Aug. 4, 1925. 1,548,310

F. H. HARTMANN ET AL

ROTARY DUPLICATOR

Filed June 19, 1925 4 Sheets-Sheet 1

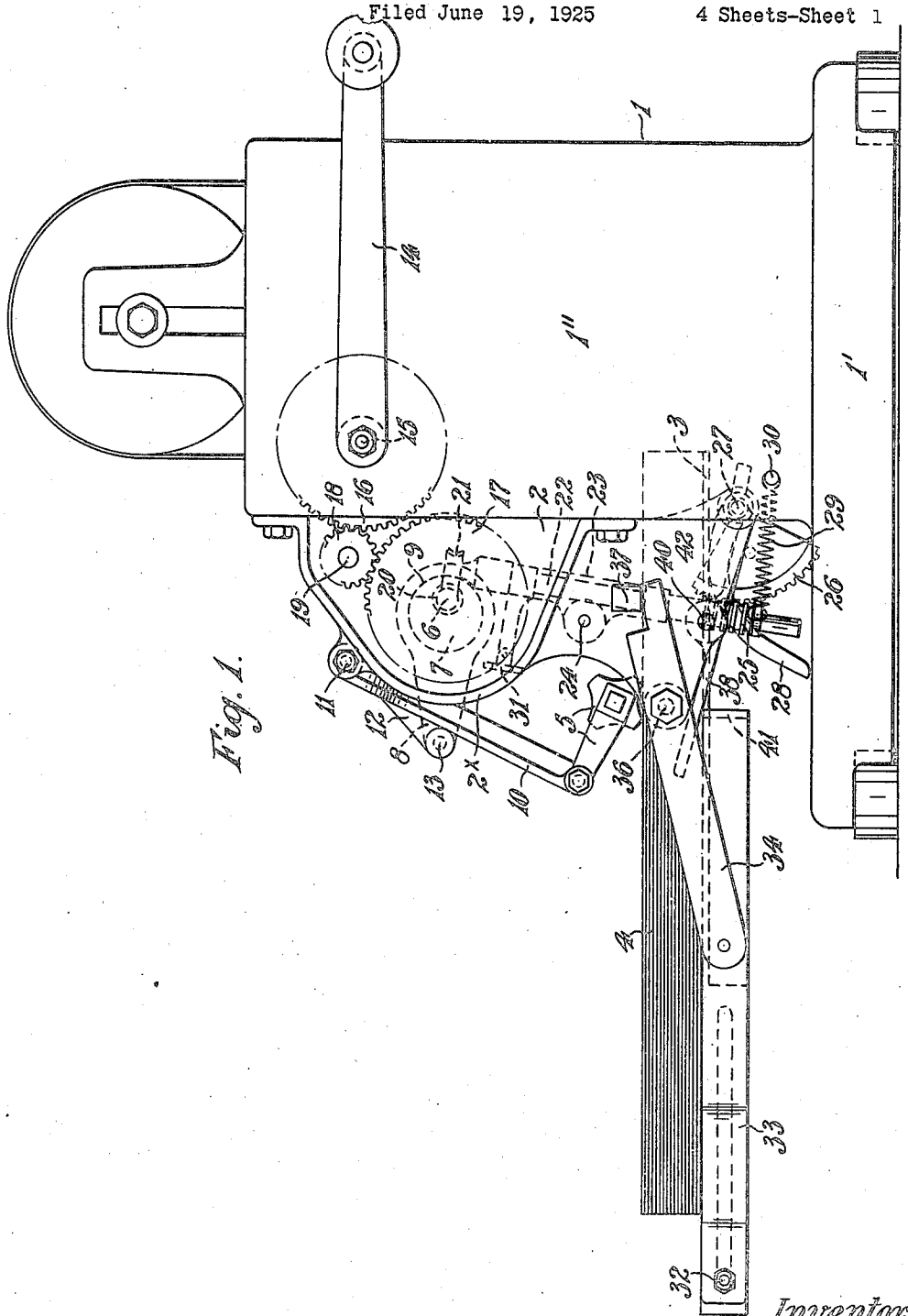


Fig. 1.

