(No Model.) 2 Sheets—Sheet 1.

A. & R. J. EDWARDS.

MACHINE FOR STRAIGHTENING AND WINDING CLOTH, &c.

No. 478,255. Patented July 5, 1892.

Fig. 1.

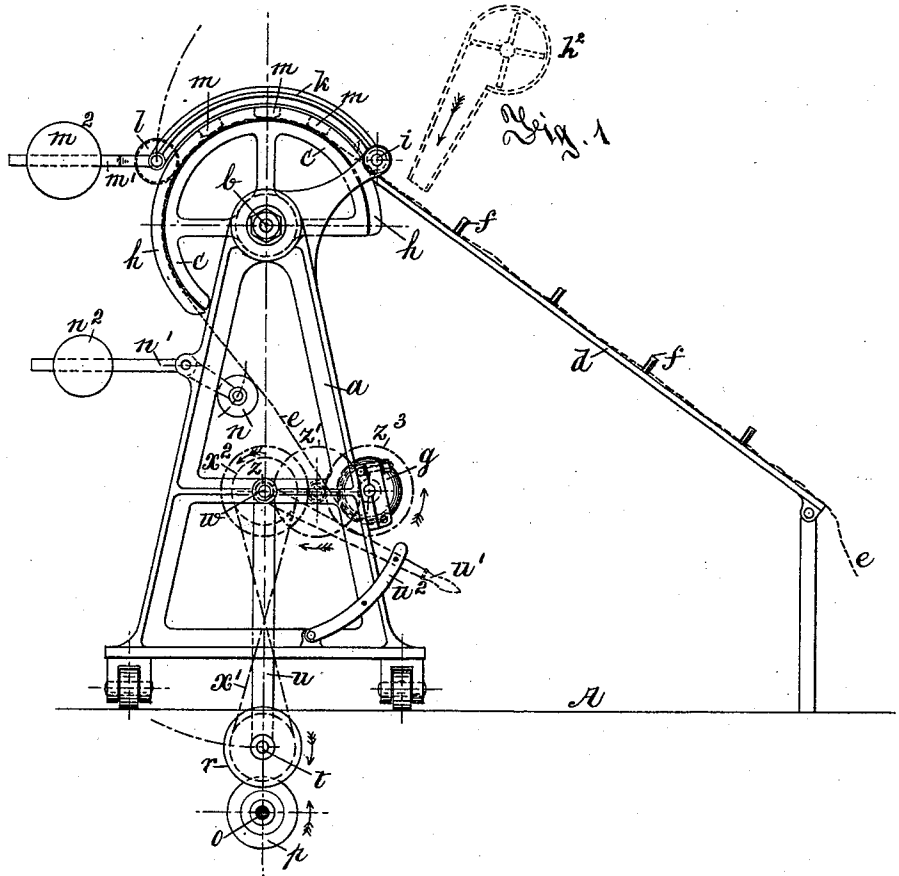
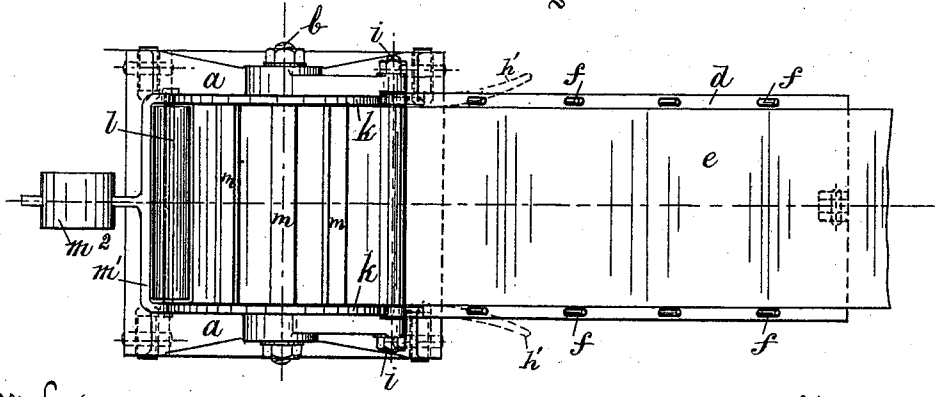


Fig. 2.



Witnesses:-
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by
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(No Model.) 2 Sheets—Sheet 2.

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Fig. 4.

