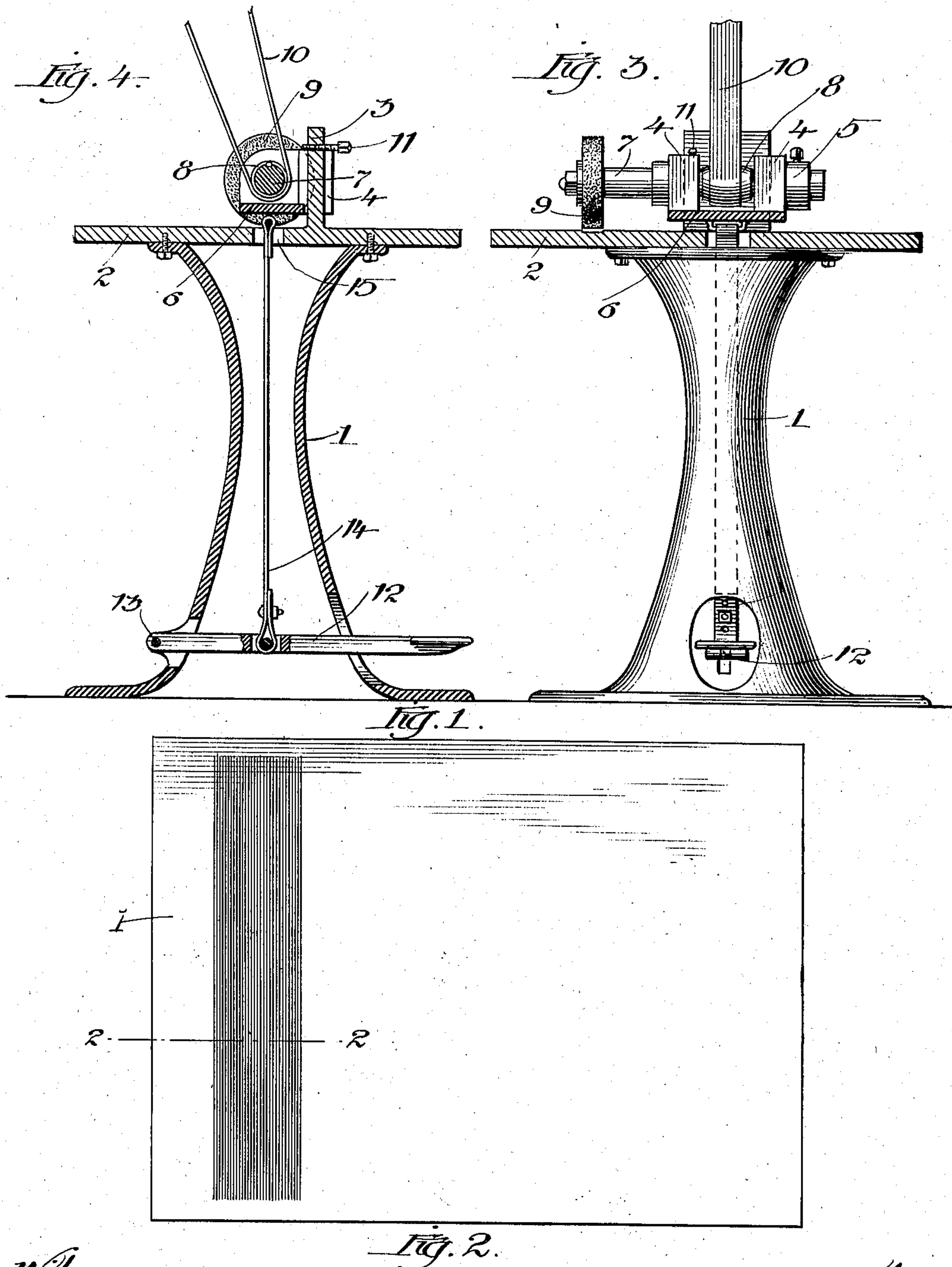


No. 855,049.

PATENTED MAY 28, 1907.

J. J. DIEHL.
FLAT OPENING LEAF FOR BOOKS.

APPLICATION FILED JUNE 11, 1906.



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FLAT-OPENING LEAF FOR BOOKS.

No. 855,049.

Specification of Letters Patent.

Patented May 28, 1907.

Application filed June 11, 1906. Serial No. 321,138.

To all whom it may concern:

Be it known that I, JOHN J. DIEHL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Flat-Opening Leaves for Books, of which the following is a specification.

This invention relates to improvements in flat opening leaves for books, such as are most commonly used in connection with loose leaf ledgers, etc.

The object of the invention is to provide a leaf of simple and, in its general features, usual construction and which has formed as an integral part thereof a hinge strip or band rendered more flexible than the remainder or main body of the leaf; this hinge strip being located along a line coincident with that part of the leaf which ordinarily is bent most abruptly in opening a book.

