

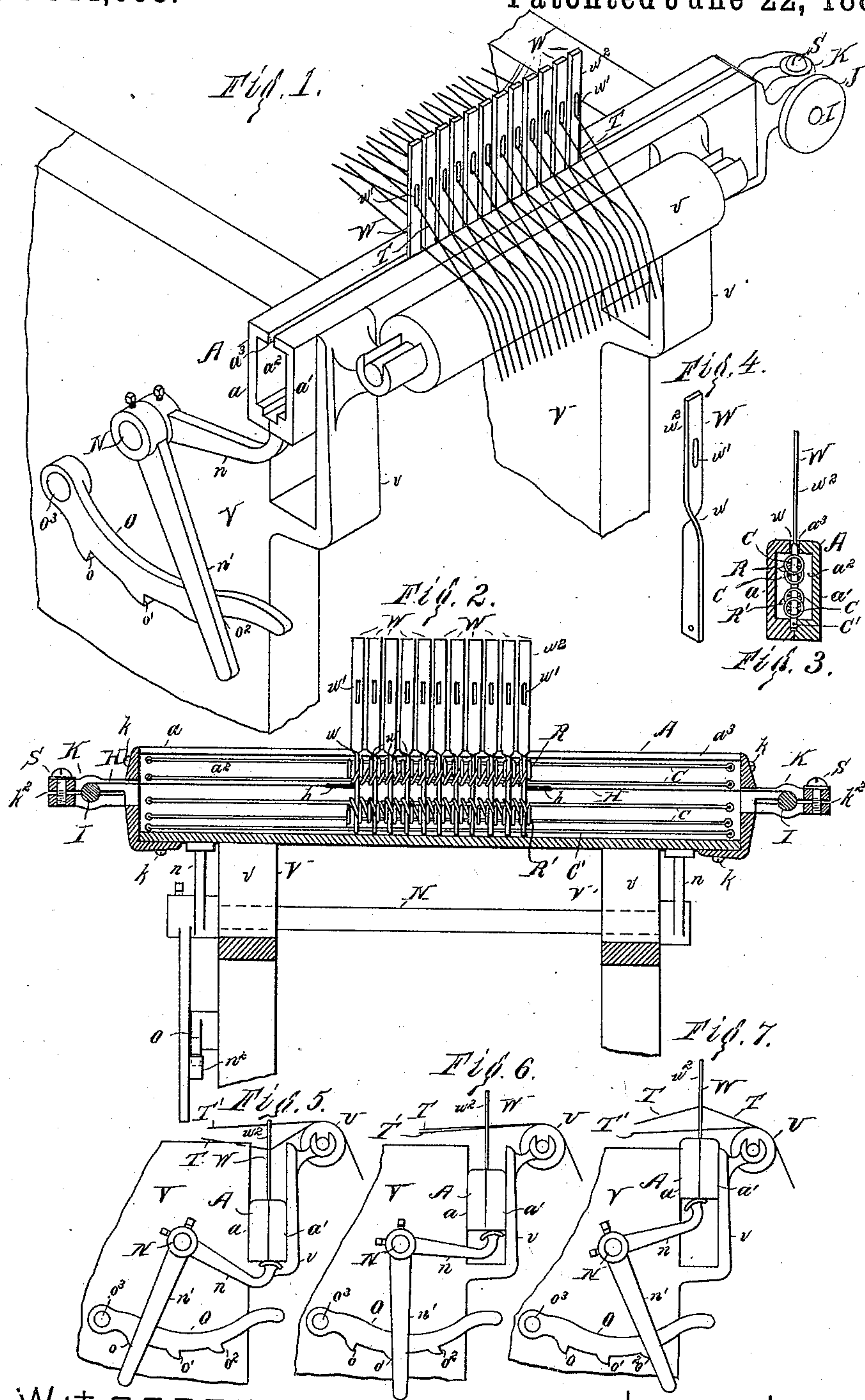
(No Model.)

T. C. ENTWISTLE.

LEASE COMB.

No. 344,093.

Patented June 22, 1886.



Witnesses—

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UNITED STATES PATENT OFFICE.

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LEASE-COMB.

