

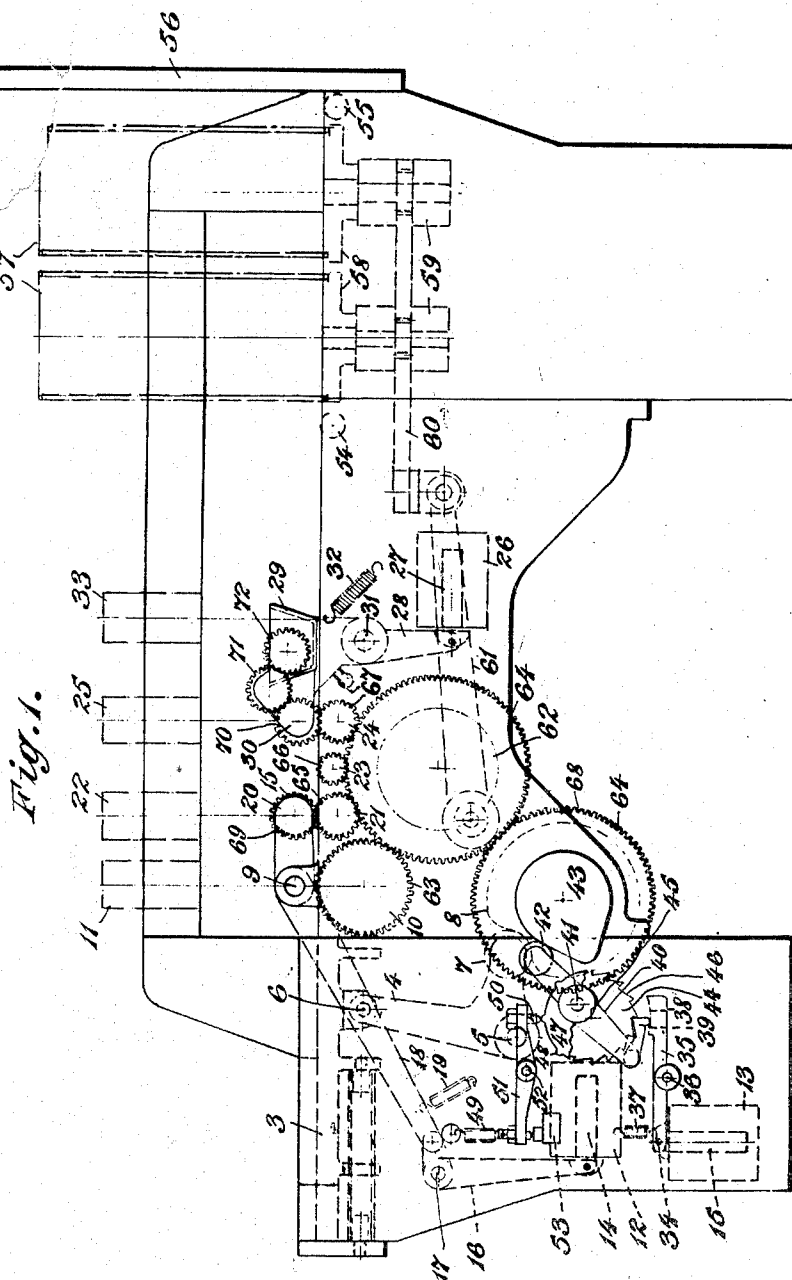
Jan. 18, 1955

A. M. HALLEY  
MECHANISM FOR USE IN THE PREPARATION  
AND ASSEMBLY OF OFFICE STATIONERY

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2 Sheets-Sheet 1



INVENTOR

Angus Murray Halley  
By Harris & Bateman

ATTORNEYS

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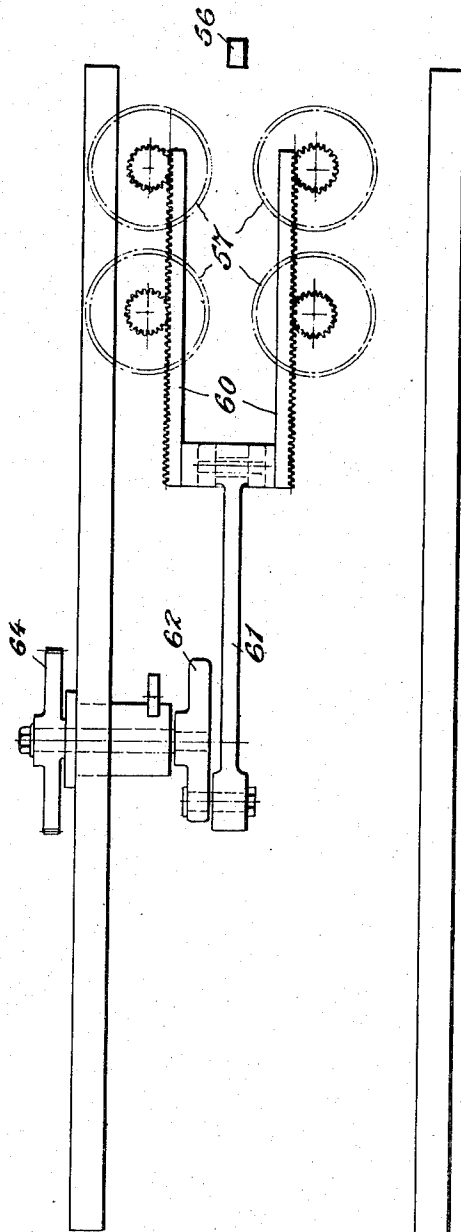
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Fig. 2.



