May 29, 1923. 1,457,158

H. C. GAMMETER

MECHANISM FOR FEEDING PAPER, CARDS, ENVELOPES, ETC

Filed Oct. 7, 1920 6 Sheets-Sheet 1

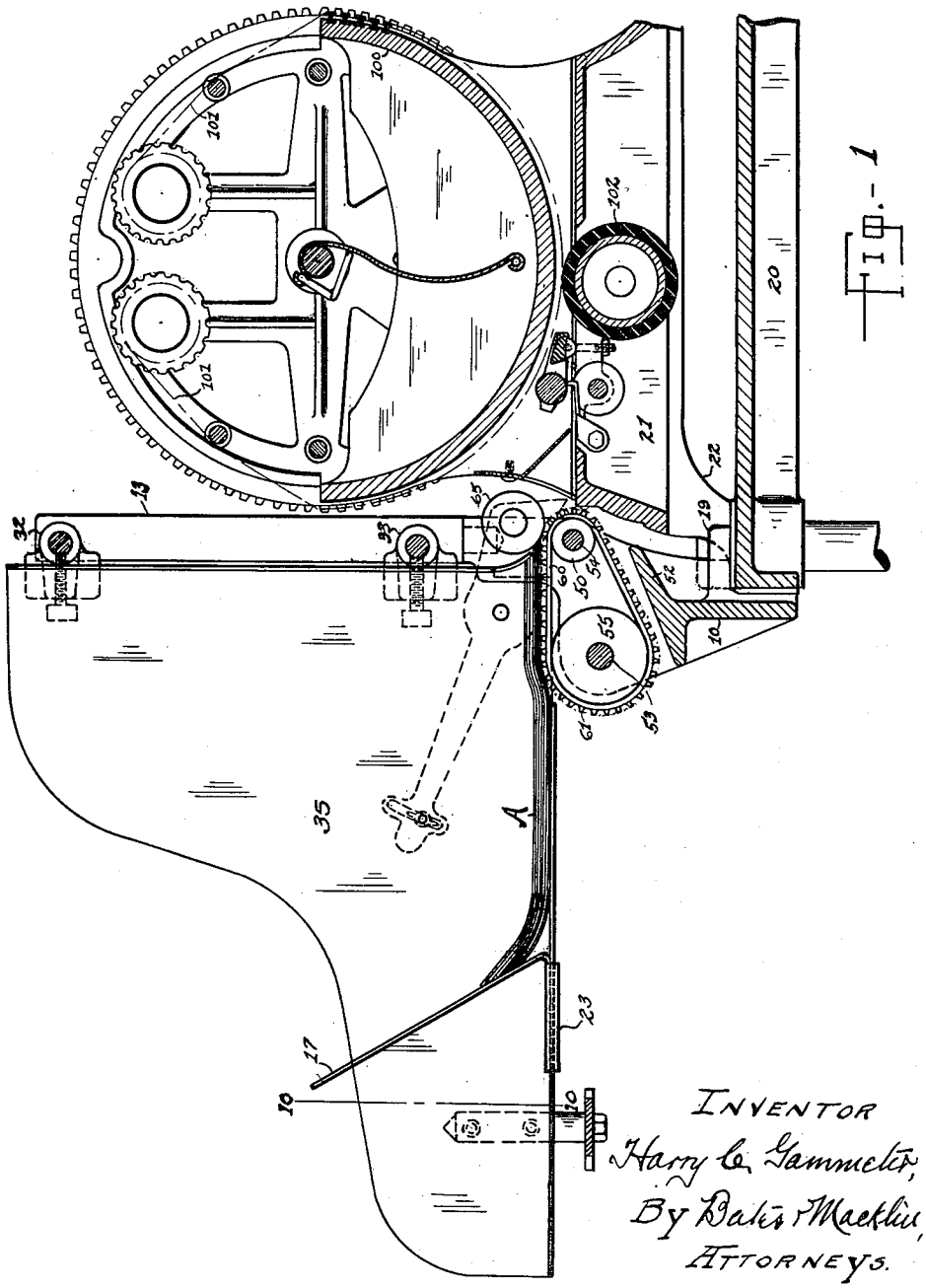


FIG. 1

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Filed Oct. 7, 1920 6 Sheets-Sheet 2