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To all whom it may concern:

Be it known that I, THOMAS C. ENTWISTLE, a citizen of the United States, residing at Lowell, in the county of Middlesex and Commonwealth of Massachusetts, have invented a certain new and useful Improvement in Lease-Combs, of which the following is a specification.

My invention relates to expansion lease-combs; and it consists in the comb hereinafter described, in a dent constructed as hereinafter described, and in the means hereinafter described of raising and lowering the lease-comb to form leases.

In the accompanying drawings, Figure 1 is an isometric view of part of a warping-machine and my improvement applied thereto, showing the means of raising and lowering the lease-comb, said comb in its highest position, a carrier or guide roll, and warp-threads running through and between the dents of said comb, the bracket at the left-hand side of the comb being omitted; Fig. 2, a vertical transverse section through the axis of the comb-box in Fig. 1; Fig. 3, a vertical section of the comb between any two of its dents at right angles to the plane of the section shown in Fig. 2; Fig. 4, an isometric view of a lease-dent detached; Figs. 5, 6, and 7, side elevations of a part of the frame of a warping-machine, showing the mechanism for raising and lowering the comb, and respectively showing the comb in its lowest, normal, and highest positions, showing also a carrier-roll and the bracket which supports the journals of said roll and which guides the comb, showing also warp-threads, Fig. 5 showing a shed formed in the warp-threads below their normal plane, and Fig. 7 a similar shed formed above said plane.

The devices hereinafter described are mainly designed to separate alternate yarns of a sheet of warp-yarns into leases, which are then tied at intervals, in order that when an entire warp is dyed the defective parts of such warp between two sets of lease-threads may readily be cut out without mixing the alternate yarns, and that thus the rest of the warp may be saved.

The comb-box A consists of a box formed in

two parts, a a' , the adjacent faces of which parts are hollowed out to form a chamber, a^2 , said parts being separated above said chamber to form a slot, a^3 , opening from said chamber through the top of said box, through which slot the dents W project vertically, the lower ends of said dents being inserted between the coils of expansion-springs, of which two pairs, R R', are shown placed within said chamber.

The construction and arrangement of the comb-box and the two pairs of springs are common in expansion-combs. The guide-rods C and stop-rod C' are used for the same purpose as in United States Patent No. 333,399. The dents are separated from each other by the expansion-springs R R', which are expanded by substantially the same mechanism as is shown in the patent last referred to, which mechanism consists of straps H H, the inner ends of which are provided with loops h , surrounding the end dents, said straps being wound on drums or cylinders I I, provided with hand-wheels J J and turning in brackets K K, which are drilled through transversely to receive said drums, and are provided with transverse slits, which lie in the planes of the axes of said drums, said slits k^2 being closed by clamp-screws S, which turn freely at right angles to the slits k^2 , through one part of each bracket into a threaded hole in the other part of said bracket, to pinch said brackets upon said drums, and to prevent their being accidentally turned. The brackets K are secured to the comb-box by screws k , which enter the ends and the under side of said box near its ends. Just above the comb-box A the dents W (which are preferably made from flat wire) are twisted quarter-way around at w , and above this point the dents are slotted at w' , half-way between the twist w and the top of the dents. This construction of the dents allows their shanks to be inserted between the springs, and at the same time allows the slot to run in the direction of the yarns. The parts w^2 of the dents which project above the comb-box are made long enough to allow the yarns T, which pass through the slots in said dents, to be raised above or below the general plane of the sheet of warp-yarns sufficiently to allow the lease-rods to be in-

serted between the yarns which pass through said slots and the alternate yarns T', which lie in the spaces between the dents, in the usual manner, and which are not affected by the raising or lowering of said comb-box and dents. The lease-comb box A extends across the frame V of the warping-machine, and projects beyond the sides of the same, being guided vertically, when said comb is raised or lowered, by brackets v, secured to said frame, said brackets also supporting the journals of the front carrying-roll, U. Except when it is desired to make a lease, the yarns lie in the same vertical plane, as in Fig. 6; but when it is desired to divide the sheet of warp-yarns by moving every alternate yarn out of the plane of said sheet it is necessary to raise or lower the comb-box and dents, or to raise the sheet of yarns, or lower the same at some distance from the dents, the eyes of which will prevent the yarns which run through them from rising or falling at said dents.

