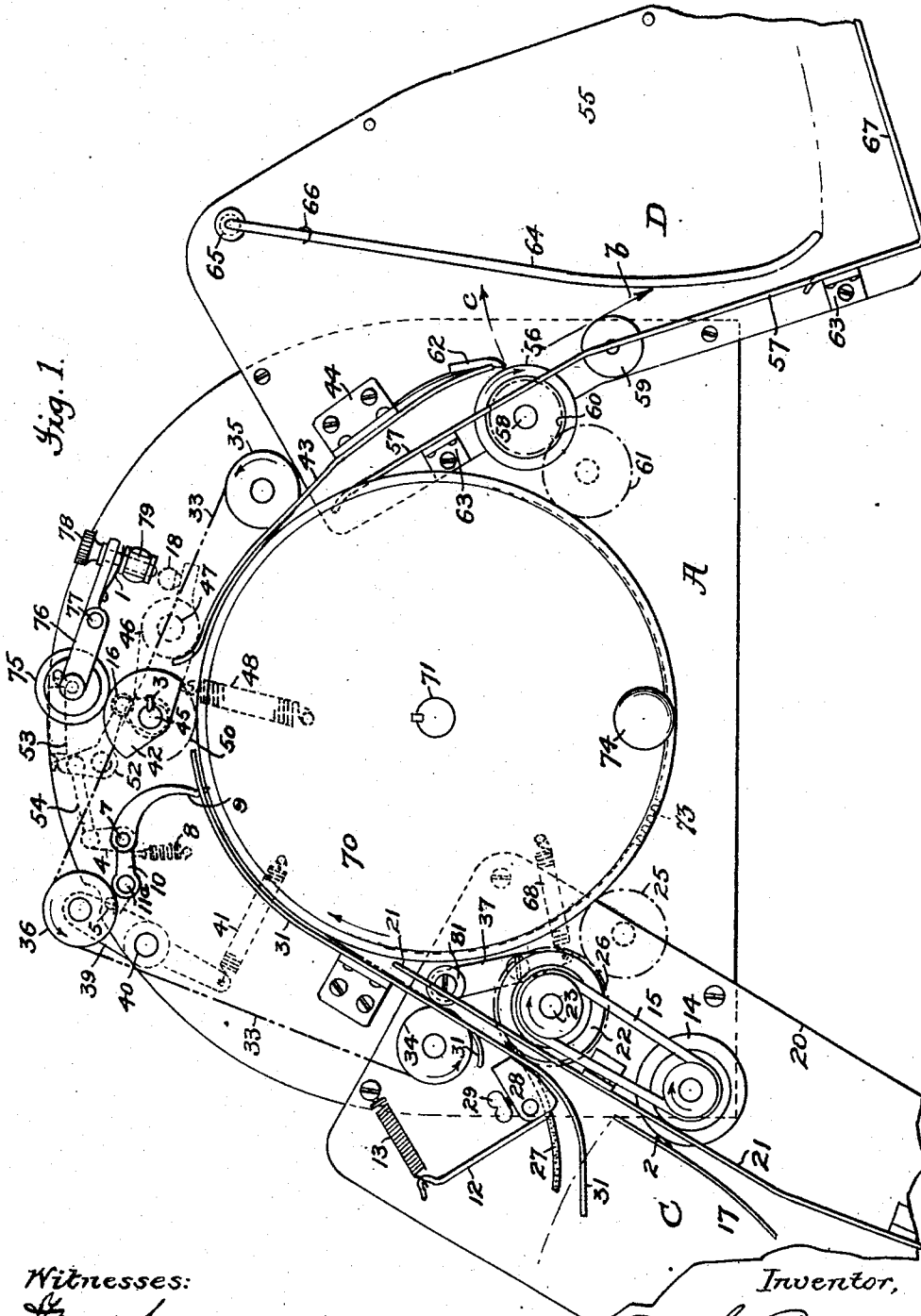


G. H. GRAHAM.
 PRINTING MECHANISM.
 APPLICATION FILED JULY 8, 1912.

1,308,628.

Patented July 1, 1919.
 5 SHEETS—SHEET 1.



