(No Model.)

E. H. BRIDGMAN.

SLITTER SHAFT FOR PAPER CUTTING MACHINES.

No. 325,812. Patented Sept. 8, 1885.

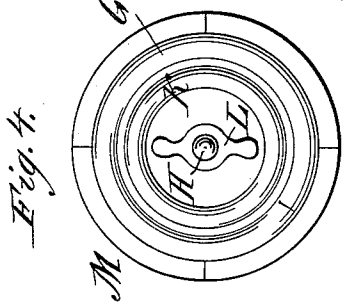


Fig. 4.

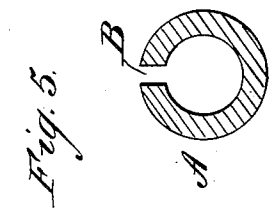


Fig. 5.

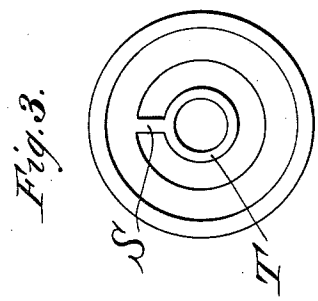


Fig. 3.

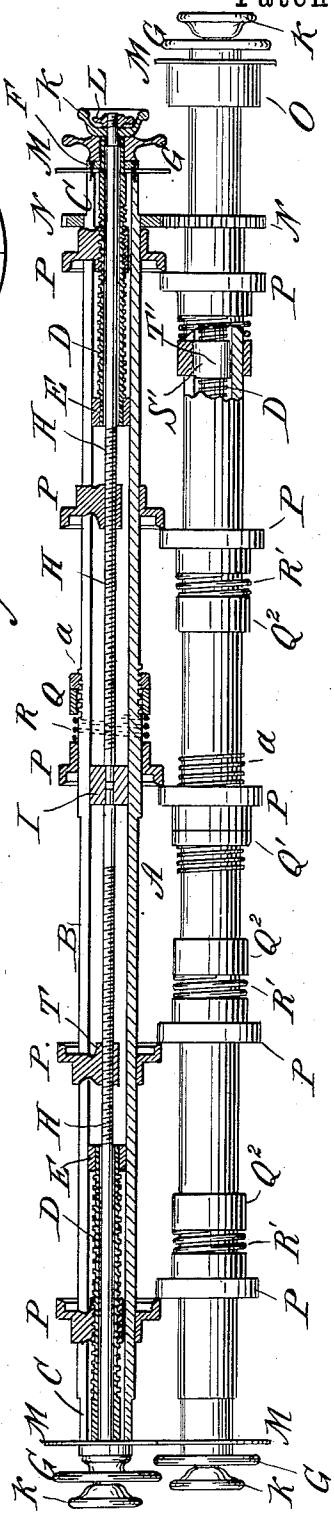


Fig. 1.

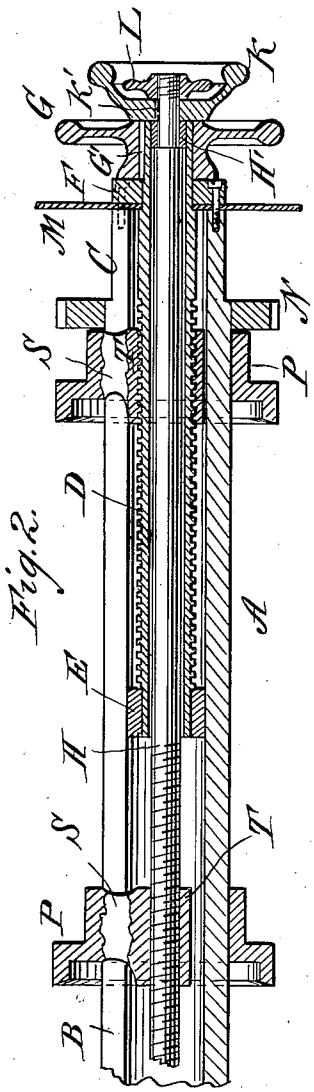


Fig. 2.

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EDWARD H. BRIDGMAN, OF PITTSFIELD, MASSACHUSETTS.

