

Oct. 22, 1968

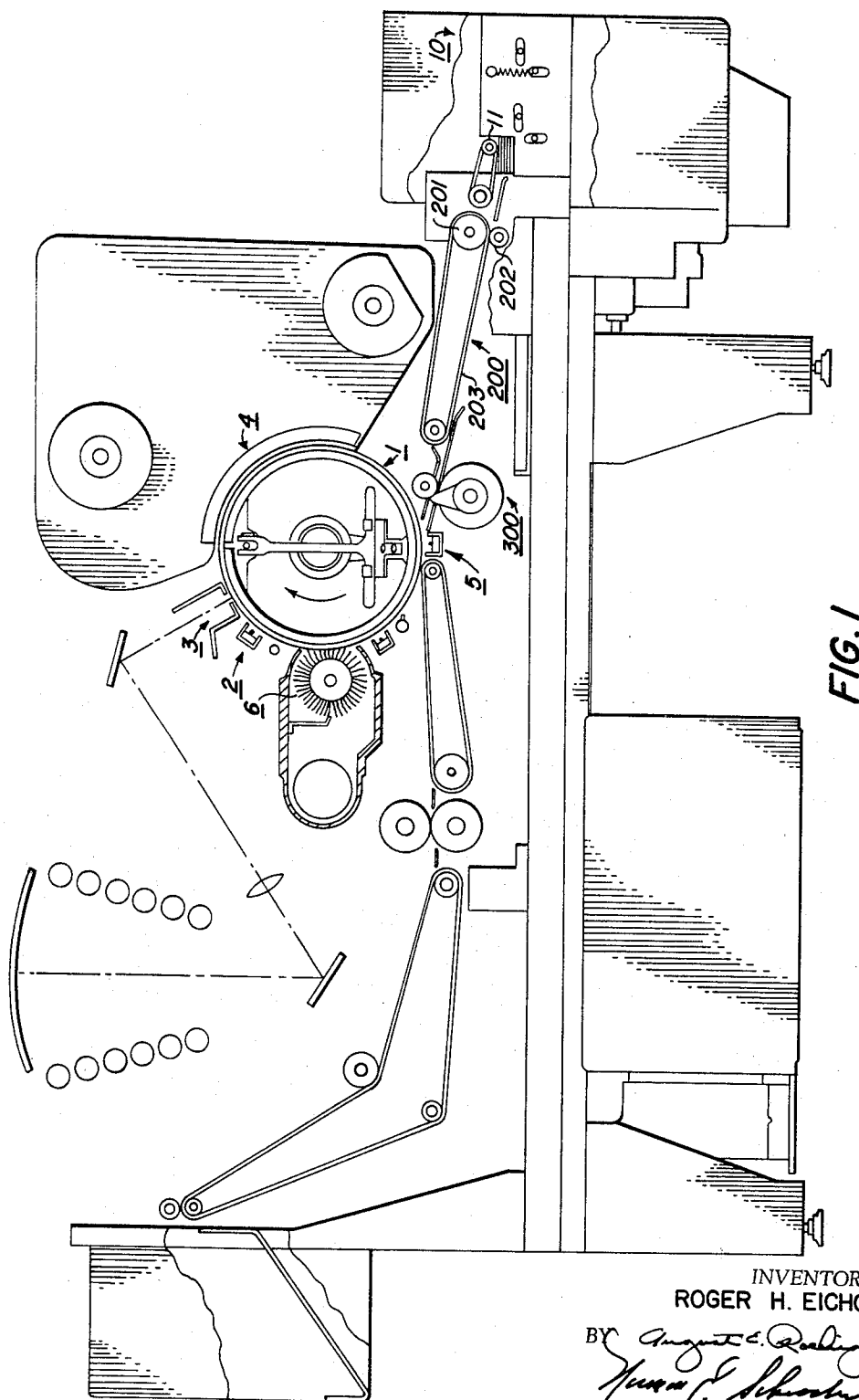
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3,406,964

