

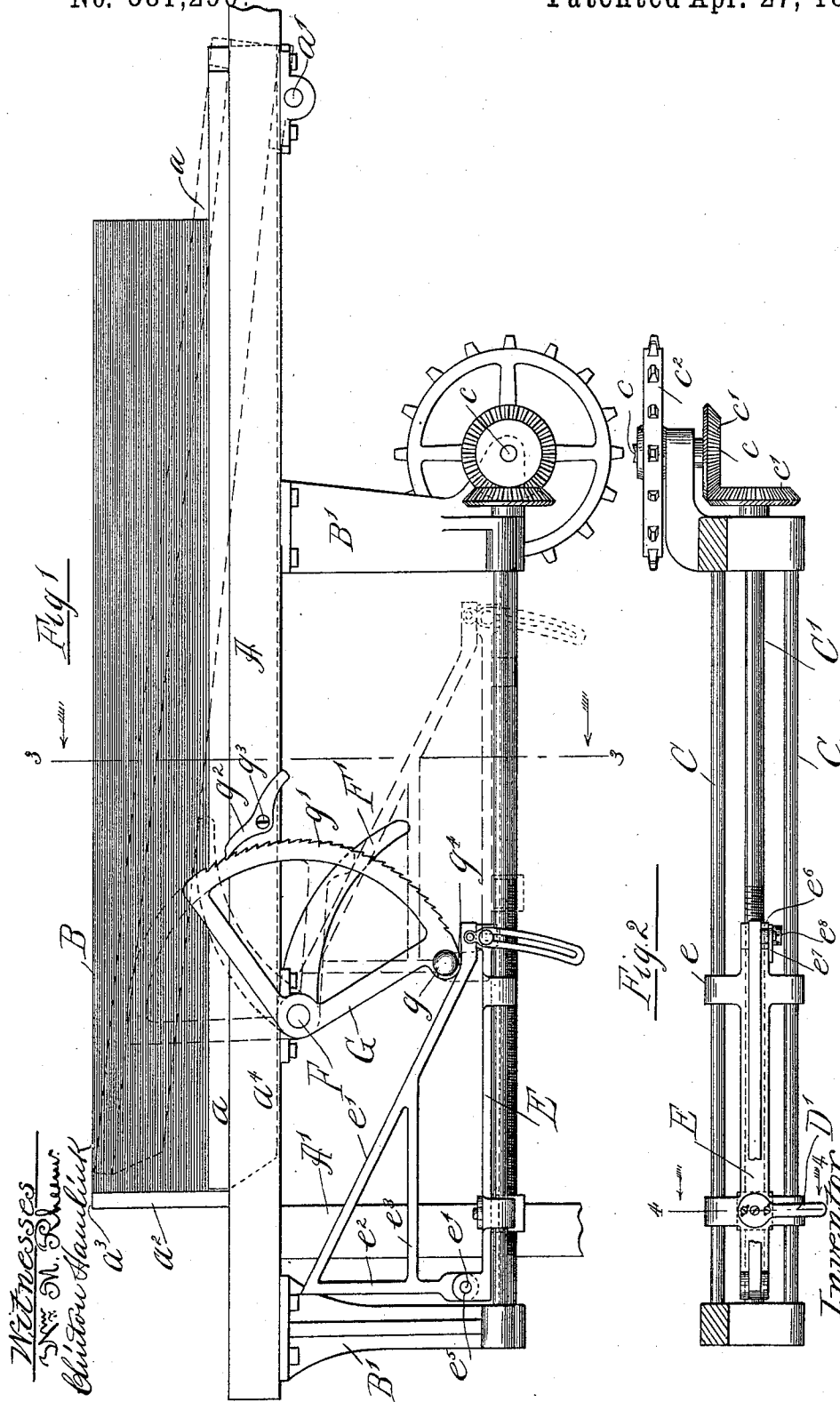
(No Model.)

2 Sheets—Sheet 1.

E. KNAPP.
MECHANICAL MOVEMENT.

No. 581,290.

Patented Apr. 27, 1897.