I am aware that drop-wires and dents have heretofore been made with closed eyes formed at their upper ends, and that dents intended for lease-combs have been provided with slots open at their upper ends, neither of which constructions would allow of the comb being lowered to make a lease, because when the eyes are formed at the top of the dents, depressing the comb to draw down a portion of the yarns would allow the remainder of the yarns to become tangled with each other, and, of course, depressing the comb provided with open-slotted upper ends would have no effect to draw down any of the yarns, and a lease could be made only by raising the comb.

I am also aware that dents have been made with slots placed about midway between the tops of the dents and the shanks or portions of said dents intended to be inserted in the comb-box, and that such dents have been formed in a variety of ways, as by taking two flat pieces of wire and inserting between them other pieces of flat wire, with an interval between the outside wires and between the ends of the inserted wires; also, that by means of a spring secured in the top of a forked or open-slotted dent the yarns have been allowed to enter the forks of said dents, and to be retained therein, the dents last described rendering it possible to separate the yarn into sheets, either by lowering or raising the comb. The objection to the dents last named is, that they are too expensive to be placed in the market, and that their springs are liable to get out of order.

I am also aware that dents for lease-combs have been made with shanks narrower than the parts which are intended to project from the comb-box; but I am not aware that a dent was ever made of flat wire and twisted between its shank and its upper part to bring the shank and upper part at right angles to each other, or that a dent was ever made of a

flat wire provided in its upper portion with a slot permanently closed at its upper end.

A shaft, N, reaches from side to side of the warping-machine and rocks in bearing in the frame of said machine. Said shaft N is provided with fingers n n, which reach under the comb-box near its ends, and the rock-shaft N is provided with a downhanging arm, n', at one side of the machine, by moving which arm said shaft N is rocked and the comb is raised or lowered by the fingers n, the weight of the comb-box resting upon said fingers n and tending to throw the lower end of the arm n' backward, or to the right, as shown in Figs. 5 to 7. The arm n' is provided with a catch, n², adapted to engage either of the teeth o o' o², projecting from the lower edge of the plate O, which plate O is pivoted at o³ to the frame of the machine at its rear end, and rests by its weight upon the catch or projection n², and thereby holds said rock-shaft, its fingers, and the comb-boxes in either of the positions shown in Figs. 5 to 7, the comb-box being raised in Fig. 7 above its normal height and carrying the alternate yarns above their normal plane, to allow a lease-rod to be introduced between the alternate yarns above their normal plane, and the box being lowered in Fig. 5, to allow the lease-rods to be introduced between the alternate yarns below their normal plane.

I claim as my invention—

1. The combination of the comb-box provided with a vertical slot in the top thereof, springs placed within said box, and dents formed of flat wire, having shanks placed between the coils of said springs, and provided above said springs and said box with slots substantially at right angles to the axis of said box, said dents being twisted quarter-way around at the top of said box, and said slots being placed midway between the top of said box and the tops of said dents and permanently closed at their upper ends, and means, substantially as described, of expanding said springs, as and for the purpose specified.

2. A dent formed of flat wire, and having its upper portion twisted quarter-way around on its shank and provided with a vertical closed slot between the top of said shank and the top of said dent, as and for the purpose specified.

3. A dent having a shank adapted to enter between the coils of the expansion-springs of an expansion-comb, and between its shank and upper portion twisted quarter-way around, and provided with a yarn-slot closed at its upper end and placed midway between the top of said dent and the top of said shank, as and for the purpose specified.

4. A dent having a flat shank adapted to enter between the coils of the expansion-springs of an expansion-comb, and having also a flat upper portion provided with a closed yarn-

slot placed midway between the top of said shank and the top of said dent, the planes of said shank and of said upper portion being substantially at right angles to each other, as
5 and for the purpose specified.

5. The combination of the frame provided with vertical guides, a comb, a rock-shaft journaled on said frame and provided with fingers which reach under said comb, and with an arm

provided with a catch or projection, and a plate 10 pivoted to said frame and provided with teeth to engage said projection on said arm, to hold said comb-box at different heights, as and for the purpose specified.

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