ADJUSTABLE PACK HOLDER

Filed Oct. 31, 1966

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

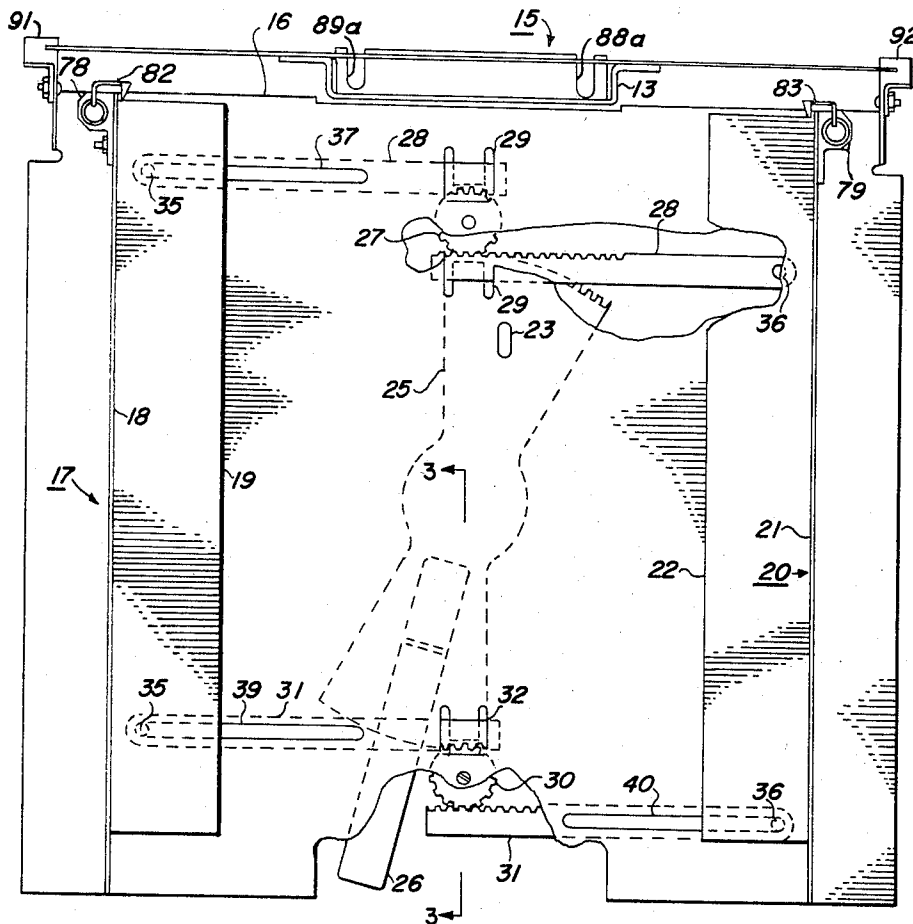


FIG. 2

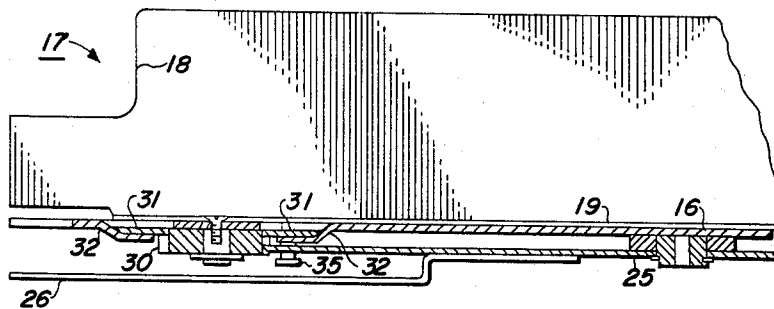


FIG. 3

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3 Sheets-Sheet. 3

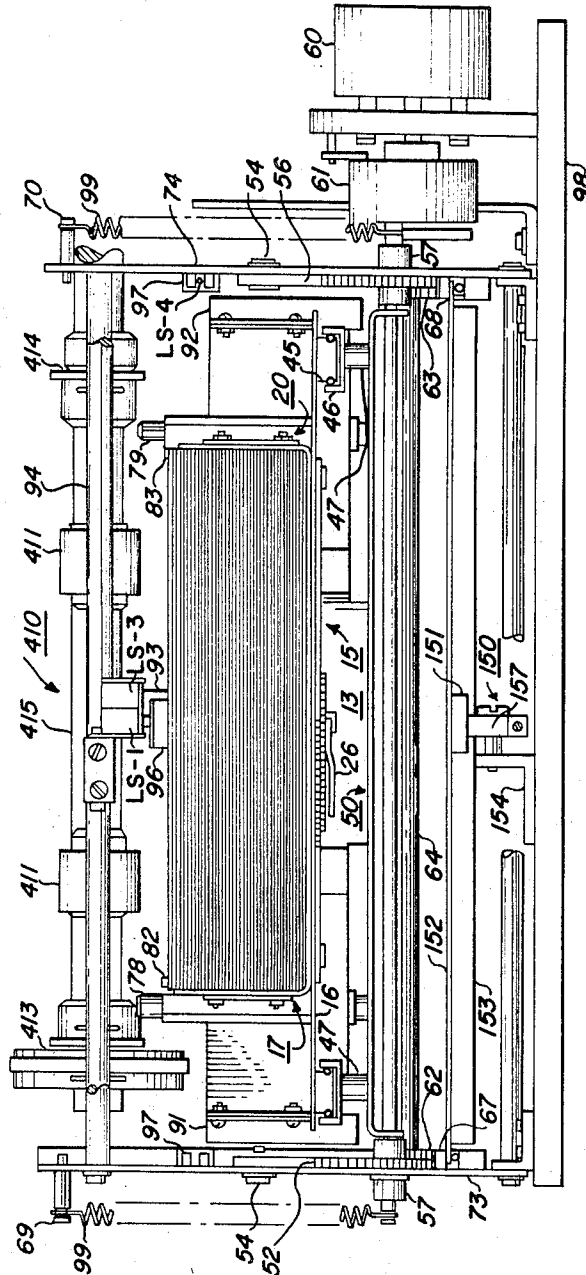


FIG. 4

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ADJUSTABLE PACK HOLDER

Roger H. Eichorn, Webster, N.Y., assignor to Xerox Corporation, Rochester, N.Y., a corporation of New York
Filed Oct. 31, 1966, Ser. No. 590,596
3 Claims. (Cl. 271-61)

ABSTRACT OF THE DISCLOSURE

A pack holder for supporting a stack of sheet material to be fed therefrom. The pack holder is adjustable through the equidistant sliding of parallel guide members. The guide members are mounted on pairs of gear racks. Pinion gears operatively associated with the gear racks rotate to slide the gear racks and the guide members. Rotation of the pinion gears is effected through a gear portion rotatably secured to the pack holder intermediate the pinion gears. A handle on the gear portion is used to rotate the gear portion and consequently adjust the guide members.

This invention relates to paper handling and, in particular, to an adjustable paper tray for holding a quantity of sheet material.

More specifically, this invention relates to a self-centering adjustable paper tray capable of rapid adjustment to facilitate the substitution of quantities of sheet material of various widths.

This invention is particularly well adapted to be used in cooperation with a pack advancer for seriatim feeding of sheet material and especially with the pack advancer disclosed in copending application, Ser. No. 518,138, filed Jan. 3, 1966, in the name of Roger H. Eichorn, and reference is specifically made to the disclosure contained therein.

It is, therefore, an object of this invention to improve sheet material pack holders.

Another object of this invention is to improve paper stack holders by adapting side guides for equidistant parallel movement so that sheet material of various sizes may be accommodated at various positions in the pack holder.

A further object of this invention is to improve paper trays by adapting the side guides for self-entering movement so that sheet material of various sizes may be accommodated in the pack holder and positioned in cooperative relationship with a sheet forwarding mechanism.