Witnesses
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Inventor
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By Dayton, Cook & Brown Attys.

(No Model.)

2 Sheets—Sheet 2.

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Fig. 3

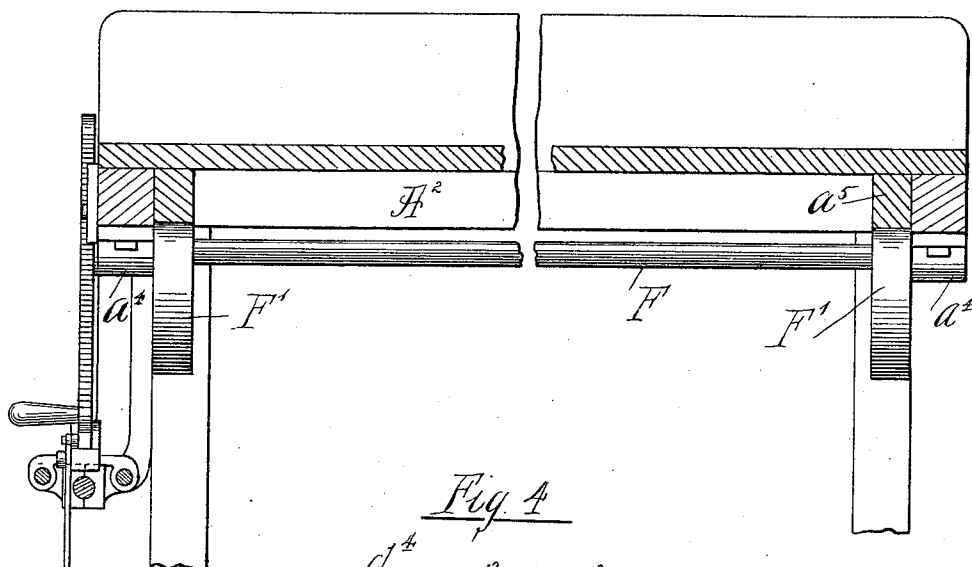


Fig. 4

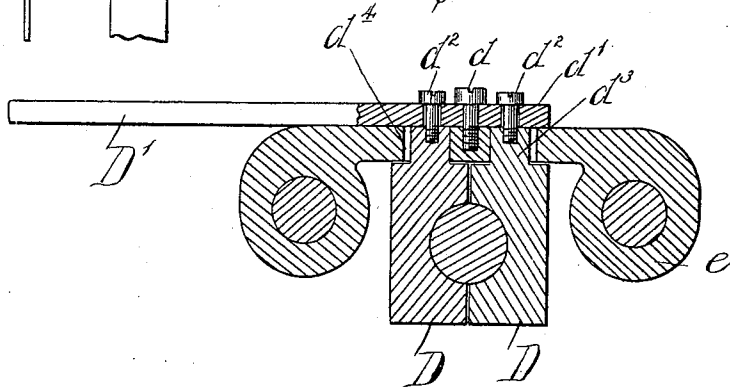
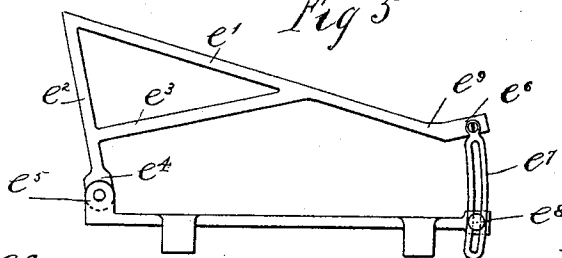


Fig. 5



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UNITED STATES PATENT OFFICE.

EDWARD KNAPP, OF ST. LOUIS, MISSOURI.

MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 581,290, dated April 27, 1897.

Application filed June 17, 1895. Serial No. 553,034. (No model.)