Witnesses:
Fred Sommerhalder
Pearce P. Williams

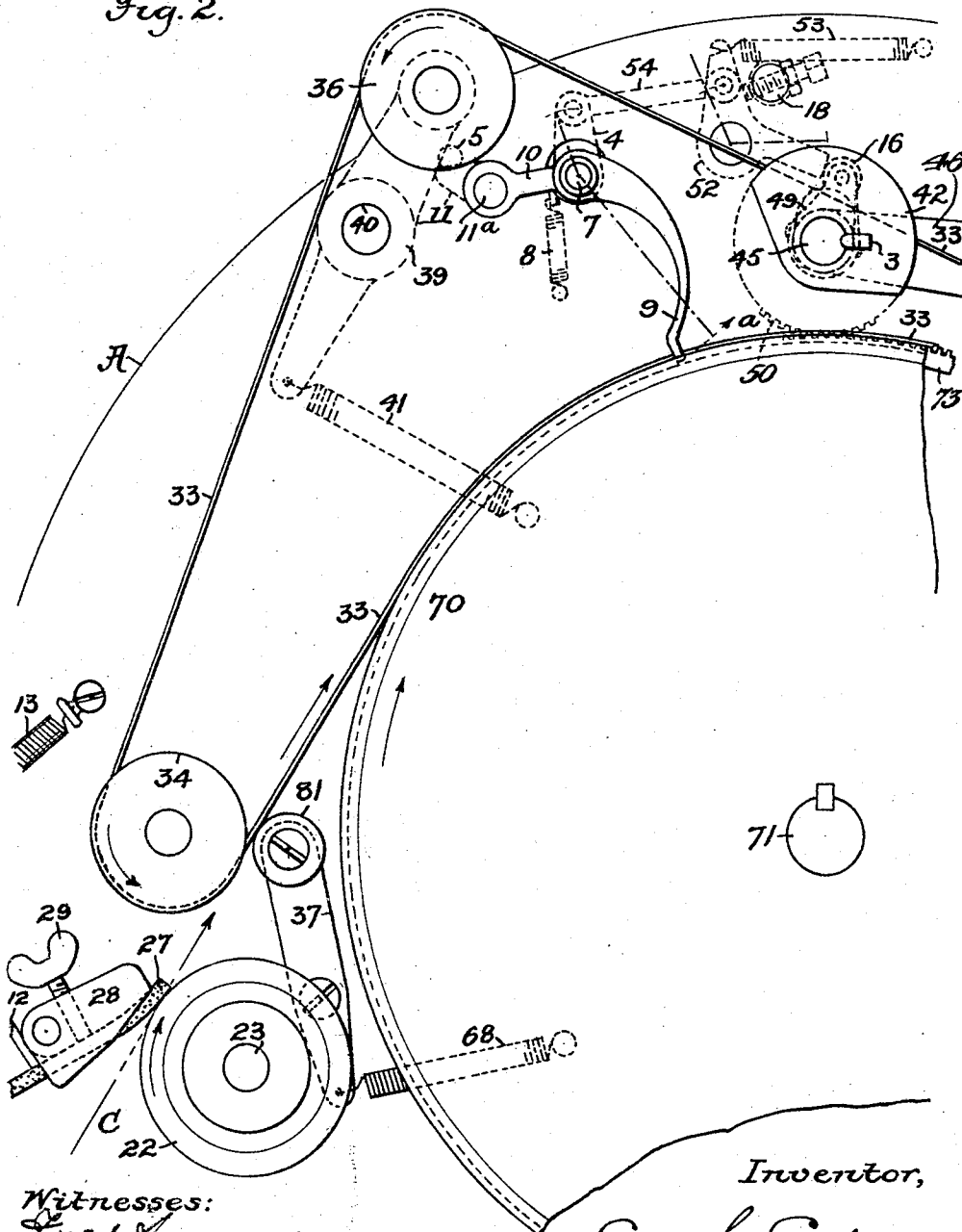
Inventor,
George H. Graham

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Fig. 2.



Witnesses:

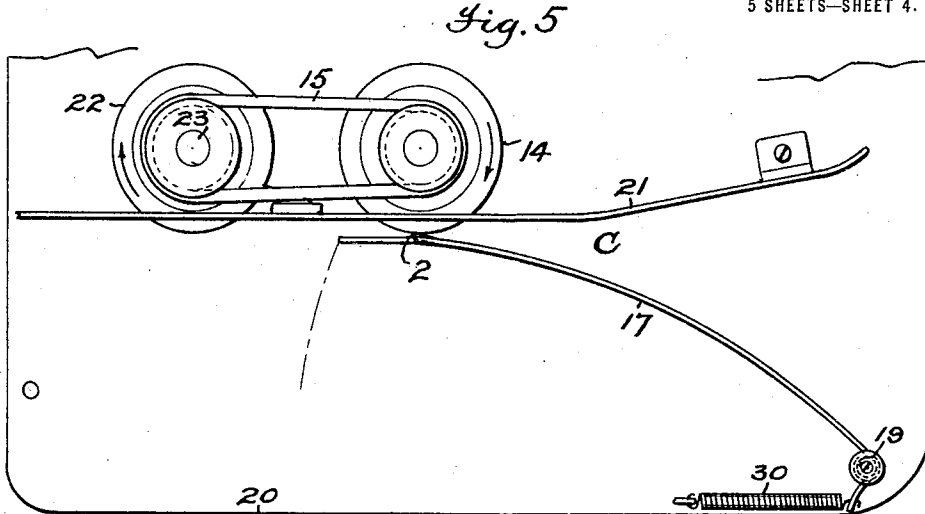
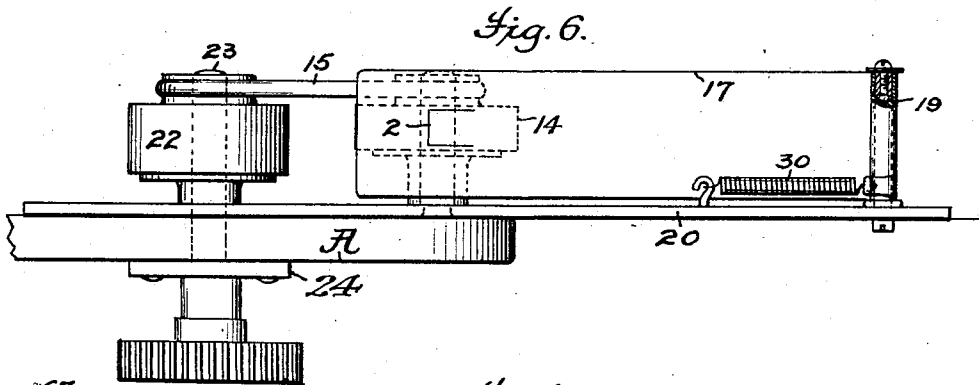
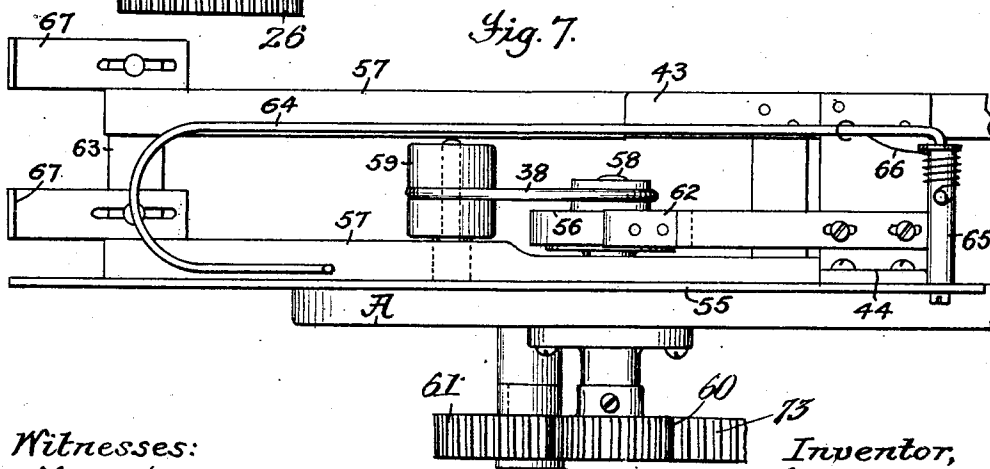
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Witnesses:

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Fig. 8.

31

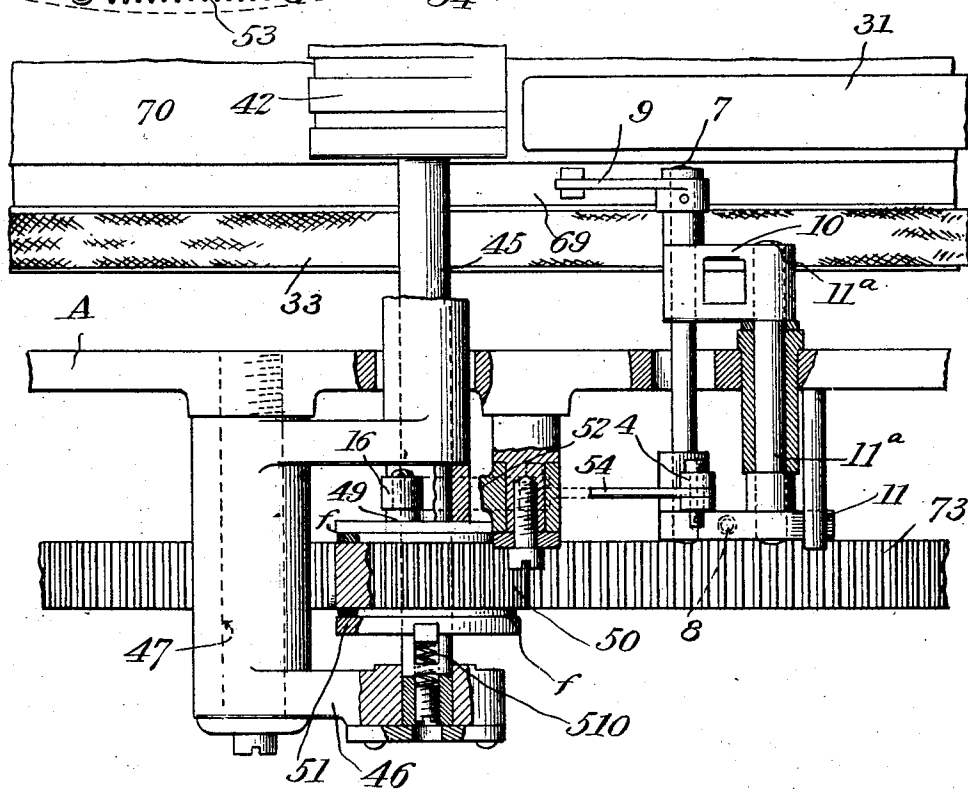


Fig. 9

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UNITED STATES PATENT OFFICE.