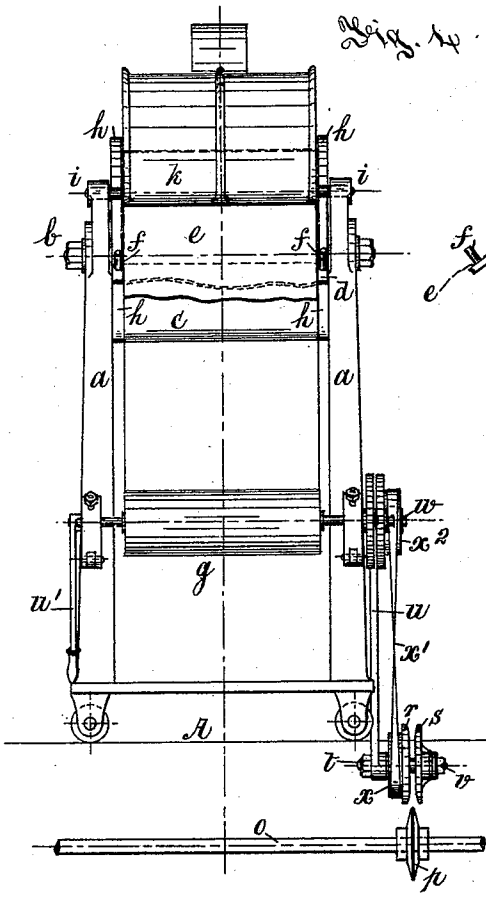


Fig. 3.

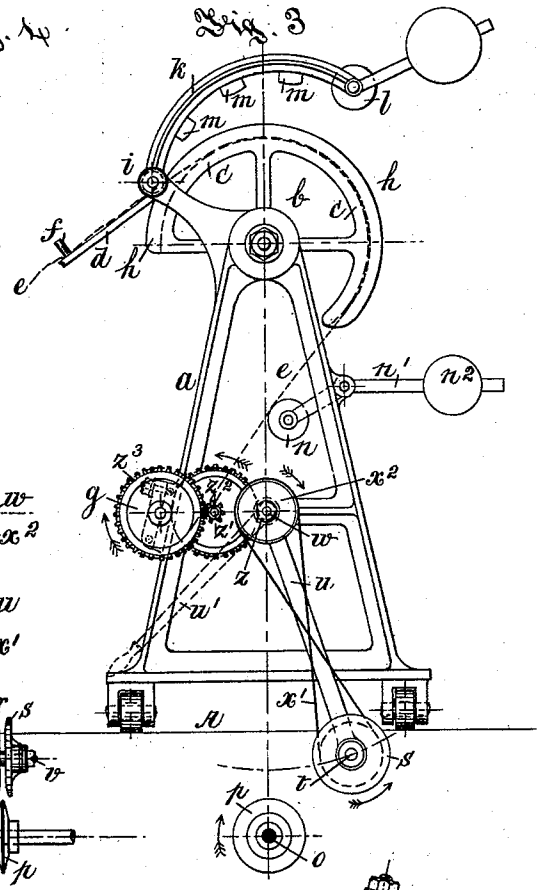


Fig. 5.

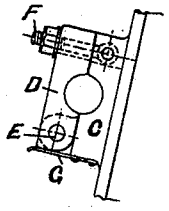
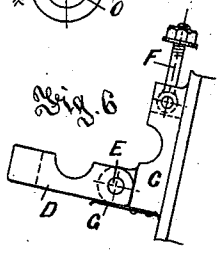


Fig. 6.



Witnesses:
J. C. Wilson
W. H. Graham.

Inventors:
Archer Edwards +
Richard John Edwards,
by
Whitman + Wilkinson, Attys

UNITED STATES PATENT OFFICE.

ARCHER EDWARDS AND RICHARD JOHN EDWARDS, OF LONDON, ENGLAND.

MACHINE FOR STRAIGHTENING AND WINDING CLOTH, &c.

SPECIFICATION forming part of Letters Patent No. 478,255, dated July 5, 1892.

Application filed July 6, 1891. Serial No. 398,540. (No model.) Patented in England July 4, 1885, No. 8,129.

To all whom it may concern:

Be it known that we, ARCHER EDWARDS and RICHARD JOHN EDWARDS, subjects of the Queen of Great Britain, residing at London, in the county of Middlesex, England, have invented a new and useful Improvement in Machinery for Straightening and Winding Cloth or Paper or other Flexible Material in Long Lengths, (for which we have obtained a patent in Great Britain, No. 8,129, dated July 4, 1885,) of which the following is a specification.