INVENTOR

Angus Murray Halley  
By *Nona B. Peterson*  
ATTORNEYS

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2,699,749

## MECHANISM FOR USE IN THE PREPARATION AND ASSEMBLY OF OFFICE STATIONERY

Angus Murray Halley, Birmingham, England, assignor to James Halley & Sons Limited, Stafford, England

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4 Claims. (Cl. 118—2)

This invention has reference to mechanism for use in the assembly of office stationery and relates particularly to mechanism for preparing and assembling collated packs of the following kinds: (a) a series of superposed sheets of paper gummed together along one edge and perforated adjacent the gumming to admit of individual sheets being detached; (b) a series of sheets of paper as in (a) provided with interposed sheets of detachable carbon paper and (c) a series of sheets as in (b) wherein the carbon sheets are imperforate.

It is the object of the present invention to provide a mechanism which will automatically perforate and gum selected sheets being fed thereto and thus admit of the assembly of the sheets by an unskilled operator. A further object of the present invention is to provide a method of securing the sheets together which will admit of them being accurately "knocked-up" before being finally secured.

The invention consists of a mechanism for use in the preparation and assembly of office stationery of the kind referred to, characterised in that the perforating and gumming mechanisms are brought into operation on selected sheets through the controlling agency of a photoelectric cell.

A preferred embodiment of the present invention will now be described with particular reference to the accompanying drawings in which:

Figure 1 is a side elevation of a mechanism in accordance with the present invention, and

Figure 2 is a plan view of the mechanism for operating the elevating means.

The paper is fed manually to the machine as single sheets which are successively placed upon a table 3 provided with stops which ensure the correct location of the sheet upon the table. The table 3 is capable of horizontal reciprocal motion on guides and is spring loaded towards the feeding position in which position it is shown in Figure 1. The reciprocations are imparted to the table by means of a bell crank lever 4 pivoted on the frame of the machine at 5 and one arm whereof is pivotally connected to the table 3 at 6 whilst the other arm carries a roller 7 which co-operates with a positively rotated cam 8. The cam 8 is furnished with one dwell which admits of the table 3 assuming its feeding position, shown in Figure 1, once during a cycle corresponding to one complete revolution of the cam shaft on which the cam 8 is mounted. If a sheet of paper is correctly located on the table 3 then when the table 3 is reciprocated to the feeding position shown in Figure 1 the edge of the sheet is presented to and gripped between draw rollers rotatably mounted upon an axis 9 and resting upon a feed cylinder 10 which has a highly polished peripheral surface. Disposed above the cylinder 10 is a light source and associated photo-electric cell, which are diagrammatically illustrated as a unit at 11 and are together capable of adjustment parallel to the axes of the cylinder 10 to admit of the point of impingement of the light ray on to the cylinder being adjusted so as to be interrupted by the margins of sheets of paper of selected widths being fed over the rollers 12. The photo-electric cell of the unit 11 is connected in a known electric circuit to solenoids 12 and 13 in such a manner that when the light ray is interrupted by a sheet of paper the solenoids 12 and 13 are energised to cause the armatures 14 and 15 thereof respectively to assume the positions shown in Figure 1. The purpose of the solenoid 13 will be described hereinafter but the energising of the solenoid 12 rocks the bell crank lever 16 about a fixed pivot 17 since