These and other objects are attained in accordance with the present invention wherein there is provided an adjustable pack holder comprising a platform with a pair of side guides supported thereon, each side guide having a pair of gear racks secured thereto and each meshing with a pinion gear secured for rotation to the base of the pack holder. Movement of the side guides is effectuated by means of a gear sector rotatably secured to the base of the pack holder and cooperating with the pinions. A handle portion is secured to the sector for manually rotating the gear sector and thereby causing rapid equidistant self-centering movement of the side guides.

Further objects of this invention, together with additional features contributing thereto and advantages accruing therefrom, will be apparent from the following description of an embodiment of the invention when read in conjunction with the accompanying drawings, wherein:

FIG. 1 is a front elevation view of an automatic xerographic reproducing machine utilizing an embodiment of this invention;

FIG. 2 is a top elevation view of one embodiment of the invention;

FIG. 3 is a section view of FIG. 2 taken along line

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3-3 to better illustrate the mechanism for moving the side guides;

FIG. 4 is a rear elevation of the subject invention being utilized in a pack advancer mechanism.

Referring now to the drawings, there is shown in FIG. 1 an embodiment of the subject invention in a suitable environment such as an automatic xerographic reproducing machine. This machine comprises a plate 1 including a photoconductive layer or light-receiving surface on a conductive backing journaled in a frame to rotate in the direction indicated by the arrow to cause the plate surface sequentially to pass a plurality of xerographic processing stations.

For the purpose of the present disclosure the several xerographic processing stations in the path of movement of the plate surface may be described functionally, as follows:

A charging station 2 at which a uniform electrostatic charge is deposited on or in the photoconductive layer;

An exposure station 3 at which a light or radiation pattern of copy to be reproduced is projected on the plate surface to dissipate the charge in exposed areas thereof and thereby form a latent electrostatic image of the copy to be reproduced;

A developing station 4 at which xerographic developing material including toner particles having an electrostatic charge opposite to that of the electrostatic latent image are cascaded over the plate surface, whereby the toner particles adhere to the electrostatic latent image to form a xerographic powder image in the configuration of the copy being reproduced;

A transfer station 5 at which the xerographic powder image is electrostatically transferred from the plate surface to a transfer or support material; and

A drum cleaning and discharge station 6 at which the plate surface is brushed to removed residual toner particles remaining thereon after image transfer, and at which the plate surface is exposed to a relatively bright light source to effect substantially complete discharge of any residual electrostatic charge remaining thereon.

It is felt that the preceding description of the xerographic process is sufficient for better understanding of the disclosure of this invention.

Referring now to FIGS. 2-4 of the drawings, there is shown a preferred embodiment of a paper pack holder mechanism 20 constructed in accordance with the invention.

An apparatus for feeding sheets of support material to the xerographic drum 1 in timed relation to the appearance of a developed image thereon is shown in FIG. 4 by the general reference numeral 410, this sheet feed means comprising driven rollers 411 secured upon a shaft 412 journaled in bearings mounted in left and right hand arms 413 and 414, respectively, adapted for accurate movement about drive shaft 415. The drive shaft 415 is driven by means of a sheet feed drive mechanism not shown. The sheet feed mechanism may be of the type disclosed in R. H. Eichorn et al. Patent No. 3,099,943 and reference is made thereto for the details disclosed therein. However, it is to be understood that this invention is not to be limited thereto, but may be used in cooperation with various sheet feed devices, the embodiment shown being illustrative only.

As shown in FIG. 1 a pair of feed rollers 201 and 202 driven by suitable means are journaled in cooperative relation to forward a sheet of support material advanced into the bite of the two rollers by an appropriate sheet feed mechanism such as indicated by reference numeral 410.

A supply of cut sheet transfer material 11, typically sheets of paper or the like, to be fed one at a time to the

feed rollers 201 and 202, is held in the paper tray 15 slidably positionable from the side of the mechanism between frame plates 73 and 74.

The paper tray 15 includes a base comprising three sections; a stationary base member 16, a left hand angle member 17 and a right hand angle member 20. The angle members 17 and 20 are each formed with upright sheet guide portions 18 and 21 and lateral portions 19 and 22, respectively, and are positioned with their upright guide portions parallel to the sides of the base member 16 and their lateral portions extending in a plane parallel to the base member 16.