Our invention relates to improvements in apparatus for straightening and winding emery or glass cloth or paper made in long lengths; but it may be applied also to wall or printing papers or other such flexible material which it is required to flatten and wind or reel easily in rolls.

The object of our improvements are, first, to provide means by which the irregular edges of the fabric are straightened or brought up to a true line, and this at the same time that the surface is being flattened under pressure; second, to provide means by which it is simultaneously wound into a roll while the surface is flat and the edges straight, and, third, to provide means by which the entire apparatus can be readily moved from place to place, as required, while the moving parts can be instantly set in motion or stopped wherever the apparatus may be placed. We attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side view of the apparatus when in action; Fig. 2, a top view of the same; Fig. 3, a view of the opposite side of the apparatus when not in motion; Fig. 4, a back view of the apparatus. Figs. 5 and 6 are side views upon a larger scale of the bearing for the reel-spindle closed and opened, respectively.

Similar letters refer to similar parts throughout the several views.

Supposing our invention to be applied to emery or glass cloth which is made in long lengths and in the process of manufacture is hung up to dry in folds suspended from racks or rollers and which it is then necessary to reel, so as to form rolls, it is found that such material, when dry, is somewhat stiff and inflexible, especially laterally, and that it is difficult or impossible to straighten it so that when wound or reeled the edges are uniform and even, its tendency in winding being to project irregularly at its sides or edges, which are liable to be damaged if the material when flat is forcibly pressed or guided laterally for the purpose of bringing its edges into a true and even line.

a a are two vertical parallel frames of metal or other suitable material held together by stays where necessary. Across these frames at their upper end is arranged a strong shaft *b*, upon which is fitted and firmly fixed, so that it cannot revolve, a cylinder or drum or part of a drum *c* of metal, or wood, covered with india rubber, leather, or other suitable material, of considerable diameter, and of a length somewhat greater than the width of the material to be operated upon. In front of the drum we fix a board or guide *d*, up which the material is drawn in the way hereinafter described, from a box in which it has been stored, or from the floor, or from the racks themselves upon which it has been dried.

The guiding-board *d* is hinged at *i*, so that it can be turned up out of the way when required, and it has two parallel sets of pins *f*, somewhat wider apart than the width of the material, which pins guide and tend to straighten the edges of the material *e*, which passes from the board *d* over the upper side of the fixed drum *c*, and around the latter to its lower side, and thence to a spindle or reel *g*, revolving in bearings in the lower part of the frame *a*, around which reel it is wound as the spindle or reel is made to revolve.

For a sufficient part of its upper circumference the drum *c* is fitted with parallel projecting flanges *h*, between which the material is drawn, and these flanges being fixed at a distance apart very slightly greater than the width of the material *e* the latter is straightened by the pressure of its edges against the flanges *h*, and is delivered from the drum *c* to the winding-reel *g* with its edges properly straightened, so that when wound upon the reel they lie perfectly true. The lateral pressure against the edges of the material, being applied where the latter is stretched round the curved surface of the drum *c*, is capable of giving sufficient force to straighten the ma-

terial *e* without injuring or bending up the edges as would be the case if it were attempted to force them laterally while they were lying upon a flat surface. The part of the drum *c*, which is not passed over by the material *e*, may be left open as shown.

In order to keep the material *e* in sufficiently close contact with the drum *c*, while it is passing over the latter, a transverse shaft or bar *i* is arranged across the machine above the drum *c*, and to this bar is hinged or pivoted a frame *k* of cast-iron or other suitable material, the outer end of which is provided with bearings carrying a roller *l*, which presses down the material *e* against the drum *c* below. The frame *k* also carries between the roller and the bar *i*, upon which it is pivoted, as described, two or more bars *m*, parallel with the axis of the drum, their lower side being somewhat rounded and coming (when the roller is pressed down) within a short distance of the surface of the moving material, which is thus kept down and prevented from rising or buckling.

When desired, the frame *k*, with the roller *l* and bars *m*, can be raised, as shown in Fig. 3, from the material *e* around the center *i* for the purpose of introducing or adjusting the material, and it may be partly balanced so as to be more readily so raised, when desired. The frame *k* can be held down with any desired pressure by adding or removing weights m^2, carried by the bar m' and the roller *l*, which is preferably covered with leather, india-rubber, or other sufficiently soft and elastic material, is prevented by its friction from revolving too freely.