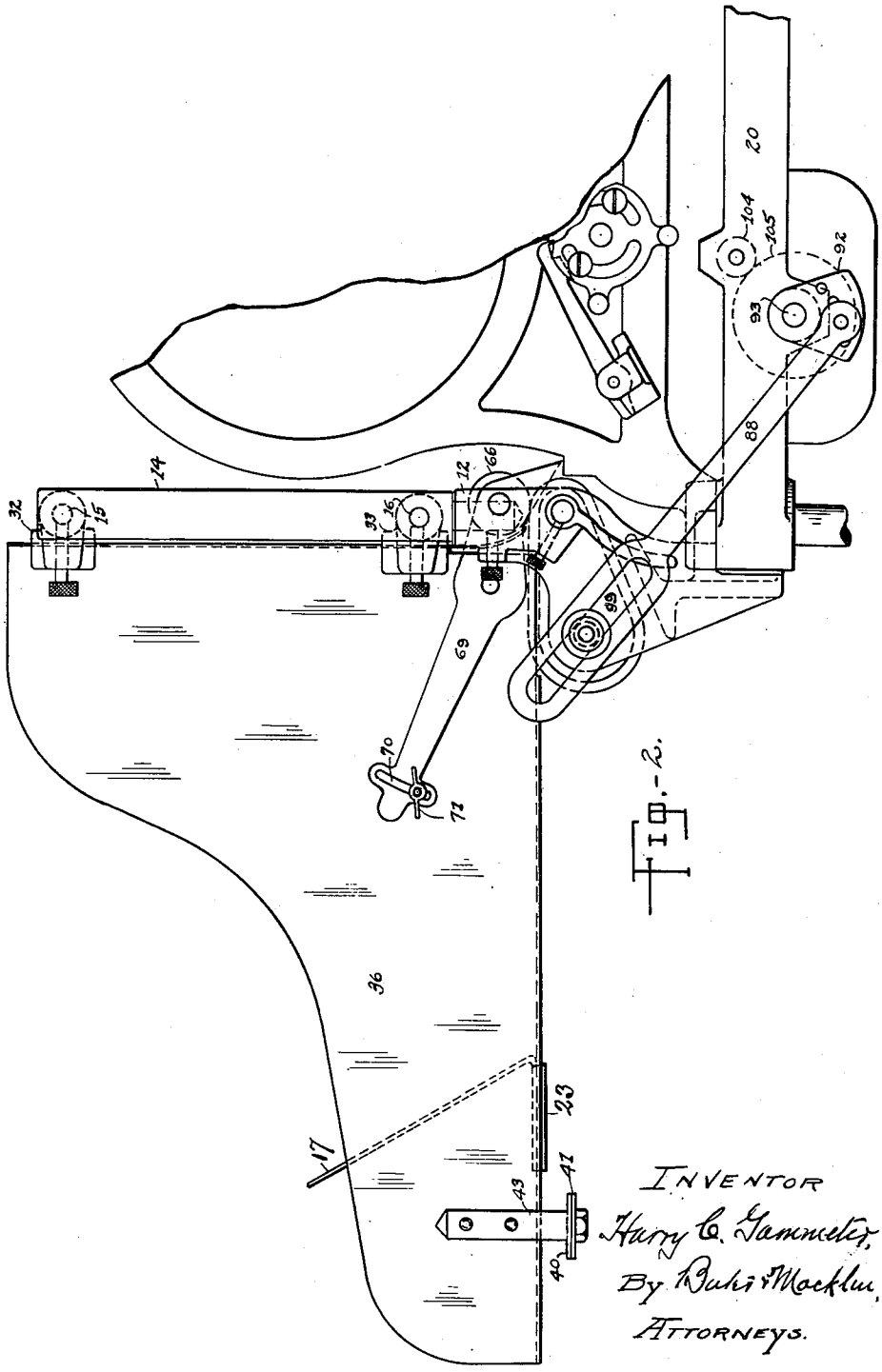


FIG. 2.