To all whom it may concern:

Be it known that I, EDWARD KNAPP, of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Mechanical Movements; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to a novel mechanical movement which, while herein illustrated and described as being applied to an automatic adjustable lifting device for paper-feeding machines, is designed for general use as a lifting device presenting articles or blanks to the feeding mechanisms of various machines and also to impart a certain predetermined degree of compression to various commodities to prepare or package the same for the market. In this connection the special object of the mechanism is to provide a device which may be adjusted or set with reference to a particular amount of total throw or movement and which thereafter when in operation will lift its load in the same length of time that would be required to lift another load which required a greater amount of movement or throw, so that one and the same mechanism may be adjusted to cause a greater or less movement to a table, platen, or plunger during a given traverse or movement of an actuating-screw or other source of applied power. For example, take a ream of paper comprising four hundred and eighty sheets and assume that to be the unit of measurement. My device would be adjusted with reference thereto so that the total longitudinal movement of the traveling wedge hereinafter to be mentioned will be precisely sufficient to cause the lifting portion of my device to raise the lowermost sheet of the four hundred and eighty sheets comprising the ream of paper to the desired height. With a ream of a given thickness as the unit of measurement it would be found desirable to use the same movement of the traveling wedge upon a ream of paper having less total thickness than the ream first mentioned. In such event my device is capable of such adjustment as to enable the paper to be fed as desired. In other words, my device is such

as to enable me to compensate for the varying thickness of different qualities of paper, so as to produce precisely the same uniform feed or lift and thus present the sheets of paper successively in a uniform manner to any suitable feeding mechanism.

To this end the invention consists in the matters and things herein shown and described and more particularly pointed out in the appended claims.

In the drawings, Figure 1 illustrates in side elevation a device embodying my invention as applied to the sheet-lifting mechanism of a paper-feeding machine. Fig. 2 represents in plan view a portion of the device, showing the operative mechanism, a portion of the traveling wedge being broken away. Fig. 3 is a transverse vertical sectional view taken upon the line 3 3 of Fig. 1, looking in the direction indicated by the arrows, the sheets of paper being removed from the table of the device. Fig. 4 is an enlarged transverse vertical sectional view taken upon the line 4 4 of Fig. 2, looking in the direction indicated by the arrow. Fig. 5 is a side view of the traveling wedge, illustrating the use of the adjustable guide.

Similar letters of reference indicate like parts throughout the several figures.

Let A represent the side bars of any suitable frame or table, A' legs or supports therefor, and A² transverse or cross bars thereof.

a is a table of any preferred pattern pivotally secured to said frame, as at a', in any desired manner. As shown, it is pivotally secured at its rear end so that its forward end is free to be moved up and down, but obviously it may be so arranged as to move in a vertical instead of in an angular direction.

a² is a suitable guide or stop bar against which the forward ends of sheets of paper B may be placed, and over the top edge a³ thereof the said sheets of paper will be fed by any suitable sheet-feeding mechanism. (Not shown in the drawings.)

Depending from the frame are suitable brackets B' B', carrying at their lower ends apertures constituting supports or bearings for two guide-rods C C and the revoluble shafts C' and c. The shafts C' and c are operatively connected by means of miter-gears c' c' upon the adjacent ends of said shafts,

and motion is communicated thereto by means of a sprocket-wheel c^2 , secured upon the shaft c . In practice power will be transmitted to the sprocket-wheel c^2 from any suitable mechanism. In this instance the sheet-feeding mechanism and said sprocket-wheel will be so geared with reference to said feed mechanism as to cause a desired amount of movement in the sheet-lifting device as compared with the throw or movement of the sheet-feeding device. This, however, not being essential to the understanding of the present invention it has not been thought necessary or desirable to illustrate the sheet-feeding mechanism and its connection with my present invention.