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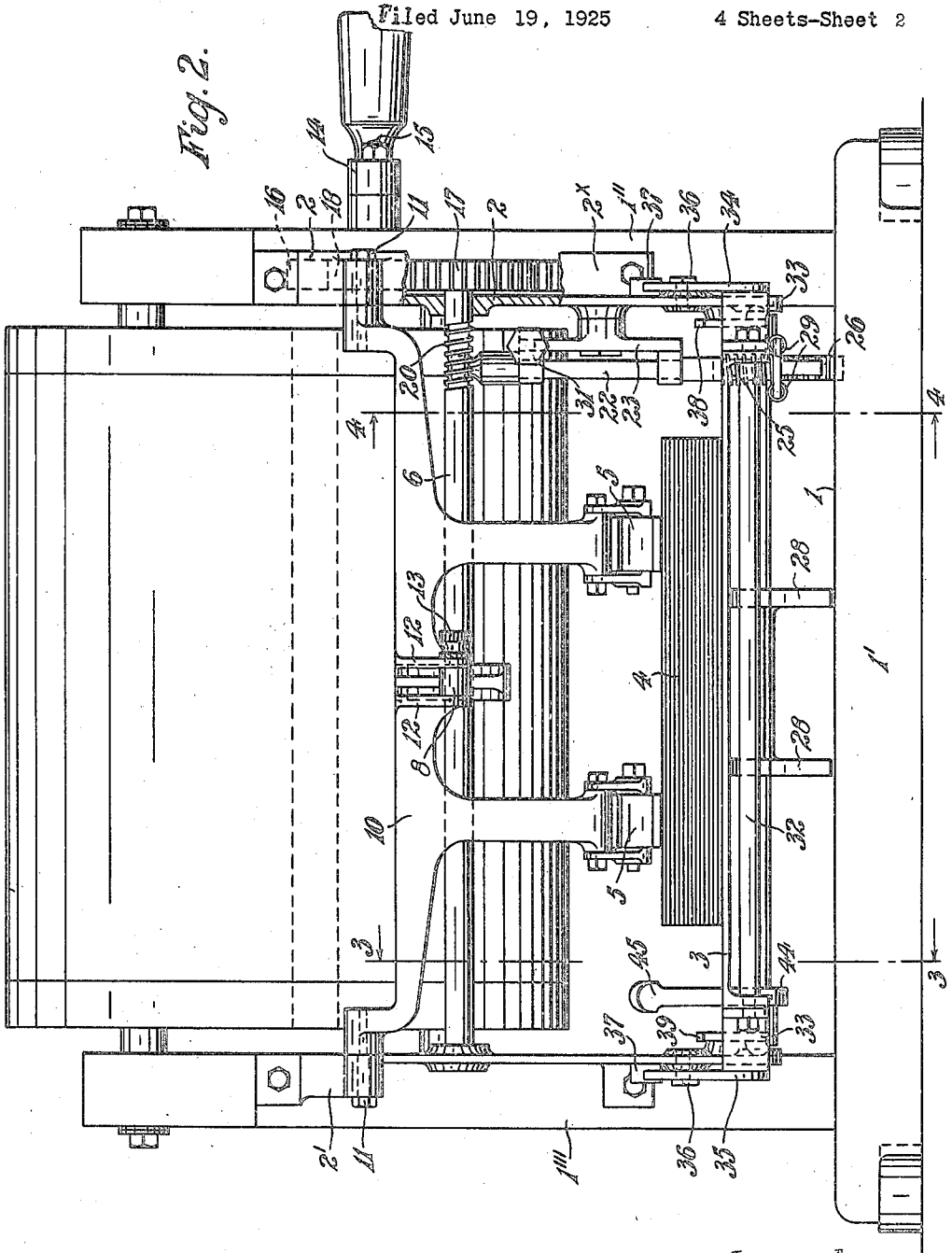
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Filed June 19, 1925 4 Sheets-Sheet 2

Fig. 2.



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Filed June 19, 1925 4 Sheets-Sheet 3

Fig. 4.