The angle members 17 and 20 are actuable toward and away from each other by a linkage system mounted below the base member 16. As shown in FIGS. 2 and 3, the base member 16 is in a plane parallel with that of left and right lateral portions 19 and 22. Immediately below the base member 16 and in the approximate center thereof is a gear portion 25 rotatably mounted as by a pivot pin appropriately secured to the bottom of base member 16. Two pinion gears, 27 and 30, are rotatably mounted on the bottom of the base member 16 in cooperative relation with the gear portion 25 whereby rotation of the gear portion will effect rotation of the two pinion gears 27 and 30. A complementary pair of gear racks 28 and 31, slidably supported by portions 29 and 32, respectively, of the base member 16 are provided in operative relation to pinion gears 27 and 30 whereby rotation of these gears will effect movement of the angle members 17 and 20 by means of pins 35 and 36 secured through rack pairs 28 and 31 to the lateral portions 19 and 22 of the angle members thereby adjusting the supply holder to various sizes of paper support material.

In order to actuate the linkage thus far described, the gear portion 25 is provided with a manually actuable handle 26 which is secured as by welding to the gear portion 25. Movement of the handle 26 in a counterclockwise direction, as seen in FIG. 2, will move the angle members 17 and 20 toward each other. Movement of the angle members 17 and 20 will be simultaneous and equal to maintain the paper supply at a center position.

During operation of the xerographic apparatus, a stack of support material sheets is placed on the tray 15 and the handle 26 operated to bring the angle members 17 and 20 into contact with the adjacent edges of the sheets. This will insure that the stack is centrally located within the tray in proper alignment with the paper feed rollers 410. In order to remove the stack, or to replace sheets, the handle 26 is rotated in a clockwise direction, as seen in FIG. 2, which results in the angle members 17 and 20 being moved away from the center of the stack. The limit of travel of the angle members 17 and 20 will be determined by the length of the slots 37, 38, 39 and 40.

The tray 15 comprising the base member 16, the angle members 17 and 20, and the adjusting mechanism is mounted for horizontal movement as a unit toward and away from the sheet feed rollers 201 and 202. To this end, as shown in FIG. 4, the base member 16 is secured to the inner races 43 and 45, denoting left and right side, of a commercial type file cabinet drawer slide. The outer races 44 and 46 for the slides are attached to spacers 47 which are mounted beneath the base member and secured to an elevating table 50. Each of the outer races 44 and 46 is secured by suitable means to the spacers 47 on the elevating table 50 and serves to support the base member 16 and linkage system relative to the elevating table 50. Suitable ball bearings mounted between the races 43 and 44, and 45 and 46, permits sliding action between the tray 15 and the elevating table 50 to allow horizontal movement of the tray relative to the elevating table to facilitate loading of sheet material. A suitable stop 13 is connected to the front of the base member 16 to insure correct positioning of the tray 15 after loading and upon repositioning in the apparatus.

The tray 15 is also mounted for vertical movement, and

to this end the elevating table 50 is provided with a suitable elevating mechanism which is disclosed in the above referenced copending application and provides a means for maintaining the stack of sheet material in the paper tray at a proper level for seriatim feeding.

In feeding sheets from the stack one at a time, as the topmost sheet is advanced forward, the movement of the topmost sheet will tend to advance the second sheet. In order to insure separation of the topmost sheet only from the stack, there are provided at opposite corners of the stack, separating devices 78 and 79 which apply a light restraining force on the forward corners of the topmost sheet and the leading edge of the paper stack. Each of the separating devices comprises a vertically movable plunger freely movable in a tubular element secured to the outside surface of angle members 17 and 20, respectively, and movable therewith.