A portion of the shaft C' is exteriorly screw-threaded to any desired pitch, and said screw-threaded portion is engaged by a split nut D . The traveling wedge above referred to consists of the base-plate E , provided with four arms, each having a laterally-depending guide-lug e , through which the guide-rods C C' pass. The upper portion of the wedge comprises an inclined surface or part e' , a vertical bar or arm e^2 , and a brace-arm e^3 . The vertical arm e^2 terminates at its lower end in an apertured lug e^4 , and is pivotally secured to an apertured lug e^5 , extending upwardly from and secured to the rear end of the base-plate E . The forward or lower end of the inclined bar or surface E' of the wedge is outwardly directed to form a horizontal portion e^6 . Pivotaly secured to the margin of the portion e^6 is a slotted segmental guide-piece e^7 , whereby the pivoted upper portion of the wedge may be secured adjustably with relation to the base-plate E thereof by means of the headed screw e^8 , which passes through the end of the guide-piece e^7 and engages the forward end of the base-plate E , the head of the bolt e^8 impinging against the guide e^7 in a familiar manner. The normal position of the two parts is illustrated in Fig. 1, while Fig. 5 shows the parts in an adjusted position. A lever or handle D' is pivotally secured to the base-plate E by means of a bolt or stud d . (Shown more clearly in detail in Fig. 4.) Said lever D' is provided on each side of said bolt d with a vertical slot or aperture therethrough d' , arranged diagonally to a diametrical line passing through the pivot-stud d and said slots, through which bolts d^2 are passed, and which bolts d^2 are rigidly secured at their lower ends to upward extensions d^3 of the split nut D . The upper extensions of said nut D pass through transversely-arranged slots d^4 in the base-plate E of the wedge. By this construction it will be obvious that when the lever D' is moved into the position illustrated in Figs. 2 and 4 of the drawings the halves of the split nut D will be moved toward each other, so that the threaded portions thereof will engage the threaded portion of the shaft C' , and if the said shaft is being rotated the nut D will move in the proper direction along the

shaft C' and carry with it the base-plate E and the said wedge. Upon the other hand, if it be desired to disengage the split nut from the shaft C' this may be accomplished by moving the lever D' to the right hand a proper distance.

Beneath the frame of the device and secured in suitable bearings a' is a transversely-arranged shaft F , upon which is secured one or more lifting-cams F' , which cams will be of such shape and arranged in such manner as to give the desired amount of lift to the table. The table may rest directly upon said cams F' , but, as here shown, it is convenient to use depending bars a^5 , secured to the lower side of the table, and which bars rest directly upon the cams F' .

G is a quadrant or open frame secured upon the end of the shaft F and having a suitable bearing-surface g , which rests normally in the angle formed by the horizontal and inclined portions e^6 e' of the wedge.

The quadrant G is provided with ratchet-teeth g' upon its face, which latter are engaged by a gravity-pawl g^2 , pivotally secured at g^3 to the side bar A of the frame. The pawl and ratchet serve to prevent the quadrant from returning to the former position in case the traveling wedge should be inadvertently removed, and thus the table will be held in proper position.

In embodying my new mechanical movement in a paper-lifting mechanism I have arranged the shape of the arm F' so that it will lift the table the required distance during the time the traveling wedge moves from the position shown in Fig. 1 in full lines to the position shown in dotted lines in said figure, and, as before stated, this movement will preferably be timed by means of the screw-threads on the shaft C' and the power applied to the sprocket-wheel c^2 with reference to the feed of the sheet-feeding device, so that the top of the pile of paper sheets will always register with the top surface a^3 of the guide or stop a^2 . If the ream of paper of four hundred and eighty sheets is placed upon the table, then the movement of the parts will be such that when the traveling wedge assumes the position shown in dotted lines in Fig. 1 the lowermost sheet of said ream will be in the uppermost position ready to be fed off from the table over the edge of stop a^2 .

In order to adjust the device to a ream of paper having less total thickness than the first-mentioned ream, the following will be the method of adjustment: The ream of thinner paper will be first placed upon the table. The screw e^8 will be loosened. The quadrant G will be raised until the uppermost of said sheets of paper of the thinner ream will be in position to be fed over the top of the guide or stop a . The upper portion of the wedge will then be moved upwardly, as indicated in Fig. 5, until the register-mark e^9 thereon registers with the corresponding registering-mark g^4 of the quadrant G , whereupon the screw e^8 will

be tightened and the bar thus secured in said new position. It will be understood, of course, that when this adjustment is made the traveling wedge is back of or to the left-hand side of the device ready for its forward movement over the screw-threaded shaft C'. The sprocket-wheel c² may then be connected with the feeding device, or, if already connected, the lever D' may be so moved as to close the split nut d upon the shaft C', whereupon the traveling wedge will begin to move and finally assume the forward position indicated by the dotted line in Fig. 1. It will move this distance in the same time that it moved before in the first instance referred to, notwithstanding the fact that the lift of the table, by reason of the cam F', will be materially less than that in the first instance, the first ream of paper possibly measuring, say, three and one-half or four inches in height, while the second ream of paper may measure but two and one-half or three inches.