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MECHANISM FOR FEEDING PAPER, CARDS ENVELOPES, ETC

Filed Oct. 7, 1920 6 Sheets-Sheet 3

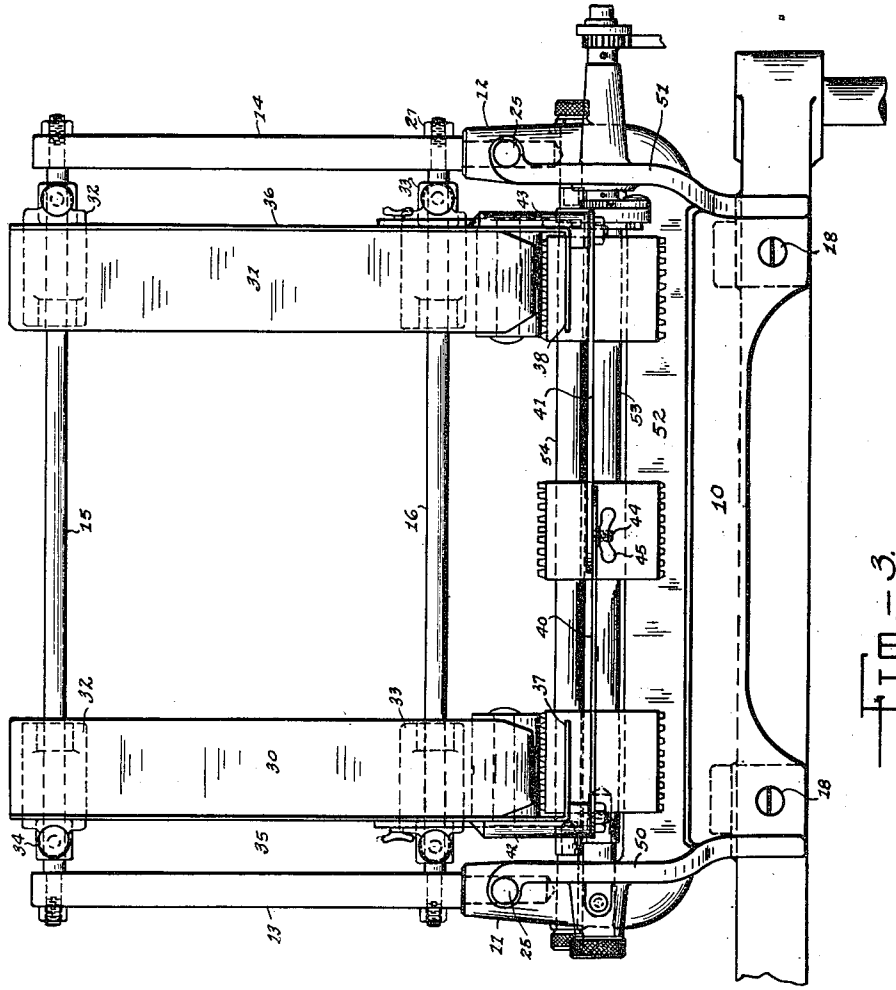


Fig. 3.

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Filed Oct. 7, 1920 6 Sheets-Sheet 4