GEORGE H. GRAHAM, OF JERSEY CITY, NEW JERSEY.

PRINTING MECHANISM.

1,308,628.

Specification of Letters Patent.

Patented July 1, 1919.

Application filed July 8, 1912. Serial No. 708,141.

To all whom it may concern:

Be it known that I, GEORGE H. GRAHAM, a citizen of the United States, residing at Jersey City, Hudson county, and State of New Jersey, have invented a new and useful Improvement in Printing Mechanism, of which the following is a specification.

This invention relates generally to printing mechanism and particularly to that class in which the operation of printing is controlled by the presence of the article or piece of matter to be printed, but is not limited thereto.

It has for its object to reduce the needful parts of such machines to the minimum, whereby simplicity and cheapness is obtained, and to thereby provide mechanism which shall require little attention and will dispense with the necessity for skilled operators.

It also has for its object to provide a portable machine which in itself shall provide means for feeding sheets or pieces of matter singly from a stack or bunch thereof, print, count or print and count, or otherwise handle each piece and deliver the same in an orderly collection or stack.

To these ends the improvements include, among other things, a carrier in the form of a wheel on opposite sides of which or in planes tangential to its periphery are arranged the feeding and stacking or delivery instrumentalities, and intermediate of which is mounted the printing or counting device coacting with the carrier—which forms the other part of the printing couple—to suitably print upon the sheets, cards, slips of paper or the like or to count the same in their transfer or passage one by one from the feeding to the stacking position.

The improvements also include a carrier wheel with which is combined a carrying tape or guide for confining the sheet, slip or other piece to the wheel so as to be carried by it in its transfer from one to the other position, whereby the mechanism is adapted to handle a practically continuous succession of sheets or articles of varying lengths in contradistinction to a carrier having grippers or the like adapted to take sheets or pieces only at definite intervals and in which the intervals must be as long as the longest sheet or piece the machine may be required to handle.

The improvements also include various

novel combinations and arrangements of parts too fully hereinafter described to need preliminary description.

In the accompanying drawings:—

Figure 1, is a plan view of the machine, parts being broken away for want of space.

Fig. 2, is an enlarged plan view of the feeding, tripping and printing instrumentalities.

Fig. 3, is an elevation looking from the printing side of the machine.

Fig. 4, is a similar view looking from the feeding side of the machine.

Fig. 5, is a plan view of a portion of the feeding instrumentalities.

Fig. 6, is an elevation of the same.

Fig. 7, is a similar view of the stacker.

Fig. 8 is an enlarged detail sectional view of the printer controlling devices.

Fig. 9 is an enlarged detail sectional side view of the printing devices.

The mechanism is supported by a horizontal table A, carried preferably through the medium of posts A' by a base B, which may rest on a bench or desk, or upon some suitable stand of its own, and with or without which latter it may be moved or carried from place to place most convenient for operation.

The operative parts of the mechanism are preferably mounted in bearings carried by the table A; those parts which consist in the main of the connective gearing are supported below the table, and those which feed, print or count and deliver the pieces handled by the machine being located above the table.

The mechanism consists of a carrier in the form of a wheel 70, secured to the upper end of a main spindle 71, that rotates in a bearing 72, fastened to the table A, and extending through it for adequate service. The same spindle also has fastened to it the main driving gear wheel 73. The periphery of the carrier is covered with a ring or strip of rubber, or other suitable material secured thereto by cement or vulcanized thereon to provide an impression surface for coaction with the printer to be presently described, and, having also, in this embodiment of the invention, the requisite adhesive quality to aid in taking and feeding the pieces to be operated upon, as fast as they are successively presented thereto and for delivering the same.

At the feeding position C, to the left of the carrier, is arranged a table plate 20, supported by the table A, to provide a smooth and slightly elevated flat surface on which the pieces to be fed by the carrier are stacked upright on their longitudinal edges alongside of a vertically arranged bearer or guide plate 21, that is supported in a position tangential to the surface of the carrier at that point, so that each piece in succession is properly presented thereto.

Behind the guide 21 is supported a feeder in the form of a rubber or other properly covered and rotating roll 22, with a portion of its active feed or adhesive surface projecting through an opening in the guide to engage the piece in immediate contact therewith and cause it to move forward on the table plate for its leading end to be projected onto the carrier.

This feed roll is carried at one end of a spindle 23, supported in a suitable bearing 24, fast to the table and carrying at its other end a gear wheel 26, which through an intermediate 25, carried by a suitable stud, also secured to the table receives motion from the main driver 73.