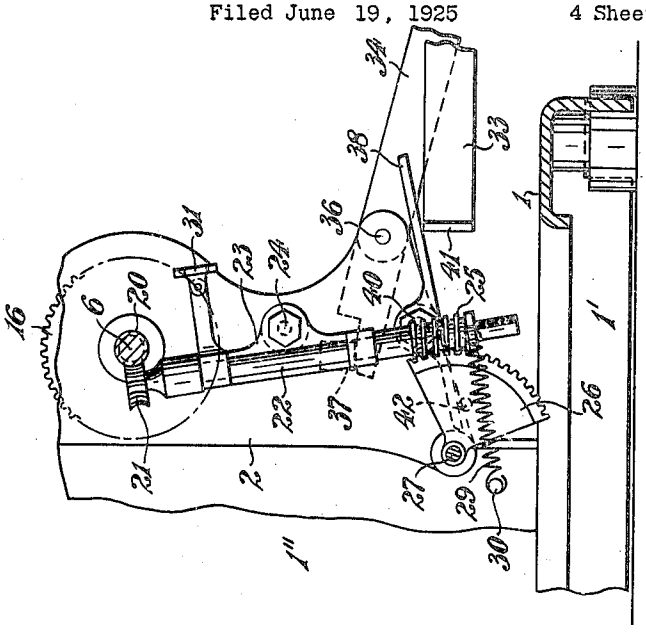
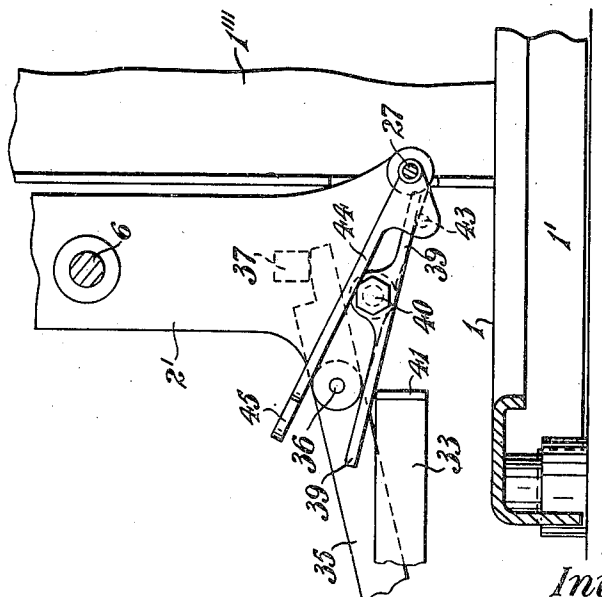


Fig. 3.



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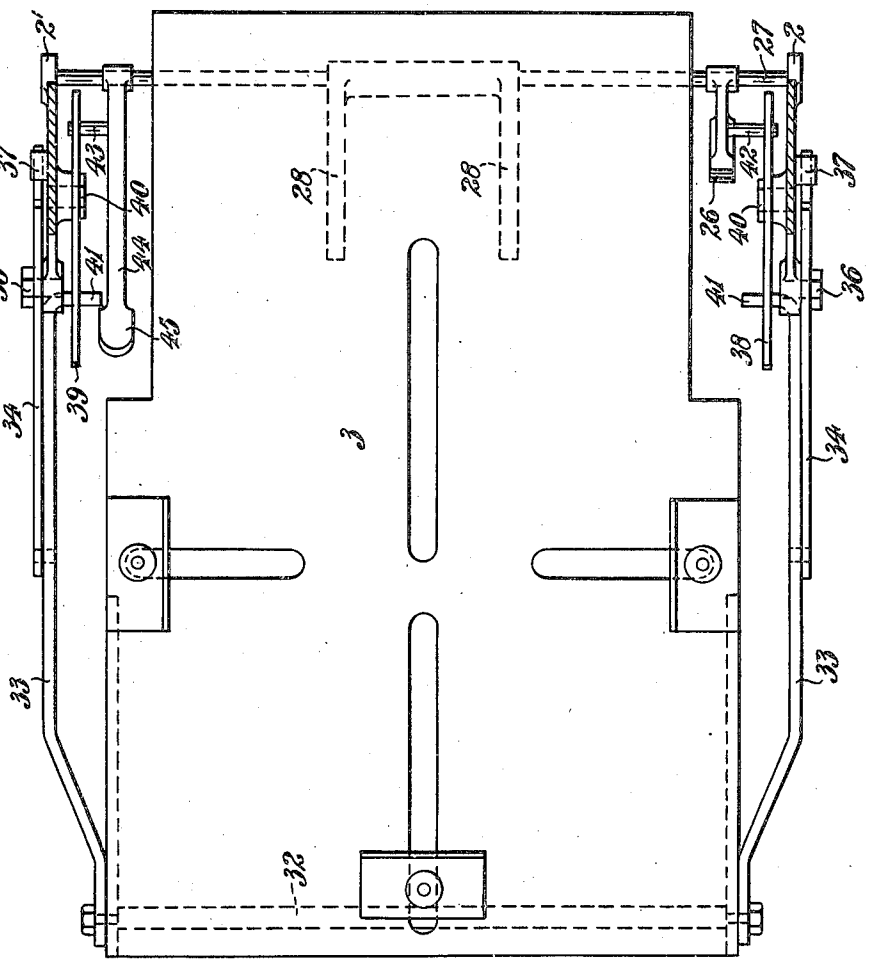
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Fig. 5.