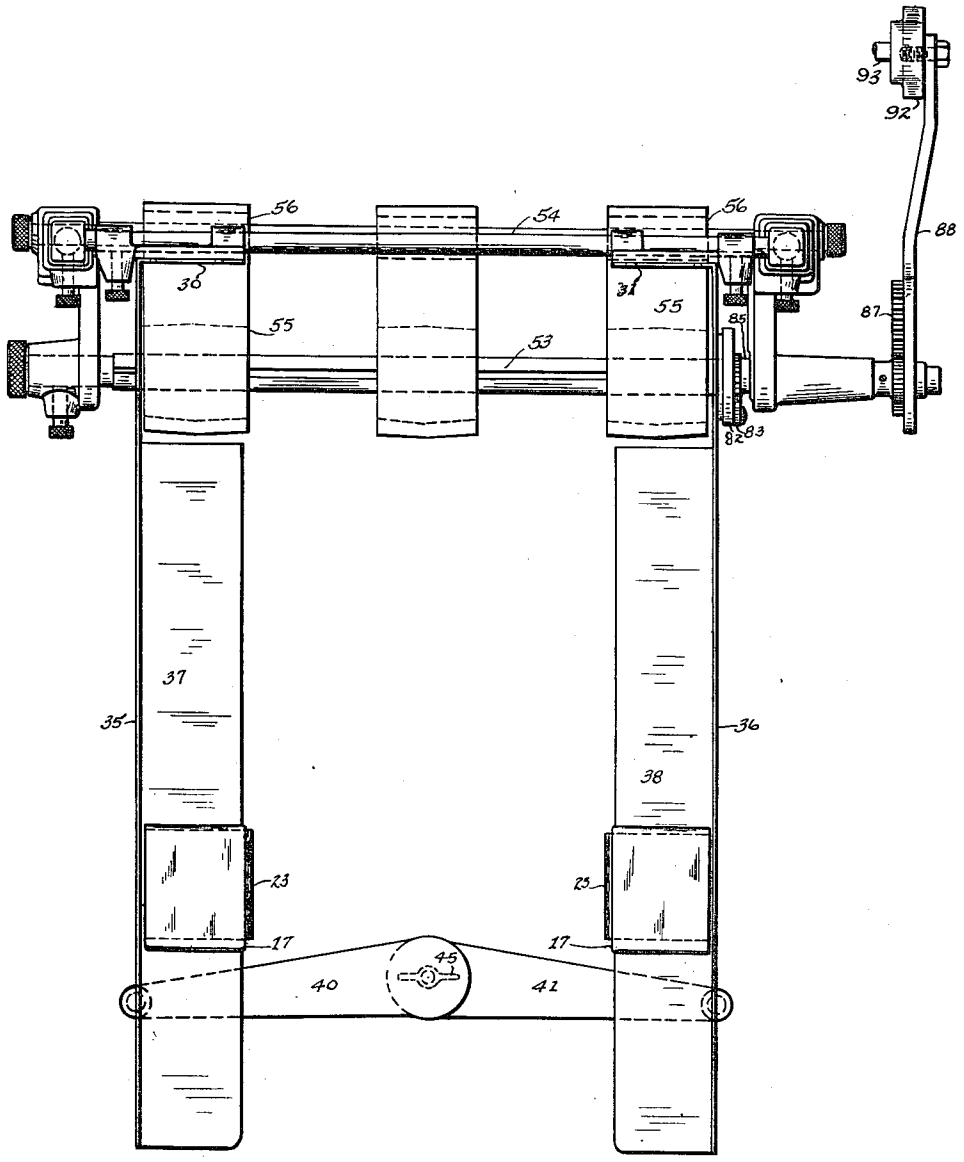


FIG. 4

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MECHANISM FOR FEEDING PAPER, CARDS, ENVELOPES, ETC

Filed Oct. 7, 1920 6 Sheets-Sheet 5

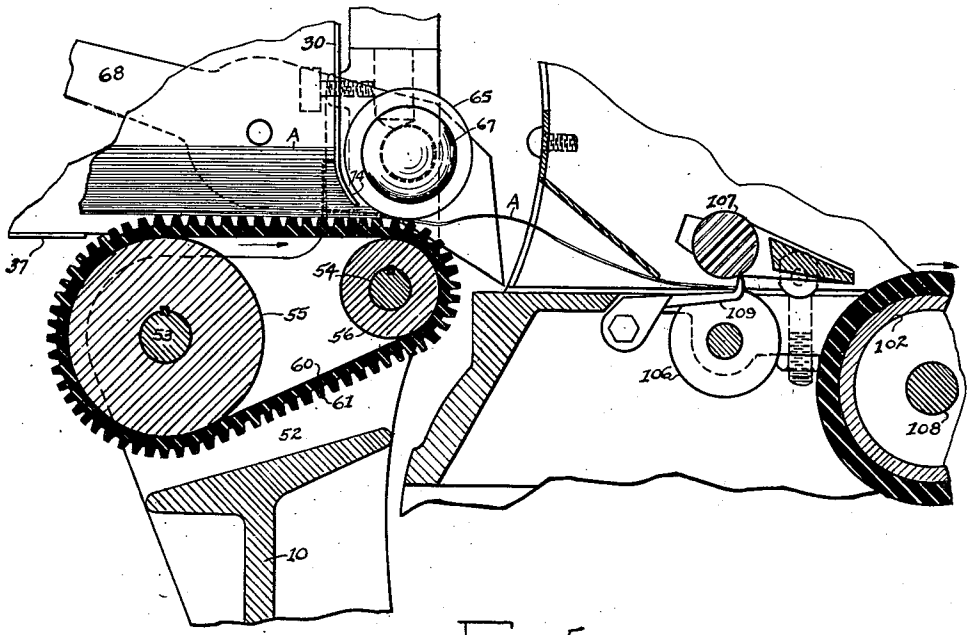


FIG.- 5.

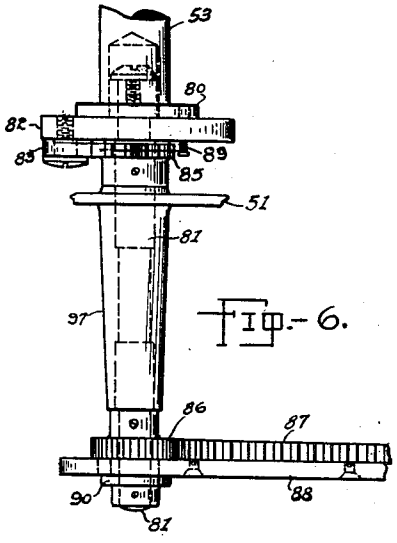


FIG.- 6.

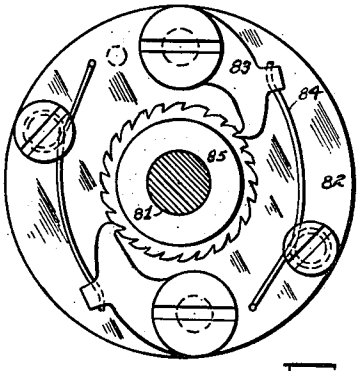


FIG.- 7.