Each of the plungers has a snubber 82 and 83, respectively secured thereto to be positioned against the leading edge of the stack with the snubber overlying the corner of the topmost sheet. The weight of each of the plungers is imposed on the upper forward corners of the paper stack by means of the snubbers 82 and 83, and the weight of each corner is such that the plungers will follow the level of the stack downwardly as the stack level is lowered. Their weight provides a restraining force which will assist in the feeding of a single sheet of paper when the stack is acted upon by a sheet feed mechanism. The lower ends of the separating devices 78 and 79 extend below the stack of support material and terminate in round ends preferably formed of nylon or Teflon. These ends are adapted to ride upon incline plates located below each separating device.

As the paper tray 15 is removed from its paper feeding position, the separating devices 78 and 79 will engage the incline plates and be raised where they will remain as the tray is retracted. With the separating devices held in their uppermost position, the snubbers 82 and 83 will be clear of the paper stack thereby permitting the addition or removal of paper sheets from the tray without encountering interference. When the tray is again moved forward into its paper feeding position, the plungers resume their position with the snubbers resting upon the topmost sheet.

Forward progress of the tray to its paper feeding position is determined by a stop plate 13, slidably in guide blocks 91 and 92 connected to the base member 16, engaging a pair of suitable stop bosses, not shown, by means of slots 88a and 89a. The stop plate 13 is slidably engaged in suitable slots of left hand and right hand guide blocks 91 and 92, respectively, secured to upturned portions of base member 16. The stop bosses which engage slots 88a and 89a are mounted on a stop plate secured to the frame plates 73 and 74. Upon repositioning the tray 15 into the elevating mechanism after loading a supply of sheet material, the slots in stop plate 13 engage the stop bosses to insure proper alignment for feeding of the sheet material. As the supply of sheet material is depleted and the tray 15 is elevated, the engagement of the stop plate 13 with the bosses by means of slots 88a and 89a prevents the elevating of the stop plate 13 with the paper tray 15. The stop plate, which is slidably in guide blocks 91 and 92 will, therefore, remain in a proper height relation to the supply of sheet material while the paper tray is elevated. The height of the stop plate 13 is normally below that of the snubbers 82 and 83 which, as previously stated, rest upon the corners of the topmost sheet of the stack. The snubbers 82 and 83 will always occupy a position no lower than the upper edge of the stop plate 13 which must be cleared for a sheet of paper to be fed to the feed rollers 101 and 102.

In operation, as the topmost sheet is advanced by the rollers 411, the leading edge corners of the sheet engage the snubbers 82 and 83 whereupon the sheet will buckle upwardly and inwardly. As shown in FIG. 2, the snub-

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bers are tapered, being formed with an inner edge that is at an acute angle relative to the leading edge to the sheets of paper. As the rollers 411 apply a forward force to the topmost sheet, the forward movement of the corners lags; and as the sheet is continually advanced over the upper edge of the stop portion 13, this lag in cooperation with the angled inner edges of the snubbers, will produce a slight inward sliding movement of the corners of the sheet of paper with consequent buckling of the sheet at its middle section. This buckling action of the topmost sheet insures its separation from the underlying sheets in the stack.

While the invention has been described with reference to the structure disclosed herein, it is not to be confined to the details set forth in this application, but is intended to cover such modifications or changes as may come within the scope of the following claims.

What is claimed is:

1. An adjustable pack holder for retaining a quantity of sheet material including
 - a support plate having a plurality of guide members supported thereby and adapted for lateral movement relative thereto,
 - pairs of gear racks carried by said support plate, each of said pairs of gear racks being secured to one of said guide members, and
 - drive means operatively connected to said gear racks to move said gear racks in a lateral direction relative to said support plate, said drive means including

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a plurality of pinion gears carried by said support plate and adapted to engage said gear racks so that rotational movement of said pinion gears effects equidistant lateral movements of said side guides, said drive means further including

a gear portion rotatably secured to said support plate at a point equidistant from said pinion gears and positioned in cooperative relationship with said pinion gears for the rotation thereof.

2. The apparatus of claim 1 wherein said guide members include a pair of angle members each having a lateral base portion extending in a plane parallel to said support plate and an upright portion extending outwardly from said support plate.

3. The apparatus of claim 2 and further including a handle mounted on said gear portion, said handle being of a length to extend from a region between said pinion gears to a region exterior thereof.

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