Coacting with the roll 22, is a spring-pressed wiper 27, arranged and adapted to permit the feed of one piece of matter at a time to the carrier 70. The wiper 27, is a strip of flat rubber preferably provided with a canvas back to prevent stretching. This wiper is adjustably held or clamped in active position, as by a thumb screw 29, in a groove or slot formed in a holder 28, that is pivoted to permit it and the wiper to yield laterally with respect to the roll 22, to accommodate the passage of pieces of matter of varying thicknesses. The wiper-holder has an arm 12, to which is connected a spring 13 for suitable pressure of the wiper against the feed roll.

In advance of this feed roll 22, and substantially in line with it, is a rotating primary feed roll 14, rubber faced, and projecting through the guide 21, to engage and feed forward pieces of matter to the roll 22, and wiper 27.

This primary feed roll rotates on a stud and is driven at a slightly faster surface speed than the roll 22 by an endless belt 15; the faster surface speed being provided to quickly advance pieces that may be behind in the bunch on the plate 20.

To eliminate the personal equation of feeding, the bunch of matter in position for feeding on the plate 20 is held pressed against the primary roll 14, by a yielding feed plate 17, one end being carried by a stud 19, supported by the plate 20 and held constantly to duty by a suitable spring 30, see Figs. 5 and 6. The feed plate 17, may have an inwardly projecting tongue 2, in line with the feeding surface of the roll 14,

to obviate a too close contact of the sheet being fed with the said roll and with the plate.

As shown in Fig. 1 the separator wiper 27 rests against feed roll 22, which is independent of the large carrying wheel 70 and has a surface feed slower than that of the carrying wheel. As a result when a paper letter or article comes in contact with the large carrying wheel it is forwarded at a higher rate of speed than at its start, and thus is moved faster than the second or succeeding piece of paper or article until the latter also comes in contact with the large carrying wheel. This causes an increased spacing between successive articles over and above that caused by the action of the separator wiper 27.

As soon as or shortly after the forward end of the fed sheet on the feeder roll 22 passes beyond the wiper 27, it encounters a leading tape 33, of narrow widthwise dimensions passing from a supporting roll 34, thence for a short distance around the surface of the carrier 70 past the printer to a point where it is led off by passing around another roll 35. The tape returns over a take-up or tension roll 36 back to the first roll 34. This tape by frictional contact with the carrier partakes of its surface speed and confines the sheet to the carrier and holds it sufficiently rigid to its surface to cause it to partake of its onward travel for the desired distance, whereupon the sheet is finally released or led off at the discharge or delivery point D. The carrying tape obviates the use of guides or rolls or other means for holding the sheet to the carrier and serves in conjunction with the carrier as an ever ready means for grasping the sheet so that the time of its feed is immaterial and one sheet may follow another in close succession irrespective of its length thereby increasing the capacity of the machine.

The tape rolls 34, 35 are idle rolls, preferably flanged, rotating on studs extending from the table. The tension roller 36, is also an idle roll and flanged, carried by a stud projecting above the table from an arm 39, swinging on a pivot 40, and pulled outwardly by a spring 41, to keep the tape always taut and to yield sufficiently during the passage of sheets or other pieces of varying thickness.

The sheets or other pieces carried onward by the tape and carrier are additionally guided as well as guarded by a guide or pair of guides 31, Figs. 1, 3 and 4, extending from the feeding position to a point close to the printing or die roller 42, a portion of the guide being flared and a portion curved to conform to the circumference of the carrier 70.

As an addition to the feed of the sheets from the roll 22 to the bight of the tape 33

and carrier 70, there is provided an intermediate idler roll 81, Fig. 1, carried by a rock arm 37 and held in yielding frictional contact with the tape 33 by a suitable spring 68. This idler roll is especially useful when sheets shorter than the distance between the roll 22 and carrier 70 are to be fed.

As the sheet or other piece is being carried onward its leading edge encounters a finger 9, whose inner end very slightly projects into a peripheral groove 69, formed in the carrier between the bight of the tape with said carrier and the guide 31; the location of the tape, groove and guide being such that the leading edge of the sheet will be supported against undue buckling at the time it strikes the finger 9.

As the sheet continues its movement it rocks the finger 9 forwardly for a limited distance and until the edge of the sheet and the finger, traveling in approximately the same direction but in different arcs, escape each other, whereupon the finger is free to return toward its normal position.

This forward movement of the finger is made the instrumentality that permits timely and intermittent rotation of the printer or die for each sheet passing onward through the machine. The construction shown in the drawings resembles that shown in United States Letters Patent No. 1,022,191, dated April 2nd, 1912, but differs therefrom in some details.

The finger 9, is fast to the upper end of a spindle 7, supported on one end of a rock arm 10, that is carried by a spindle 11^a, mounted in bearings in the machine table A, Fig. 3. The lower end of the spindle 11^a, below the table is fast to a lever 11, one end of which engages the lower end of the spindle 7, and the other or short end bearing against a stop-pin 5, under the tension of a spring 8, tending also to hold the end of the finger 9, in sheet engaging position.