It will thus be noted that the inequality in thickness of a given unit of sheets of paper will be equalized by simply adjusting the upper portion of the traveling wedge by means of the slotted guide-arm e' and the nut e², without altering the mechanism of the device as a whole or readjusting the same with reference to the feeding mechanism or other source of power with which it may be connected.

It will be obvious that instead of applying this traveling adjustable wedge, quadrant, and lifting-arm as a sheet-lifting device for sheet-feeding mechanism it may be variously applied with little or no change of mechanism. I find that great power is exerted upon the cam by the traveling wedge, and I am thus enabled to elevate the table or platen to any desired extent (within limits) by a single traverse of the traveling wedge, exerting greater or less power or causing greater or less movement to the platen or table according to the degree of inclination to which the working surface of the wedge is adjusted, as will be understood; and in the claims appended hereto I desire it to be distinctly understood that I do not limit the application of my mechanical movement to the use referred to nor the construction thereof to the details illustrated. Even in the illustration selected it will be obvious that many modifications may be made. For example, the lifting-cams F' are shown as separate from the segment G and as being secured independently to the shaft F, whereas it will be obvious that the cams F' might be made integral with the segment G.

What I claim as my invention is as follows:

1. A feeding or compressing mechanism comprising a reciprocating wedge adjustable to change the angle of its inclined bearing-surface with relation to the plane of its movement, a movable table or platen actuated thereby, and means for moving the wedge longitudinally in a plane diagonal to its working surface, substantially as described.

2. The mechanical movement described, comprising a suitable frame, a shaft rotatably mounted in said frame and screw-threaded throughout a portion of its length, a longitudinally-traveling wedge or part adapted to be actuated by the screw-threads of said shaft and having its inclined bearing-surface adjustable with respect to the axis of the shaft, a second part or frame movably secured to the main frame and interposed between the load upon the latter and the inclined surface of the traveling wedge or part, whereby upon the rotation of the shaft the traveling wedge will actuate the movable part and in turn move the load as desired.

3. The mechanical movement described, comprising a suitable frame, a shaft rotatably mounted in said frame and screw-threaded throughout a portion of its length, a nut adapted to engage the screw-threaded portion of said shaft, a longitudinally-traveling part or wedge secured to said nut and provided with its inclined bearing-surface adjustable with respect to the axis of said shaft, a second part or frame movably secured to the main frame, adapted to be engaged by the inclined surface of the traveling wedge or part and having a bearing-surface to engage the load, whereby upon the rotation of said shaft the traveling wedge will actuate the movable part or frame and thus move the load as desired, substantially as described.

4. The mechanical movement described, comprising a frame, a rotatable shaft secured to said frame and provided with screw-threads throughout a portion of its length, means for applying power to said shaft to rotate the same, a reciprocating wedge-shaped part having its inclined bearing-surface adjustable with respect to the axis of the shaft, suitable guides on said traveling part and said main frame for directing the course of the movement of said traveling part, a nut secured to said traveling part and adapted to engage the screw-threads upon the said shaft, and a second part or frame movably secured to the main frame, and adapted to engage the inclined surface of the wedge-shaped part as well as the load.

5. The mechanical movement described, comprising a suitable frame, a shaft rotatably mounted in said frame and screw-threaded throughout a portion of its length, a nut adapted to engage the screw-threaded portion of said shaft, a longitudinally-traveling part or wedge secured to said nut, and having its inclined bearing-surface adjustable with respect to the axis of said shaft, a second part or frame movably secured to the main frame, adapted to be engaged by the inclined surface of the traveling wedge or part and having a cam bearing-surface to engage the load, whereby upon the rotation of said shaft the traveling wedge will actuate the movable part or frame and thus move the load as desired, substantially as described.]