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the one arm of the bell crank lever 16 has engagement with the armature 14. The other arm of the bell crank lever 16 has engagement with an arm of a bell crank lever 18 having a spring loading 19 and pivoted about the axis 9. The other arm of this lever 18 carries a known form of perforating wheel 20, which, when the solenoid 12 is energised, is forced into contact with a hardened cylinder 21 having a highly polished light reflecting periphery. Disposed above the cylinder 21 is a light source and associated photo-electric cell which are together diagrammatically illustrated as a unit at 22 and which are adjustable together with the unit 11 parallel to the axes of the cylinders 10 and 21. The light beam emitted by the unit 22 is designed to strike the surface of the cylinder 21 in alignment with the point of impingement of the light ray emitted by the unit 11 on the cylinder 10 as measured in the direction of traverse of the paper. The purpose of the second light source and associated photo-electric cell unit 22 is to ensure that the perforating mechanism controlled by the solenoid 12 is not rendered inoperative until the paper has been traversed completely from beneath the perforating wheel 20 and to this end the photo-electric cell in the unit 22 is connected in a known electrical circuit to the solenoid 12 to ensure that the solenoid 12 is not de-energised until both photo-electric cells in the units 11 and 22 are receiving light from their associated light sources.

It will be understood that if a sheet of paper is fed through the mechanism which is shorter transversely relative to its direction of travel than that for which the units 11 and 22 have been adjusted, then it will not interrupt the light rays emitted therefrom and will not be perforated. This feature admits of stationery being formed wherein selected sheets, such as carbon papers, remain imperforate provided they are shorter transversely to their direction of traverse than the other sheets for which the mechanism is adjusted.

As a sheet of paper passes from the perforating station it is traversed horizontally over a roller 23 on to a cylinder 24, which has a highly polished surface adapted to receive and reflect the light rays emitted from a light source disposed vertically above it, on to an associated photo-electric cell. This light source and associated photo-electric cell is diagrammatically illustrated as a unit at 25 and the photo-electric cell is connected in a known electrical circuit to a solenoid 26 in such a manner that when the light ray impinging on to the cylinder 24 is interrupted by a sheet of paper the solenoid 26 is energised and the armature 27 thereof assumes the position shown in Figure 1. The armature 27 is pivotally connected to the lever 28 which carries an adhesive box 29 and an adhesive applying wheel 30 and is pivoted on the frame of the mechanism at 31, the lever 28 being urged towards a position in which the wheel 30 is removed from contact with the cylinder 24 by means of a spring 32.

Advantageously the adhesive used is a thermo-setting plastic adhesive which when dry will admit of the sheets being accurately "knocked up" before being removed and secured together in a heated clamp. It will be appreciated that it is essential that no adhesive should be applied to the cylinder 24 and to this end the light source and associated photo-electric cell 25 is so positioned that the wheel 30 is brought into contact with the sheet slightly inside the leading edge thereof and the circuit to the solenoid 26 is broken slightly before the following edge reaches the wheel 30 by the interruption of the light rays emitted from another light source to another photo-electric cell. This last mentioned light source and associated photo-electric cell is diagrammatically illustrated as a unit at 33, which is adjustable parallel to the direction of traverse of the sheets of paper to accord with various widths of paper in their direction of travel, and the light is reflected from a mirror (not shown) which extends beneath the path of the sheets for a distance equivalent to the adjustment permitted to the unit 33.

It will be understood that since the adhesive is applied to the upper surface of the sheets it is essential that the first sheet of each series to form a set should not have adhesive applied thereto. This purpose is achieved by a counter operated by the solenoid 13 in a manner which will now be described.

The armature 15 of the solenoid 13 is pivoted at 34 to the one arm of a two-armed lever 35 which is pivoted on the frame at 36 and is urged towards the inoperative position by means of a spring 37. The other arm of the lever 35 has an arcuate face 38 upon which rests a protuberance on a detent 39 pivoted at the one end of a double-armed lever 40 pivoted on the frame at 41 and carrying at its opposite end a roller 42 which is spring urged into contact with a cam 43. The detent 39 co-operates with the teeth of a ratchet wheel 44 rotatable in one direction about an axis 45. When the solenoid 13 is de-energised the detent 39 rests upon the arcuate face 38 out of contact with the teeth 46 of the ratchet wheel 44. However, when the solenoid 13 is energised, as obtains when the light ray emitted from the unit 11 is interrupted, the detent is moved upwardly into engagement with the teeth 46 of the ratchet wheel 44 so that a rotation of the cam 43 through rocking the lever 40 rotates the ratchet wheel 44 one step per cycle. Rotatable with the ratchet wheel 44 is a disc 47 around the periphery whereof are a plurality of equally spaced protuberances 48 whilst urged by a spring 49 into contact with the periphery of this disc 47 is an adjustable stud 50 carried by the one arm of a double-armed lever 51 pivoted on the frame of the mechanism at 52. The other arm of this lever 51 is adapted to operate a microswitch 53 when a protuberance 48 is in contact with the stud 50 so as to break the circuit to the solenoid 26 and maintain the adhesive applying mechanism out of operation so long as the microswitch is operated. It will, therefore, be seen that by providing a number of interchangeable discs 47 and/or ratchet wheels 44 having different numbers of protuberances and/or teeth respectively the adhesive applying mechanism can be maintained inoperative after any predetermined number of sheets have been fed through the mechanism.