The finger-spindle 7 passes through an enlarged hole in the table, has fast to its lower end an arm 4, that is connected by a link 54, with one end of a stop-lever 52; the other end of which, by a suitable spring 53, is held in position to engage a stop in the form of an antifriction roll 16, forming part of the printer spindle 45. The construction is such that when the end of the finger 9, is rocked by the passing sheet in the direction of the arrow *a*, Fig. 2, the stop-lever 52, is also rocked against the pull of the spring 53, to move its end away from the roll 16, and thus release the printer and spindle 45, so that they may rotate. After the roll, in rotation, passes beyond the stop-lever, the spring 53, causes the return of the stop-lever against a limiting stop 18 or set-screw carried thereby, and also the return of the finger 9; but as the broad surface of the passing sheet is still present, the

finger yields laterally outward by reason of the rock-arm 10, against the slight or gentle pull of the spring 8. As soon, however, as the tail end of the sheet passes the finger 9, the spring 8 throws the finger inwardly to its complete normal position ready to be engaged and moved by the succeeding sheet or piece.

The printer or die 42, is carried at the upper end of the spindle 45 and splined thereto by a removable key 3, for ready removal. The spindle is mounted in suitable bearings provided by a rock-arm 46, Figs. 1 and 3, that is mounted on a stud 47, projecting from and below the machine table A; a set screw in the rock-arm in connection with a stud, adjusts the printing position of the printer with respect to the impression surface of the carrier 70, against the pull or pressure of a suitable spring as 48. The roll 16, as in said patent, is carried by a head 49, fast to the printer spindle 45, Fig. 2, immediately above a gear wheel 50, Fig. 3, loosely mounted on the spindle and in mesh with the main driver 73. Below the gear wheel is a disk 51, keyed to but vertically movable on the spindle, with a suitable spring and set screw to press the disk and head frictionally against opposite sides of the loose gear wheel 50, as in said patent; the whole forming a clutch by which when the stop-lever is removed from the roll 16 by the passing sheet, the wheel 50, which during the operation of the machine is continually rotating, is allowed to impart its rotations to the spindle 45, and to the printer or die. To obtain efficient action of the clutch there is interposed an oiled felt washer *f*, between the gear wheel 50, and disk on one side, and the said wheel and the head on the other side. These felt washers and contiguous parts may be kept properly and preferably constantly oiled by any suitable means.

The printer 42, as shown, consists of a roll in segmental form carrying suitable matter to be impressed on the passing sheets. This matter may be engraved directly on the surface of the roll or it may be inset therein and removable therefrom, as in the case of date and time stamps or post office and bank check indorsing dies in a manner of common knowledge in the printing art.

After being printed upon or otherwise having caused a rotation of the spindle 45, the sheet or other piece, still within the control of the carrier 70, and tape 33, is further guided and guarded by a guide 43, curved to correspond with the carrier and extending outward substantially tangential thereto and supported by a suitable bracket 44, carried by a delivery plate 55, fast to the upper side of the table A. After leaving the tape the sheet or other piece is deflected from the carrier by a guide or guides 57, 130

supported by brackets 63, to and between a rubber faced roll 56, and a spring pressed bearer 62, supported by the bracket 44, and thence in contact with a roller 59, against a yielding guide or support 64.

The roller 56, is carried by a spindle 58 mounted in suitable bearings in the table A, and carrying a gear wheel 60, in mesh through an intermediate 61 with the main driver 73. The roller 59 may be an idler roll rotated merely by the frictional contact of the moving article passing onto the delivery plate 55, as in Fig. 1; or if desired it may be driven by a belt 38, as in Fig. 7.

The guide or guides 57 may terminate in an end stop or stops 67 to limit the outward travel of the sheets and keep them on the plate; and the end stop or stops may be adjustable, as in Fig. 7, inward and outward to accommodate the size of sheet operated on.

The yielding guide or support 64 is pivotally mounted in a stud 65, projecting from the plate 55, with a suitable spring 66, tending to hold its free end toward the guide or guides 57. The sheet passing from the roller 56, and spring pressed bearer 62 in meeting the yielding guide, as indicated by the arrow b, Fig. 1, is deflected thereby inwardly toward the guide 57, whereupon when its tail end passes the bearer 62, such portion will spring outwardly as indicated by the arrow c, thereby leaving a clear space for the entrance of the succeeding sheet. As the sheets accumulate on the delivery plate 55, the guide 64 yields laterally outward, while still providing a suitable vertical support for said sheets.

The printer or die 42, may be inked by any suitable means, but that shown is to be preferred. The felt or other ink receiving roller 75 is mounted loosely in one end of an arm 76 pivoted on a stud 77 to the table A, the opposite end carrying a thumb set screw 78 that engages a nut 79 supported in a stud standing up from the table. A suitable spring 1 carried by the arm bears against the nut and allows the arm and ink roller to yield outwardly to accommodate any outward movement of the die as well as any irregularities in the surface of the die and the roller.