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MECHANISM FOR FEEDING PAPER, CARDS, ENVELOPES, ETC

Filed Oct. 7, 1920 6 Sheets-Sheet 6

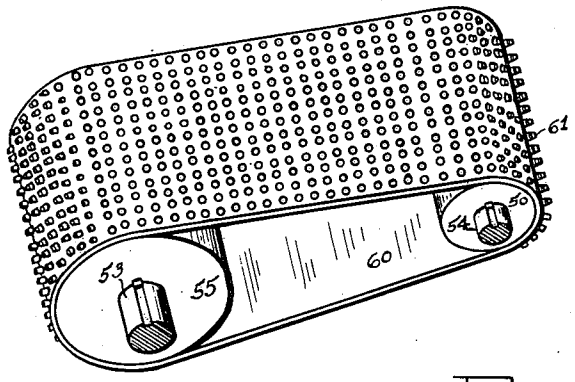


Fig. - 8.

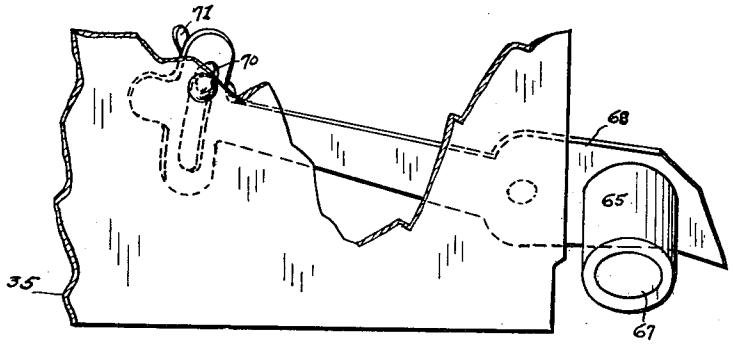


Fig. - 9.

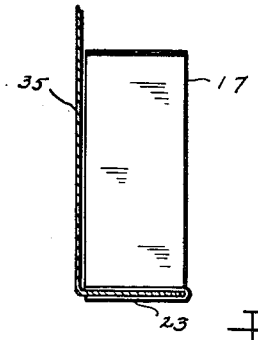


Fig. - 10.

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Patented May 29, 1923. 1,457,158

UNITED STATES PATENT OFFICE.

HARRY C. GAMMETER, OF CLEVELAND HEIGHTS, OHIO, ASSIGNOR TO THE AMERICAN MULTIGRAPH COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

MECHANISM FOR FEEDING PAPER, CARDS, ENVELOPES, ETC.

Application filed October 7, 1920. Serial No. 415,344.

To all whom it may concern:

Be it known that I, HARRY C. GAMMETER, a citizen of the United States, residing at Cleveland Heights, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Mechanism for Feeding Paper, Cards, Envelopes, etc., of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

The object of this invention is to provide a simple and efficient mechanism for feeding paper, cards, envelopes, etc. Certainty of feed of but one article at a time and ready adjustability for different sizes or characters of the articles are features of the invention.

My feeding mechanism is adapted for use in conjunction with various machines to act on the product fed, as for example, a printing folding or sealing machine. The invention is shown herein as adapted to feed material to a multigraph, and such embodiment is hereinafter more fully described. The essential novel characteristics of the invention are summarized in the claims.

In the drawings, Fig. 1 is a vertical section of my paper feed mechanism and a multigraph to which it is applied; Fig. 2 is a side elevation of the paper feed mechanism showing also a portion of the multigraph; Fig. 3 is a front elevation of the paper feed mechanism; Fig. 4 is a plan of the paper feed mechanism; Fig. 5 is an enlarged side elevation of the paper gripping portion of the paper feed mechanism and the adjacent portion of the multigraph; Fig. 6 is a detail in the nature of a plan showing the driving mechanism for the paper feeding belts; Fig. 7 is an enlarged detail in the side elevation of the ratchet portion of the belt feeding mechanism; Fig. 8 is a diagrammatic perspective illustrating one of the feeding belts and its carrying rollers; Fig. 9 is a detail in perspective, showing one of the paper retarding rollers and its carrying arm; Fig. 10 is a sectional elevation of one side of the frame, showing the adjustable mounting of the back members of the frame.

The frame of the paper feed mechanism comprises a cross portion 10, having upright standards 11 and 12, which carry upright bars 13 and 14, to which are rigidly secured horizontal cross bars 15 and 16. The horizontal frame bar 10 is secured in any suitable manner to the machine with which the paper feed cooperates. I have shown this cross bar secured by screws 18 to the edge of a table top 20, on which a multigraph 21 stands. Suitable lugs 19 extending rearwardly from the bar 10 rest on the top of the table between the legs 22 of the multigraph. The upright bars 13 and 14 are preferably removable from the standards 11 and 12 to enable convenient packing and are secured to them by set screws 25. The cross bars 15 and 16 may conveniently extend thru the bars 13 and 14 and be secured to them by nuts 27.