SLITTER-SHAFT FOR PAPER-CUTTING MACHINES.

SPECIFICATION forming part of Letters Patent No. 325,812, dated September 8, 1885.

Application filed April 17, 1884. (No model.)

To all whom it may concern:

Be it known that I, EDWARD H. BRIDGMAN, of Pittsfield, in the county of Berkshire and State of Massachusetts, have invented new and Improved Slitter-Shafts for Paper-Cutting Machines, of which the following is a full, clear, and exact description.

The object of my invention is to provide a new and improved slitter-shaft for paper-cutting machines and for cutting paper into strips of any desired width.

The invention consists in the construction and arrangement of parts, as will be hereinafter fully described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a longitudinal elevation of a pair of my improved slitter-shafts, the upper shaft being shown in longitudinal section. Fig. 2 is an enlarged detail longitudinal section of one end of the upper shaft. Fig. 3 is an end view of one of the cutting-disks. Fig. 4 is an end view of one of the shafts and the wheels for turning it. Fig. 5 is a cross-sectional elevation of the tubular shaft.

Two tubular shafts, A, similar to each other, are mounted to revolve one above the other. Both tubular shafts A are provided with a longitudinal slit extending from end to end, and at each end the shaft A is provided with a neck or bearing, C, on which the tubular shaft can revolve.

In each end of the tubular shaft A a hollow screw, D, is held, which is journaled in a block or collar, E, held within the shaft a short distance from the end and in an end piece or collar, F, the screw being journaled in such a manner that it can revolve on its longitudinal axis, but cannot move in the direction of its length.

On the outer end of the hollow screw D a hand-wheel, G, is mounted, and is held by a spline or key, G′, in such a manner that the screw D must revolve with the said hand-wheel. A spindle, H, which is screw-threaded throughout its entire length, or part of its length, passes longitudinally through each screw D, and has its outer end journaled in a collar, H′, held within the outer end of the screw D, and the inner ends of the two spindles H extend to and are journaled in a block, I, held in the middle of the tubular shaft.

On the outer end of each spindle H a hand-wheel, K, is held by a spline, K′, in such a manner that the said spindle must revolve with the hand-wheel K. The extreme outer end of each spindle H is screw-threaded, and on the said screw-threaded part a jam-nut, L, is held, which is provided with suitable handles for turning it.

Between the end plate, F, and the end of the tube A a dial or disk, M, is held, which has regular subdivisions on its outer surface. On each shaft A a cog-wheel, N, is mounted near the outer end, the said cog-wheels engaging with each other, so that the shafts revolve in opposite directions, and on the end of the bottom shaft A a belt-pulley, O, is mounted, or other means are provided for transmitting motion to the lower shaft. A series of cutter rings or disks, P, are mounted on the upper and lower shafts, A, in such a manner that the edges of each pair of cutter disks or rings on the upper and lower shafts face each other and work against each other. The middle cutter-disk P on the upper shaft has a smooth bore, and is held to slide on the upper shaft A. The upper shaft is provided at its middle and on its outer surface with screw-threads *a*, on which a collar or nut, Q, is screwed, and between the inner edges of the collar Q and the adjoining cutter-disk P a spiral spring, R, is coiled around the upper shaft A, the tension of which spring can be adjusted by screwing the nut or collar Q a greater or less distance toward or from the adjoining edge of the cutter P. The other cutters P are provided with wings or arms S, extending through the slot B of the shaft A, and provided on the inner end with a nut, T, through which the spindle H is screwed, so that if the said spindle H is turned on its longitudinal axis it will move the corresponding cutter-disks toward or from the ends of the shaft. The end cutters P are also provided with the wings S, and with nuts T; but the nuts are of such size that the tubular screw D can be screwed through them. The lower shaft is also provided at its center with a screw-thread, *a*, on which a nut, Q′, is screwed, the inner edge of which nut rests against the adjoining edge of the middle cutter-disk P on the lower shaft,

which cutter-disk is also screwed on the screw-threaded part of the bottom shaft. By turning the said cutter-disk P it can be shifted a greater or less distance toward either end of the shaft, and it is locked in place by the nut Q'. The other cutter-disks P on the lower shaft are mounted loosely on the shaft, and between the inner end edge of each cutter—that is, the end opposite the cutting-edge—and a corresponding collar, Q^2, a spring, R', is coiled around the shaft, which spring acts upon the loose cutter-disk P. Each collar Q^2 is provided with a wing, S', extending longitudinally through the slot B of the lower shaft and terminating in its inner end with a nut, T', through which the spindle H and the screw D are screwed.