The operation of the improved machine will have become clear from the foregoing description. It may be stated, however, that the pieces of matter preferably in bulk lined up on their lower longitudinal edges are placed on the table plate 20 against the primary feed roll 22, between it and the yieldable feed plate 17. Motion being imparted to the main wheel or carrier 70, either by hand through a handle 74, or by power, the primary feed roll 14 will feed the sheet or piece of matter, in contact therewith, forward, projecting its leading

edge between the wiper 27 and the feed roller 22, whereupon, the sheet will pass between the tape 33 and the idler roll 81 to the carrier 70, which with the tape will carry the sheet onward toward the delivery position D.

It is obvious that in lieu of, or, in addition to the printer, the finger 10, may control a counter device by which each piece of matter is counted as it passes through the machine, and in this respect it is to be understood that the printer and counter are alternative devices.

The primary feed roll 14 may be omitted and the pieces fed by direct contact with the surface of the feed roller 22. The delivery devices may be omitted and the sheets be delivered by the simple guide 57 acting as a stripper or delivery device to throw the sheets off into some suitable receptacle.

The feed roller and the carrying wheel have a coöperative relation, inasmuch as they both act to feed or forward the articles; and the object of having the feed roller operated at a slower surface speed than the carrying wheel, is that when the article comes within the control of the carrying wheel and co-acting tape such article will be drawn away from the next following article by being moved at greater speed, thereby increasing the space between the following edge of the first article and the leading edge of the second article, in excess of the space caused by the action of the separating device or wiper; this insures ample space and time for the trip finger to come back into normal position to engage the front edge of the following article after each operation. Such separation of the articles is also of advantage in preventing articles from crowding on or over one another in entering the stacker.

What is claimed is:

1. The combination with the printing couple, of a delivery stripper coacting with the impression member of the couple, a leading tape coacting with said impression member for feeding the articles, a feed roller adjacent the said stripper and operating on the delivered articles, and an outwardly yielding guide opposite said stripper.

2. The combination of a carrier wheel, a printer coacting therewith, a feeding device for the articles at one side of said carrier wheel, a delivery device at the other side of the same, a leading tape coacting with the carrier wheel and extending in contact with the periphery thereof from the feeding device to the delivery device, and a guide coacting with the feeding device and extending beyond the initial point of contact of the tape with the wheel.

3. A mechanism adapted to convey articles on their longitudinal edges, comprising a feeding device adapted to feed individual articles one at a time successively from a

stack thereof, a carrying wheel receiving said articles and having a surface speed greater than said feeding device whereby spaces are automatically produced between successive articles, a delivery device receiving the articles from said carrying wheel, a leading tape coacting with and stretched partially around said wheel and extending from the feeding device to the delivery device and held yielding taut against the wheel and partaking of its surface speed to confine articles of varying thicknesses thereto, and an article operated device located intermediate the feeding and delivery devices and the extremities of said leading tape contacting with said carrying wheel.

4. A mechanism adapted to convey articles on their longitudinal edges, comprising a feed roller and a cooperating yielding wiper adapted to feed individual articles one at a time from a stack thereof, a carrying wheel receiving said articles and having a surface speed greater than said feed roller whereby spaces are automatically produced between successive articles, a delivery device receiving articles from said carrying wheel, a leading tape coacting with and stretched partially around said wheel and extending from the feed roller to the delivery device and held yielding taut against the wheel and partaking of its surface speed to confine articles of varying thicknesses thereto, and an article-operated printer located intermediate the feed roller and the delivery device and the extremities of the leading tape contacting with said carrying wheel.

5. A mechanism adapted to convey articles on their longitudinal edges, comprising a feed roller and a cooperating wiper adapted to feed individual articles one at a time from a stack thereof, a carrying wheel receiving said articles and having a surface speed greater than said feed roller, a delivery device receiving articles from said carrying wheel, a leading tape coacting with and stretched partially around said wheel and extending from the feed roller to the delivery device and held yielding taut against the wheel and partaking of its surface speed to confine articles of varying thicknesses thereto, a printer located intermediate the extremities of the leading tape, and an article-operated trip device operating to release and stop the printer after each rotation.

6. A printing mechanism adapted to convey articles on their longitudinal edges, comprising a feeding device adapted to feed individual articles one at a time successively from a stack thereof; a carrying wheel having a surface speed greater than said feeding device; a delivery device; a leading tape coacting with and stretched partially around said wheel and held yielding taut against it and partaking of its surface speed to confine articles of varying thick-

nesses thereto, said tape extending from the feeding device to the delivery device; and an article operated device intermediate the feed and delivery devices and the extremities of that portion of the tape contacting with the carrying wheel and adapted to make intermittent single rotations and to yield with respect to said wheel according as the varying thicknesses of the conveyed articles may require.