The paper supporting and positioning body of the feed mechanism consists of sheet metal members slidably mounted on the cross bars 15 and 16. Thus there are two vertical flat strips 30 and 31, each having bosses 32 and 33 slidably mounted on the respective bars, each boss being provided with a set screw 34 for clamping it in place. These two strips 30 and 31 form abutments for the front of the pile of paper to be fed. Each strip has projecting from its outer edge a plate as 35 and 36, the lower edge of which is turned inwardly horizontally as at 37 and 38. The horizontal flanges 37 and 38 form supports for a pile of paper sheets, envelopes, cards or other articles to be fed. The plates 35 and 36 form guides for the end or side edges of such paper articles, while the vertical strips 30 and 31 form abutments for the front of the stack.

In order to maintain the ends of the articles to be printed in an abutting position against the strips 30 and 31, I have provided the back plates 17 which may be made from one piece of sheet metal in such a manner as to form the U-shaped slide way 23, which is adapted to embrace the upper and lower faces of the bottom strips 37 and 38 and are thus slidably maintained thereon. The upwardly extending portion 17 is bent outwardly to present a surface which tapers toward the abutment strips 30 and 31. By adjusting the back plate along the bottom strips until they abut and underlie the edges of the sheets it is apparent that the bottom of the stack will be urged toward the multigraph.

The simple loosening of the set screws holding the front strips 30 and 31 may enable adjustment of the two paper positioning members toward or from each other for

different sizes of paper or articles to be fed. I prefer, however, to brace the outermost portions of the side members, and this I accomplish by a pair of arms 40 and 41, which are pivoted at their outer ends to studs 42 and 43, depending from the side members, these arms overlapping each other at their inner ends and being there pivoted to each other by a bolt 44, which carries a wing nut 45. When the relative position of the side members is to be changed, the nut is loosened and the arms swing on their common pivot into a position more at an angle to each other or more nearly straight, according to whether the side members are brought near each other or separated. Either side member, therefore, may be positioned by loosening its set screws 34, together with the clamping nut 45, and shoving the side members as desired, and thereafter tightening these clamping members.

These standards 11 and 12 above the cross portion 10 of the frame take the form of flat webs 50 and 51, which are braced by an inclined transverse web portion 52. In these webs 50 and 51 are journalled two shafts 53 and 54, on which are mounted belt-carrying rollers 55 and 56, there being three rollers shown on each shaft. Over each of the rollers 55 and the roller 56 at the rear thereof is mounted a continuous elastic belt 60, preferably made of rubber. The rollers 55 may be crowned to insure the belts tracking on the rollers. Each belt is preferably a continuous strip of rubber, having short projections 61 on each surface. These projections are arranged in rows parallel with the axes of the shafts. The rollers are splined on their respective shafts so that they may be shoved toward and from each other, but are compelled to rotate with the shafts. Suitable mechanism hereinafter described is adapted to periodically turn the shaft 53 in the direction to feed to the upper reach of the belt forwardly, as indicated by the arrow in Fig. 5.

It will be seen from Figs. 1, 4 and 5, that the paper supporting strips 37 and 38 terminate a short distance in front of the belt. The outermost portion of the paper stack is supported by the back plates 17, but the forward portion rests on the upper reach of the belts and against the front strips 30 and 31. The upper reaches of the belts are horizontal and stand slightly higher than the supporting strips 37 and 38, and the foot of each front strip is a short distance above the corresponding belt.

Just above the two extreme belts, where they pass onto the extreme rollers 56, are a pair of elastic retarding rollers 65 and 66. These rollers are mounted comparatively tightly on studs 67 carried by and projecting inwardly from levers 68 and 69, which are pivoted to the side member 35 and 36, respectively. The levers extend to the rear of their pivots a considerable distance, and are there provided with arcuate slots 70 into which extend clamping bolts carried by the side members, and provided with wing nuts 71. The loosening of these nuts enables the rear ends of the levers to be adjusted up and down, which changes the presentation of the retarding rollers 65 and 66 to the belts.

In operation the retarding rollers are positioned so that they stand above the belt a distance substantially equal to the thickness of the sheet of paper fed and materially less than the thickness of two sheets. At the rear of these rollers, the front strips 30 and 31 are curved forwardly concentric with the roller, as shown at 74 in Fig. 5. As the back plates 17 are tapered toward the strips 30 and 31, it is to be seen that the forward edges of the sheets are constantly urged to follow the contour of the retarding rollers, and the forward travel of the belt causes the paper to take the position shown at A in Fig. 5, the lowermost sheets projecting slightly forwardly from the surmounting sheets. The retarding roller holds back all of those sheets which pass under the curved edge 75 with the exception of the lowermost sheet, indicated at A′ in Fig. 5. This sheet is fed forwardly between the belt and the retarding roller directly above it. The rollers 65 and 66 are clamped by their studs tight enough so that they do not rotate in operation, and thus effectively retard all but the lowermost sheet. Their roller form, however, enables them to be manually turned above their supports to bring a fresh surface into use whenever desired.