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UNITED STATES PATENT OFFICE.

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ROTARY DUPLICATOR.

Application filed June 19, 1925. Serial No. 38,324.

To all whom it may concern:

Be it known that we, FREDERICK HENRY HARTMANN and BEATRICE ELIZA HARTMANN, subjects of the King of Great Britain and Ireland, residing at 11 Red Lion Square, London, England, have invented new and useful Improvements in Rotary Duplicators, of which the following is a specification.

The invention relates to rotary stencil duplicators. Such duplicators, as hitherto constructed, though satisfactory in action when the sheets of paper to be passed through a machine are fed by hand are not so satisfactory when the sheets of paper are automatically fed into the machine. This is due to the character of the mechanism by which the platform supporting the pile of sheets of paper to be fed through the machine is raised as the sheets of paper are used up, and to the fact that feeding of the sheets of paper is dependent on the buckling of the sheets of paper.

In such rotary stencil duplicators the platform supporting the pile of sheets of paper is mounted at its rear end on a fixed axis on which it is turned at intervals so as to raise the front part of the platform, and as the sheets of paper are used up the platform, though more or less horizontal at first, becomes more and more inclined. Such inclination is objectionable in practice, as it only allows a small depth of sheets of paper to be placed on the platform before printing is started. Again the uppermost sheet of the pile of sheets of paper on the platform of a machine is at the commencement of the feeding movement buckled against a stop. Such buckling varies not only according to the quality of the paper that is used, but also from time to time with the same quality of paper, so that it is impossible in the case of a machine in which feeding of the sheets of paper depends on such buckling to ensure uniform feeding and correct registration. Such buckling also entails the use of parts for retaining in position the uppermost sheet of the pile of sheets of paper whilst it is being buckled and for lifting the front end of the buckled part of the sheet over said stop when said buckled part is to be released.

The present invention consists of means for raising the platform of a rotary stencil duplicator by which the platform will as each sheet of paper is fed through the machine be vertically raised to a height corresponding to the thickness of a sheet of paper. By raising the platform of a rotary stencil duplicator in this manner it is possible to place on the platform of a machine, before printing is started, a very much deeper pile of sheets of paper than is the case with existing rotary stencil duplicators, and to avoid the necessity for buckling the sheets of paper against a stop at the commencement of the feeding movement. As a consequence of obviating such buckling the parts necessary for effecting same and lifting the buckled parts of the sheets over the stop are dispensed with, and the cost of manufacturing a rotary stencil duplicator is greatly reduced. Moreover the parts used for carrying out the present invention are positive and certain in action, and, as they are of simple construction, are not liable to get out of order.

The invention may be carried out as follows:—

A worm is cut in or is fixed to the shaft of a rotary stencil duplicator from which the feeding fingers of the machine are actuated, in known manner, through the medium of an eccentric, strap, link and a rocking frame pivoted to the frame of the machine. This worm engages with a worm wheel which is fixed to the upper end of an angularly disposed shaft, that is, for the purpose hereinafter mentioned, mounted in a pivotal bearing. The other or lower end of said angularly disposed shaft is provided with a worm which engages with a segment of a worm wheel. This worm-wheel segment is secured to a third shaft that is provided with a cam or, if desired, two cams connected to one another, adapted to bear against a platform upon which is placed the pile of sheets of paper to be fed through the machine. Means are also provided for raising the rear part of the platform simultaneously and to an equal extent with the raising of the front part of the platform.

The invention is illustrated by the accompanying drawings.