7. A printing mechanism adapted to convey articles on their longitudinal edges, comprising a feed device with a cooperating yielding wiper adapted to feed individual articles one at a time successively from a stack thereof, a carrying wheel having a surface speed greater than said feed device, a delivery device, a leading tape co-acting with and stretched partially around said carrying wheel and held yielding taut against it and partaking of its surface speed to confine articles of varying thicknesses thereto, said tape extending from the feeding device to the delivery device; and an article operated device intermediate the feed and delivery devices and the extremities of that portion of the tape contacting with the carrying wheel and adapted to make intermittent single rotations and to yield with respect to said wheel according as the varying thicknesses of the conveyed articles may require.

8. A printing mechanism adapted to convey articles on their longitudinal edges, comprising a feeding device adapted to feed individual articles one at a time successively from a stack thereof; a carrying wheel having a surface speed greater than said feeding device; a leading tape co-acting with and stretched partially around said wheel and held yielding taut against it and partaking of its surface speed to confine articles of varying thicknesses thereto, said tape extending from the feeding device to the delivery device; a delivery device, and an article operated printer; with a trip device controlling the intermittent single rotations of the said printer.

9. A horizontal carrying wheel, a feeding device having a surface speed slower than that of the carrying wheel directing articles longitudinally on edge successively to said wheel, a delivery device receiving the articles from the wheel, means for operating upon the articles between the feeding and delivering devices, a leading tape coacting with and stretched partially around the carrying wheel from the feeding device to the delivery device and adapted to confine each successive article to said wheel from the feed to the delivery; and an article operated device intermediate the feed and delivery and the extremities of the portion of the tape that is in contact with the wheel.

10. In combination a carrying wheel, a

printer coacting therewith, a trip device controlling the action of the printer, a feeding device having a surface speed slower than that of the carrying wheel to insure separation of successive articles by the carrying wheel, and a leading tape coacting with and stretched partially around the carrying wheel and extending in contact therewith from the feeding device past the trip device to a point beyond the printer and adapted to confine the article to said wheel and support its leading edge while in contact with the trip device.

11. In combination a carrying wheel, a printer coacting therewith, a trip device controlling the action of the printer, a feeding device having a surface speed slower than that of the carrying wheel to insure separation of successive articles by the carrying wheel, a delivery device, and a leading tape coacting with the carrying wheel and extending in contact therewith past the trip device from the feeding to the delivery device, and adapted to confine the article to the wheel while it engages the trip device and while the printer operates thereon.

12. In combination a carrying wheel, a normally inactive printer, and an article-operated finger for controlling the action of the printer, and a feeding device having a surface speed slower than that of the carrying wheel to insure separation of successive articles by the carrying wheel; with a leading tape coacting with the wheel and extending in contact therewith from the feeding device past the printer to the delivery device and adapted to confine the articles to the wheel until they pass beyond the printer.

13. In combination, a printer, a horizontally rotating carrying wheel, an endless yieldingly taut carrying tape coacting therewith to confine the articles of varying thicknesses to the wheel and extending from the feed guide past the printer to the delivery guide; with a feed device having a surface speed slower than that of the carrying wheel to insure separation of successive articles by the carrying wheel, a tangential feed guide extending outwardly from the tape and wheel to guide the article between the tape and wheel, and a stripper delivery guide extending outwardly from the tape and wheel to remove the article from the wheel.

14. In combination a horizontally rotating carrying wheel, a printer, a feed guide

extending tangentially toward said wheel to guide the article to the wheel, a feed device having a surface speed slower than that of the carrying wheel to insure separation of successive articles by the carrying wheel, a delivery guide extending tangentially from said wheel to guide the article from the wheel, and a leading tape coacting with and held yieldingly taut against the wheel to confine articles of varying thicknesses thereon in their passage between the two guides, said tape extending in contact with the wheel from the feed guide past the printer to the delivery guide.

15. In combination, a carrying wheel, an endless tape moving with the periphery of said wheel and in contact therewith and adapted to hold an article to its surface; a printer coacting with the wheel at a point intermediate the points of meeting and separating of said tape and wheel; with a feeder having a surface speed slower than that of the carrying wheel, and a wiper cooperating with the feeder for presenting the articles one by one to said wheel.

16. The combination of a carrying wheel, a guide tangential to the carrying wheel, a primary feed roll having a surface speed slower than said carrying wheel to insure separation of successive articles by the carrying wheel, and a suitably mounted printer adjacent the wheel; with a leading tape coacting with and held yieldingly taut against the wheel and adapted to confine the articles of varying thickness thereto from the guide to a point beyond the printer.

17. The combination of a carrying wheel, a primary feed device having a surface speed slower than said carrying wheel, a supporting feed plate mounted with said device and directing the articles on their longitudinal edges successively between the tape and wheel, and a suitably operated printer cooperating with the carrying wheel; with an endless tape coacting with said wheel and extending in contact therewith from the feed device to a point beyond the printer, substantially as described.

In testimony whereof, I, GEORGE H. GRAHAM, have signed my name to this specification in the presence of two subscribing witnesses, this 8th day of May, 1912.

GEO. H. GRAHAM.

Witnesses:

STEPHEN H. DORR, Jr.,
FRED SOMMERHALDER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."