When the supporting members and feeding belts have been laterally positioned according to the size of paper, envelopes or other articles to be fed, and the position of the retarding rollers is adjusted so that the paper may just pass easily between them and the belt, the material is simply deposited in a stack in the skeleton pocket thus provided and rests at its forward end on the belt and toward the rear on the strips 37 and 38. Then when the belts are fed forwardly by the rotation of the shaft 53, the sheets one after the other are fed out forwardly from the feeding mechanism.

For many uses it is desirable to allow a period of rest between successive feedings of sheets. The drawings show a convenient operative mechanism for the shaft 53, adapted to accomplish this result. Referring to Figs. 2, 4, 6 and 7, it will be seen that the shaft 53 is provided with collar 80, which is connected by a pin 89 with a disk 82 carrying pawls 83. An aligned shaft 81 having a bearing in a hollow boss

97 carried by the frame web 51 has a ratchet wheel 80 rigid thereon, which cooperates with the pawls to drive them in the right hand direction, these pawls being pressed by springs 84 into engagement with the ratchet wheel. On the shaft 81 is a pinion 86, with which meshes a rack 87, formed on the side of a bar 88. This bar has in it a longitudinal slot 99, which extends over the end portion of the shaft 81, the bar being held in place by a collar 90 on the shaft. The bar 88 has its other end pivoted to a crank 92 on a driving shaft 93, shown as mounted in the supporting table 20.

The rotation of the shaft 93, it will be seen, reciprocates the bar 88. On the outward stroke of this bar the rack teeth thereon rotate the pinion 86 in the right hand direction, which carries the ratchet wheel in this direction and turns the pawl disk in this direction, thus turning the pulleys 55 in the right hand direction and feeding the upper reach of the belts 60 forwardly. On the return movement of the bar 88, the rack will rotate the pinion in the left hand direction, and this causes the ratchet wheel to pass idly across the pawls. The belts are therefore operated to feed the paper forwardly during half the rotation of the driving shaft, and are idle during the remaining half.

Figs. 1, 2 and 5 of the drawings illustrate the feeding mechanism adapted for use with a multigraph, and in such use the periodical operation to the belts described is very desirable, since after the feeding of a sheet has been well started it comes into the grip of the regular feeding mechanism of the multigraph, which thereafter controls its progress. The stack feeder of this invention may be timed with reference to the multigraph so that the sheet is fed from the feeding mechanism into the multigraph slightly before the multigraph feed operates to grip it. The forward edge of the sheet is thus stopped by the multigraph and the intermediate portion buckles slightly, as shown at A′ in Fig. 5. This buckle gives the sheet a forward spring when the multigraph feed releases it and starts to move it.

The multigraph has a rotary printing drum 100, Fig. 1, which carries on a portion of its surface type or other impressing members, which type is suitably inked, as for instance, by a ribbon 101, or otherwise as desired. Beneath the printing drum is an impression platen 102, suitably geared with the drum by means not shown. This platen may also be geared with the shaft 93, Fig. 2, by means of an idler 104 and a gear 105 on the shaft 93. The multigraph paper feed comprises feeding rollers 106 and 107 the former of which are adapted to be driven by the platen shaft 108 by gearing not shown. 109 designates suitable stop fingers on the multigraph normally in the path of the paper, but which at the desired time are automatically depressed to free the paper, and at the same time the roller 107 is depressed to pinch the paper between it and the roller 106, and thus feed it forwardly. This operation of the stop fingers and the upper roller is usually effected by a cam on the multigraph, not herein shown.

It will be seen from the above description that my paper feed mechanism is well adapted for use in conjunction with a multigraph. It may be conveniently carried in front of the multigraph in the space ordinarily occupied by the hand-feeding table, and it operates to feed the sheets into the grip of the standard multigraph feed at a time just preceding the operation of the multigraph feed to grip the paper. The present invention, however, is not limited to use in conjunction with the multigraph, as my paper feeding mechanism is capable of many other adaptations.

Having thus described my invention, I claim:—

1. In a paper feeding mechanism, the combination with a propelling belt having its upper reach positioned to support the forward portion of a stack of paper, of a retarding device cooperating with said belt, and a movable lever carrying the retarding device.