I am aware that several varieties of hinged leaves have been heretofore devised and patented, but the present construction is believed to be novel and an improvement in the matter of cheapness in manufacture and quality as a finished article.

In the drawing—Figure 1 is a plan view of a leaf embodying my invention; Fig. 2 a fragmentary section thereof; the thickness being necessarily exaggerated; Fig. 3 is a front elevation, and Fig. 4 a sectional view on line 4—4, of a machine for treating the leaves.

Referring to the drawing, 1 designates as a whole a leaf, which is formed of any suitable dense and moderately-heavy or heavy paper which in itself possesses considerable stiffness. Sized paper is most commonly employed, and the present invention can be very efficiently and satisfactorily embodied in a leaf having considerable sizing, such as ordinary ledger paper.

Across the sheet, at a suitable distance from, and parallel with, the edge which is to be bound in to form the book, I provide a band-like strip 2 which is treated in a peculiar manner to render it very considerably more flexible than the remainder of the sheet. This increased flexibility is secured without removing any considerable part of the leaf structure; without perforating, puncturing or otherwise substantially mutilating the paper, and without so destroying the

surface as to materially interfere with its availability for writing thereon with ink, and in the peculiar manner in which this is accomplished resides the present invention.

I have discovered that if a sheet of paper of the general character described be subjected to the rubbing action of a comparatively coarse stone or analogous rough surface under a moderate pressure and accompanied by a continuous traverse or progressive movement of the paper relatively to the stone, and in a direction parallel with the progressive movement of that part of the stone which engages the paper, a series of exceedingly minute parallel scores will be formed without removing any considerable portion of the surface of the paper. If the surface thus treated is made in the form of a band extending across the sheet, as shown at A in the drawing, and with the score lines extending parallel with the direction of the band, the flexibility of the sheet along this line is greatly increased. This increased flexibility can not be said to be due to the removal of the sizing because as a matter of fact where the paper is heavily sized the hinge strip thus treated takes on a glossy burnished but striated appearance. The increased flexibility is doubtless due to the fact that the surface sizing and the surface fibers are, by the action of the stone, formed into minute ridges alternated with minute creases, and the increased flexibility thus brought about. That is to say, the surface fibers are combed out, as it were, and laid parallel with the minute score lines while the presence of the sizing prevents such surface fibers from being removed or bodily torn away, and it is probable that the heat due to the rubbing friction momentarily softens the sizing, and in this manner facilitates the re-arrangement of the fibers in parallelism with each other and facilitates the formation of the minute score lines or creases without substantially tearing away the surface of the paper.

From the foregoing it will be obvious that the leaves may be treated by the use of any suitable mechanism, but I prefer to employ a simple apparatus, the stræ-forming member of which is an ordinary grind-stone or emery wheel of moderately coarse grain having a narrow cylindric grinding face.

Referring to Figs. 3 and 4, 1 designates a

suitable standard frame carrying a table 2 upon which is mounted an upstanding support 3. Upon the support 3 are mounted to slide vertically a pair of yoked-together bearings 4, 5, united by a bar 6. In these bearings is journaled a main shaft 7 carrying a belt pulley 8 and at one end the grinding wheel 9. The shaft is driven by a belt 10, the tension of which normally holds the shaft and grinding wheel thereon slightly elevated from the face of the table; the extent of upward movement is limited by a stop 11. In the lower part of the frame is mounted a foot lever or treadle 12 pivoted at 13, and with its intermediate portion is connected a strap 14 which extends upwardly through an opening 15 in the table and connects with the yoked-together bearings 4 and 5. By depressing the foot lever the wheel line is brought into bearing with the face of the table or with the sheet to be treated interposed between the table and face of the wheel. That part of the face of the table which underlies the acting face of the wheel is of wood or other material affording an appreciable amount of frictional resistance to the movement of the leaf over the same.

The operation of treating the leaves consists simply in introducing the edge of the

leaf beneath the stone, depressing the latter by means of a foot lever and lightly guiding and restraining the leaf as it is drawn quite rapidly through beneath the wheel by the rotation of the latter. The leaf is placed far enough beneath the stone to cause the latter to commence the formation of the band at a short distance from the advance edge of the leaf, and as the rear edge of the leaf approaches the acting surface of the stone the latter is allowed to rise so that the treated strip terminates short of the edge, as shown clearly in Fig. 1. The wheel is driven at a comparatively high rate of speed, and the leaves are fed through at a moderate speed, the operation occupying say from one and one-half to two seconds in treating a leaf of ordinary size, say twelve inches in width.

I claim as my invention:

A leaf of sized paper provided with an integral band-like flexible hinge strip, said strip being surfaced with minute corrugations extending lengthwise thereof and consisting mainly of sizing, and the body of the strip being unbroken and uncorrugated.

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