Fig. 1 is a side view of a rotary stencil duplicator provided with the present invention. Fig. 2 is a front view of the duplicator. Figs. 3 and 4 are side views, partly in section, of parts of opposite sides of the

machine, the sections being taken on the lines 3—3 and 4—4 of Fig. 2, and the parts being viewed in the directions indicated by the arrows at the sides of said lines. Fig. 5 is a plan of the platform of the machine and of the parts by which the platform is raised at both its front and rear.

Referring now to these drawings, 1 is the frame of the improved duplicator, consisting of a base 1′ and two uprights 1″ and 1‴. 2 and 2′ are brackets screwed to one of the vertical edges of the uprights 1″ and 1‴. 3 is the platform of the machine, and 4 is a pile of sheets of paper supported on the platform 3. 5 are the feeding fingers of the machine. These feeding fingers are actuated from a shaft 6, by means of an eccentric disc 7 on the shaft, a lever 8 formed with a recess 9 fitting the eccentric disc 7, and a rocking lever 10 which is pivotally mounted in the brackets 2 and 2′ by means of pivot pins 11 and is connected to the outer end of the lever 8 through the medium of lugs 12 on the rocking lever 10 and a pin 13 passing through the lugs 12 and the outer end of the lever 8. The shaft 6 is rotated by means of a crank 14 which is fixed to a short shaft 15, that is supported in the upright 1″ of the frame 1, a toothed wheel 16 on the shaft 15, a second toothed wheel 17 secured to the shaft 6, and an intermediate pinion 18 fixed to a stud shaft 19 which is supported by the bracket 2. All of the above enumerated parts are similar to those hitherto used in rotary stencil duplicators and form no part of the present invention.

According to the present invention a worm 20 is cut in or is fixed to the shaft 6. This worm 20 engages with a worm wheel 21 which is fixed to the upper end of a shaft 22 disposed at an angle to the base 1′ of the frame 1 of the machine. The shaft 22 is mounted in a bearing 23 which is mounted on a pin 24 carried by the bracket 2. The lower end of the shaft 22 is provided with a worm 25 which engages with a segment of a worm wheel. This worm-wheel segment 26 is secured to a shaft 27, upon which latter are fixed two cams 28 connected to one another and bearing against the front part of the lower surface of the platform 3. The angularly disposed shaft 22 is kept in the position shown in Figs. 1 and 4, that is to say, with the worm wheel 21 in engagement with the worm 20 and the worm 25 in engagement with the worm wheel segment 26, by means of light tension springs 29, which are connected at their ends to the lower end of the shaft and to a stud 30 fixed to the upright 1″ of the frame 1 of the machine. 31, see Figs. 1 and 4, is a finger-piece the function of which is to facilitate the swinging of the bearing 23 on the pin 24. As will be seen from an examination of Fig. 1, the bracket 2 is provided with a flange 2× which acts as a guard for the toothed wheels 17 and 18.

Suitable means are provided for raising the rear part of the platform 3 simultaneously with and to an extent corresponding to that by which the front part of the platform is raised by the cams 28. This result may be effected by the means now to be described. The platform 3, which, as already mentioned, rests with its front on the cams 28, is mounted at its rear end on a rod 32. The ends of the rod 32 are fixed to the rear ends of bars 33, one at each side of the machine, which are supported, intermediate their ends, by means of links 34 and 35. The links 34 and 35 are pivotally mounted on pins 36 screwed into the brackets 2 and 2′, which are secured to the uprights 1″ and 1‴ of the machine. The free ends of the links 34 and 35 are stepped and co-operate with square projections or studs 37 on the brackets 2 and 2′. A pair of two-armed levers 38 and 39 are pivoted intermediate their ends on the inner sides of the brackets 2 and 2′ by means of screwed pins 40. The rear arms of these levers 38 and 39 bear against abutments 41 on the inner ends of the bars 33, which are provided, as shown in Fig. 5, by bending inwards these ends of the bars 33. The front end of the lever 38 bears against a stud 42 fixed to the outer side of the worm-wheel segment 26, while the front end of the other lever 39 bears against a stud 43, which is disposed in line with the stud 42 and is fixed to a lever 44 secured to the shaft 27. The outer end of the lever 44 is provided with a finger-piece 45 to enable the shaft 27 to be rotated when the worm wheel 21 and worm 25 respectively are to be disengaged from the worm 20 and worm wheel segment 26.