The operation is as follows: If the sheet of paper is passed in between the two shafts, the end cutter disks or blades P trim off the edges of the sheet, and the intermediate cutter disks or blades cut the sheet into strips of the desired width, according to the adjustment of the blades or cutter-disks. The end disks P must also be adjusted according to the width of the sheet of paper. The cutter-disks on the lower shaft are pressed by springs against the cutter-disks of the upper shaft, but the central cutter-disk of the upper shaft is pressed by a spring against the central cutter-disk of the lower shaft. By turning the hand-wheels K the screw-spindles H in the upper shaft are revolved on their longitudinal axes, and those cutter-disks between the central and end cutter-disks are moved in the direction of the shaft, and can thus be adjusted according to the desired width of the strips. The end cutter disks are adjusted by turning the hand-wheels G, which turn the screws D. The central disk P on the upper shaft can only be adjusted after the central disk on the lower shaft has been adjusted; and the adjustment of the said central disk P on the upper shaft is accomplished by turning the nut Q in one direction or the other. The end cutter disks or blades on the lower shaft and the cutter disks or blades between the central cutter disks and the end cutter-disks of the lower shaft must be adjusted after the corresponding disks on the upper shaft have been adjusted. This is accomplished by turning the hand-wheels G and K, whereby the nuts Q^2 will be moved in the direction of the length of the shaft until the edges of the cutter disks or blades are pressed against the edges of the corresponding cutter disks or blades on the upper shaft.

It is immaterial on which shaft those cutter-disks acted upon by screws are mounted; but it is evident that of each pair of cutter-disks one disk must be held rigidly after adjustment, and the other must be acted upon by a spring, so that the cutting-edges of the two disks will always be pressed against each other, thus causing an automatic sharpening of the disks, whereby a clean and sharp cut is obtained.

The dials M facilitate the adjustment of the cutter-disks, as the revolutions of the hand-wheels can be regulated according to the subdivisions on the said dials.

The jam or lock nut L is drawn taut after the parts have been adjusted, for the purpose of locking the several parts in place securely.

I do not desire to claim the journal-bearings in this application, but reserve the right to make such the subject-matter of a separate application.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, with a hollow shaft having a longitudinal slot, of cutter-disks mounted on the shaft, and provided with lugs or wings projecting through the slot, and having nuts on the inner ends of the wings, and of screws passed longitudinally through the shaft and through the said nuts, substantially as herein shown and described.

2. The combination, with a tubular shaft, of cutter-disks mounted on the same, and screws passed longitudinally through the tubular shaft and adapted to move the cutter-disks, substantially as herein shown and described.

3. The combination, with a tubular shaft, of cutter-disks mounted on the same, nuts or collars on the said shaft, and of screws extending longitudinally through the shaft and engaging with the nuts, substantially as herein shown and described.

4. The combination, with a hollow shaft, of cutter-disks mounted on the same, a tubular screw held within the hollow shaft and adapted to act on one of the cutter-disks, and of a screw-spindle passed through the tubular screw and adapted to act on the other cutter-disks, and of hand-wheels on the ends of the spindle and the tubular screw, substantially as herein shown and described.

5. The combination, with a hollow shaft, of cutter-disks mounted on the same, a tubular screw held within the said hollow shaft and adapted to act on one of the cutter-disks, of a screw-spindle passed through the tubular screw and adapted to act on the other cutter-disk, of hand-wheels upon the ends of the spindle and the tubular screw, and of a jam-nut on the outer end of the spindle, substantially as herein shown and described.

6. The combination, with a hollow shaft, A, having a longitudinal slot, B, of a block, I, the screw-spindles H, journaled in the outer ends of the shafts and in the block I, the hollow screw D, held around the spindle H and in the shaft A, and of the cutter-disks adapted to be acted upon by the spindle and tubular screws, substantially as herein shown and described.

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