2. In a paper feeding mechanism, the combination with a propelling belt, and a retarding device cooperative with the belt, of a plurality of members adapted to support the paper, a positioning member adjustably carried by the paper supporting member, and comprising an inclined end piece for engaging the rear edge of a stack of paper to be fed.

3. In a paper feeding mechanism, the combination of means for positioning a stack of paper, a pair of arms carried thereby, a pair of retarding devices projecting toward each other on the inner sides of said arms, a pair of feeding belts adapted to engage the undersurface of the bottom sheet adjacent to its edges, and means for driving said belt in the direction to feed the sheet.

4. In a paper feeding mechanism, the combination with laterally adjustable devices for positioning a stack of paper to be fed, and laterally adjustable endless belts adapted to engage the bottom of the stack near its forward end.

5. In a paper feeding mechanism, the combination of a positioning device having a front stop, side plates and a botton flange, of an endless belt located in front of the bottom flange, and extending to a somewhat higher plane.

6. In a paper feeding device, the combination with a supporting frame, of a pair of laterally adjustable members thereon,

each having a front abutment, a side wall and a bottom flange, and means to engage and feed the paper located between the side walls and in front of the bottom flange.

7. The combination with a laterally adjustable positioning device comprising front abutments, side walls and bottom flanges, of endless belts having their upper reaches between the side walls and in front of the bottom flanges.

8. The combination with a positioning device comprising side walls, bottom flanges and inclined supports slidable on the flanges, of endless belts having their upper reaches between the side walls and in front of the bottom flanges, and retarding devices adapted to cooperate with the belts.

9. The combination with a laterally adjustable positioning device comprising front abutments, side walls and bottom flanges, or rear supports slidable on the flanges, endless belts having their upper reaches between the side walls and in front of the flanges, and retarding devices in front of the front abutments and adapted to cooperate with the belts.

10. The combination with a laterally adjustable positioning device comprising front abutments and side walls, of endless belts having their upper reaches between the side walls, arms pivotally mounted on the positioning device described to be laterally adjustable therewith, and retarding devices carried by said arms and cooperating with the belts.

11. In a paper feeding mechanism, the combination of a frame, comprising a cross member and a pair of upright standards, and cross bars carried by the standards, of paper positioning devices slidably mounted on the cross bars, and comprising front stops, side walls and bottom supports, and feeding mechanism adapted to engage the forward portion of the bottom sheet in the stack of positioned paper.

12. In a paper feeding mechanism, the combination of a frame, of a pair of paper positioning devices independently slidable on the frame, and each comprising a front stop, a side wall and a paper support, adjustable means for bracing the rear portion of the positioning devices, and feeding mechanism adapted to engage the forward portion of the bottom sheet in the stack of positioned paper.

13. The combination with laterally adjustable positioning devices each made of sheet material and comprising a front abutment, a side wall projecting rearwardly therefrom, and a bottom flange projecting inwardly from the side wall, of laterally adjustable endless belts having their upper reaches between the side walls and in front of the bottom flanges, and means for moving the belts.

14. In a paper feeding device, the combination with a supporting frame, of a pair of laterally adjustable members thereon, each having a front abutment, a side wall and a longitudinal flange, a rear support slidable on the flange, a pair of transverse shafts, laterally adjustable pulleys thereon, and endless belts on the pulleys located between the side walls and in front of the flanges and adapted to engage and feed the bottom article in a stack.

15. The combination, with a machine for acting on paper, and having its own paper feed, of an automatic feeding device adapted to feed paper from the stack to the feed first mentioned, said automatic device having a paper feeding belt, and means for periodically operating it timed to operate in proper sequence with reference to the feeding mechanism first mentioned.

16. The combination with a rotary printing machine, having its own paper feeding device, of an automatic paper feed having means supporting a stack of articles to be fed, an endless belt engaging the lowermost article, and means for periodically operating said belt to advance the article in timed relation with the paper feed of the printing mechanism.

17. The combination with a rotary printing machine having its own paper feeding device, of an automatic paper feed having means supporting a stack of articles to be fed, an endless belt engaging the lowermost article, and means for operating said belt to advance the article in timed relation with the paper feed of the printing mechanism, and adjustable means co-operating with the belt to restrict the feed to one sheet at a time.

18. The combination with a rotary printing machine, having its own paper feeding device including a stop finger, of an automatic paper feed having means for supporting a stack of paper, an endless belt engaging the lowermost sheet, and means for periodically operating said belt to advance the sheet in timed relation with the paper feed of the printing mechanism and shove it into contact with the stop finger and buckle the paper before the stop finger releases the sheet.

In testimony whereof, I hereunto affix my signature.

HARRY C. GAMMETER.