6. The combination of a frame, a shaft rotatably secured therein and provided with screw-threads throughout a portion of its length, means for actuating said shaft, a reciprocating wedge-shaped part or frame actuated by said shaft and provided with a bearing-surface inclined with respect to the axis thereof, a second frame movably secured to the main frame and adapted to engage the load, said movable frame being in engagement with the inclined bearing-surface of the reciprocating wedge-shaped frame, and means for varying the angle of inclination of the bearing-surface of the latter.

7. The combination with a frame, of a shaft rotatably secured therein and provided with screw-threads throughout a portion of its length, means for actuating said shaft, a two-part reciprocating wedge-shaped frame actuated by the shaft and provided with a bearing-surface inclined with respect to the axis thereof, a second frame movably secured to the main frame and adapted to engage the load, said last-mentioned frame being also in engagement with the inclined bearing-surface of the reciprocating wedge-shaped frame, and means for varying the angle of inclination of the bearing-surface of the latter consisting of an arm or guide-piece pivotally secured to one part of the traveling wedge and adjustably secured to the other part, substantially as described.

8. The combination of a frame, a shaft rotatably mounted therein and provided with screw-threads on a portion of its length, a reciprocating wedge-shaped frame having its inclined bearing-surface adjustable with respect to the axis of the shaft, a nut secured to said latter frame and adapted to engage the screw-threads of the shaft, a second shaft journaled in the main frame, a quadrant secured on one end of said second shaft and adapted to be engaged by the inclined surface of the wedge-shaped part or frame, and a cam or cams secured to the other end of said second shaft, substantially as described.

9. The combination with a substantially horizontal frame, of a shaft rotatably secured thereto and having screw-threads throughout a portion of its length, means for actuating said shaft, guide-rods parallel with the axis of said shaft, a movable wedge-shaped frame having its inclined bearing-surface adjustable with respect to the axis of said shaft and provided also with depending guide-lugs adapted to engage said guide-rods, a nut secured to said traveling part and adapted to engage the screw-threads on said shaft, and a part movably secured to the main frame in engagement with the inclined surface of the

reciprocating part, and with the load, substantially as described.

10. In a mechanical movement embracing a traveling wedge-shaped part, having its inclined bearing-surface adjustable with relation to its plane of movement and a rotatable shaft for actuating the same, the combination with said part and shaft, of a split or two-part nut secured to said reciprocating part, and means for engaging and disengaging the parts of said nut with the screw-threads of said shaft, comprising a lever pivotally secured to said reciprocating part, slots in said reciprocating part, extensions of the split nut entering said slots, and screw-bolts passing through said lever and engaging said extensions whereby when the lever is moved in one direction the parts of the nut will separate, and when moved in the opposite direction said parts will be brought together, substantially as and for the purpose indicated.

11. The mechanical movement described, comprising a suitable frame, a shaft rotatably mounted in said frame and provided with screw-threads throughout a portion of its length, a traveling wedge-shaped part having its inclined bearing-surface adjustable with respect to the axis of said shaft, a nut secured to said traveling part and adapted to engage the screw-threads of the shaft, a second part or frame pivotally secured to the main frame adapted to actuate the load and in turn be actuated by the traveling wedge-shaped part, ratchet-teeth on said pivoted frame or part, and a pawl upon said main frame adapted to engage said ratchet-teeth, substantially as and for the purpose specified.

12. In a mechanical movement, the combination of a suitable frame provided with a movable table upon which the load rests, a shaft rotatably mounted in said frame and screw-threaded throughout a portion of its length, a traveling wedge-shaped part in engagement with said shaft and having its inclined bearing-surface adjustable with respect to the axis of said shaft, and a movable part interposed between the inclined surface of the traveling part and the movable table, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature, in presence of two witnesses, this 14th day of June, A. D. 1895.

EDWARD KNAPP.

Witnesses:

TAYLOR E. BROWN,
WILLIAM L. HALL.