, folded, pasted, lapped, printed in any desirable manner, and dried at one continuous operation.

FRANCIS WOLLE.

Signed in the presence of—
JACOB WOLLE,
JOSEPH H. TRAEGER.