The improved mechanism acts as follows:—

Assuming that a pile 4 of sheets of paper has been placed on the platform 3, the crank 14 is turned, so rotating the shaft 6 and actuating the feeding fingers 5. At the same time the angularly disposed shaft 22 is rotated and the cams 28, bearing against the lower surface of the front of the platform 3, are rotated. As a consequence the front part of the platform 3 is slightly raised, and simultaneously the rear part of the platform 3 is raised to a corresponding extent. The mechanism is such that as each sheet of paper is fed through the machine the platform 3 is correspondingly raised in a vertical direction, with the result that the uppermost sheet of the pile of paper 4 will always be at a constant level, thus ensuring proper feeding of the sheets of paper and perfect registration. When the last sheet of the pile of sheets of

paper 4 has been passed through the machine the user of the machine presses on the finger-piece 31 and causes the bearing 23 supporting the angularly disposed shaft 22 to be swung on the pin 24 and the worm wheel 21 and the worm 25 to be respectively disengaged from the worm 20 and the worm-wheel segment 26. The user of the machine now presses on the finger-piece 45 of the lever 44 and turns the shaft 27 and the cams 28, so as to allow the platform 3 to be depressed in order that a fresh pile of sheets of paper may be placed on the platform. The bearing 23 of the angularly disposed shaft 22 is now swung back on the pin 24 and the worm wheel 21 engaged with the worm 20 and the worm 25 with the worm-wheel segment 26.

Having now described our invention what we have invented and desire to secure by Letters Patent of the United States is as follows:—

1. Means for vertically raising the platform of a rotary stencil duplicator to a height corresponding to the thickness of a sheet of paper each time a sheet of paper is fed through the machine comprising cams bearing against the lower surface of the front part of the platform and secured to a horizontally disposed shaft arranged transversely to said platform, gearing for slowly rotating said horizontally disposed shaft driven from the shaft actuating the feeding fingers of the machine, and means for raising the rear part of the platform simultaneously and to an equal extent with the raising of the front part of the platform, substantially as described.

2. Means for vertically raising the platform of a rotary stencil duplicator to a height coresponding to the thickness of a sheet of paper each time a sheet of paper is fed through the machine comprising a worm on the shaft which operates the feeding fingers of the machine, a shaft disposed at an angle to the base of the machine, a pivoted bearing supporting said angularly disposed shaft intermediate its ends, a horizontally disposed shaft arranged transversely to and below the front part of said platform, a worm wheel secured to the upper end of said angularly disposed shaft and engaging with the worm on the shaft which operates the feeding fingers of the machine, a worm secured to the lower end of said angularly disposed shaft, a worm-wheel segment secured to said horizontally disposed shaft and engaging with said last mentioned worm, cams fixed to said horizontally disposed shaft and bearing against the lower surface of the front of the platform of the machine, and means operated from said horizontally disposed shaft for tilting upwards the rear end of the platform of the machine simultaneously with the raising of the front end of the platform, substantially as described.

3. Means for vertically raising the platform of a rotary stencil duplicator to a height corresponding to the thickness of a sheet of paper each time a sheet of paper is fed through the machine consisting of a worm on the shaft which operates the feeding fingers of the machine, a shaft disposed at an angle to the base of the machine, a pivoted bearing supporting said angularly disposed shaft intermediate its ends, a horizontally disposed shaft arranged transversely to and below the front of said platform, a worm wheel secured to the upper end of said angularly disposed shaft and engaging with the worm on the shaft which operates the feeding fingers of the machine, a worm secured to the lower end of said angularly disposed shaft, a worm-wheel segment secured to said horizontally disposed shaft and engaging with said last mentioned worm, cams fixed to said horizontally disposed shaft and bearing against the lower surface of the front of the platform of the machine, a rod supporting the rear end of said platform, bars secured to the outer ends of said rod, inclined links pivotally supported on the outer sides of the frame of the machine and connected at their lower ends to said bars, a stud fixed to the outer side of said worm-wheel segment, a lever fixed to said horizontally disposed shaft, a stud on said lever in line with the stud on said worm-wheel segment, and two-armed levers pivotally supported on the inner faces of the frame of the machine and co-operating at their inner ends with said studs and bearing at their outer ends against abutments on the inner ends of the bars to which are secured the ends of the rod that supports the rear of the platform of the machine, substantially as described.

In testimony whereof we have signed our names to this specification.

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BEATRICE ELIZA HARTMANN.