The sheets are traversed through the machine on tapes passing around the cylinder 10, over cylinder 21, roller 23 and cylinder 24 and around rollers 54 and 55 and feed the sheets against a stop 56 which is adjustable in a direction parallel to the direction of traverse of the sheets so as to admit of the correct location of a sheet of paper between the lower coils of four intermittently rotatable helices 57. These helices are arranged to make one complete revolution in half a machine cycle and to remain at rest for half a machine cycle and to this end each helix is supported upon a base 58 to which is secured a known form of free wheel clutch 59 having a toothed outer driving member engaging with one of a pair of rack bars 60. The rack bars 60 are adapted to be reciprocated in a horizontal plane by means of a connecting rod 61 connected to a crank disc 62. The sheets of paper are thus supported at their edges upon the coils of the helices which are intermittently rotated so as to traverse the sheets vertically upwards, the sheets being separated in the helices by a distance equal to the pitch thereof and being maintained from horizontal movement by the stops 56, which extend upwardly for at least the height of the helices, until the sheets are delivered from the helices at the top as a superimposed stack from whence they can be manually removed to be secured together in a heated clamp. The timing of the mechanism is so arranged that the thermo-setting plastic adhesive will have dried by the time the sheets are delivered into the stack so that before being placed into the heated clamp they can be accurately knocked up.

The cylinder 10 is furnished at one end with a pinion 63 exterior to the frame of the mechanism which pinion is in mesh with a pinion 64 which is adapted to be positively driven. This pinion 64 is also in mesh with a pinion 65 connected to the cylinder 21, with a pinion 66 connected to the roller 23, with a pinion 67 connected to the cylinder 24 and with a pinion 68 mounted on the cam shaft carrying the cams 8 and 43. The pinion 65 meshes with a pinion 69 connected to the perforating

wheel 20 and the pinion 67 meshes with a pinion 70 connected to the adhesive applying wheel 30, this pinion 70 meshing with a pinion 71 in turn meshing with pinion 72 which are connected to rollers for transferring the adhesive from the box 29 to the wheel 30.

What I claim is:

1. Mechanism for selectively gumming margins of sheets of stationery for assembly into packs, comprising feeding means for successively advancing sheets which are of relatively different widths in a direction transversely of their direction of advance, gumming mechanism positioned in the path of the lateral margins of the relatively wider sheets to apply gum thereto, and photo-electrically controlled means positioned to respond to the presentation thereto of lateral margins of the relatively wider sheets but non-responsive to the relatively narrower sheets for controlling selectively the operation of the gumming mechanism according to the relative widths of the sheets.

2. Mechanism as defined in claim 1, wherein said photo-electrically controlled means comprises a pair of photo-electric units spaced in the direction of advance of the sheets to cooperate respectively with the leading and following edges of the relatively wider sheets to control the commencement and cessation of the operation of said gumming mechanism.

3. Mechanism for selectively gumming sheets of stationery for assembly into packs, comprising feeding means for advancing successively sheets which are of relatively different widths in a direction transversely of their direction of advance, gumming mechanism including a cylinder mounted for passage of the sheets thereover and a gum applying member positioned in the path of the lateral margins of the relatively wider sheets and movable to and from operative relation therewith, means including a pair of photo-electric cells spaced apart in the direction of advance of the sheets and positioned to cooperate with lateral margins of the relatively wider sheets at points spaced in the direction of advance of the sheets for moving the gum applying member toward said cylinder to render the gum applying member operative upon the margins of the wider sheets, one of said photo-electric cells being positioned to cooperate with the leading edges of the wider sheets to render the gum applying member operative on the lateral margins thereof inside of their leading edges, and the other photo-electric cell being positioned to render the gum applying member inoperative upon the margins of the wider sheets before the following edges thereof reach the gumming mechanism.

4. Mechanism for preparing sheets of stationery of relatively different widths for assembly into packs, comprising feeding means for successively advancing sheets which are of relatively different widths in a direction laterally of their direction of advance, gumming mechanism including a cylinder positioned for the passage of the sheets thereover and a gum applying member movable to and from operative relation with said cylinder and operatively positioned in the path of the lateral margins of the relatively wider sheets, photo-electric means positioned to cooperate with the margins of the relatively wider sheets for rendering the gum applying member operative thereon and for rendering the gum applying member inoperative relatively to said cylinder during passage of the relatively narrower sheets, and a counter for rendering the gumming mechanism inoperative after a predetermined number of relatively wider sheets have been fed past the gumming mechanism.

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