When the edge of the material *e* is very much curled up we sometimes arrange lateral curved guides, (shown in dotted lines at h' h' in Fig. 2,) between which it passes so as to be gradually straightened or flattened to some extent before it passes between the flanges upon the drum, as already described; or where very thin paper is being treated, the curled-up edges may be so flattened down by a blast of air directed upon them from a fan or other convenient source, as shown at h^2 in Fig. 1.

Before passing from the drum *c* to the winding-reel *g*, as already described, we make the material pass over a roller *n*, revolving in bearings carried by a lever n', the outer end of which is provided with a balance-weight n^2, so that the roller is pressed up with any desired force.

In Figs. 1, 3, and 4, A is the floor of the room in which the apparatus is to be worked. *o* is a longitudinal driving-shaft running below the floor, and driven by steam or other power. *p* is a driving-disk, one of which is fixed upon the shaft *o* at every position where the apparatus is required to be worked. This disk *p* is angular at its circumference, and fits between two disks *r s*, carried and turning upon a pin or stud *t* at the lower end of a lever *u*. The space between the edges of the disks *r s* is made to correspond with the edge of the disk *p*, and they are adjusted at the proper distance apart by a nut *v*. The lever *u* is fixed upon a shaft or center *w*, and the disk *r* has attached to it a pulley *x*, which drives by a band x' a corresponping pulley x^2, which turns freely upon the shaft *w*, and has attached to it a toothed pinion *z*, which in turn drives the toothed wheels z' z^2 z^3, the latter of which is fixed upon the spindle of the winding-reel *g*. The lever *u* has connected with it a handle u', by which it can be turned upon the stud *w* and fixed in the required position in the guide u^2, Fig. 1, so that the pulleys *r s* can be brought into contact with or removed from the driving-disk *p*. The lower end of the lever *u* and the disks *r s* pass through an opening in the floor A. When the apparatus has been brought into the proper position and the end of the material *e* which is to be straightened and wound has been brought over the drum *c* and roller *n* to the reel *g*, the handle u' is moved until the disks *r s* have been brought into contact with the disk *p*, as shown in Fig. 1. The reel *g* is then set in motion and the material *e* is wound upon it, being first partly straightened at its edges as it passes up the board *d* by the pins *f f*, at the sides of the latter, then further flattened as it passes over the drum *c* and under the bars *m m* and roller *l*, its edges being straightened while it is in a curved form by the flanges *h h*. When the hole of the material has been strightened and wound, as described, the handle u' is raised and the disks *r s* disengaged from the driving-disk *p*, and the reel *g* with the material wound upon it is removed from its bearings and another one substituted for it, the entire apparatus being removed upon the rollers B to a fresh position, where the disks *r s* can be put in contact with another driving-disk *p* upon the shaft *o*.

In order to facilitate the speedy removal and replacement of the reel *g*, the bearings in which its axle rests and turns are made as shown in Figs. 5 and 6.

C is the body of the bearing, and D its cover, which is hinged at E. A bolt F is also hinged to C at the other end and fits into a slotted opening in the end of the cover D, so that when the nut of the bolt F is slackened the latter can be turned down and the cover D opened, as shown in Fig. 6.

G is a spring fixed to the end of C by which the cover D is retained securely in either its closed or open position.

By our invention emery or glass cloth or paper or other flexible material in long lengths is very quickly and easily flattened, straightened at its edges without injury, and wound upon a reel, and the apparatus can be removed to any desired position and instantly set in motion or stopped.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. In a machine of the class herein described, the combination of the drum *c*, having a

curved upper surface, and the flanges *h h* upon the ends of the said drum, with the frame *k* hinged above the drum *c*, the roller *l*, mounted in the said frame *k* in position to bear upon the said drum *c*, and means for moving the fabric between the drum *c* and the roller *l*, substantially as described.

2. In a machine of the class herein described, the combination of the drum *c*, having a curved upper surface, and the flanges *h h* upon the ends of the said drum, with the frame *k*, hinged above the drum *c*, the roller *l*, mounted in the said frame in position to bear upon the surface of the drum *c*, the transverse bars *m* on the under side of the frame *k*, and means for moving the fabric between the drum *c* and the frame *k*, substantially as described.

3. In a machine of the class herein described, the combination of the frame *a*, the drum *c*, rigidly fixed in the said frame, the flanges *h h* upon the drum *c*, the frame *k*, hinged above the said drum, and the roller *l*, mounted in the said frame *k* with the winding-reel *g*, and means for moving the fabric between the drum *c* and the frame *k* and winding it upon the reel *g*, substantially as set forth.

4. In straightening and winding apparatus, the combination of the frame *a*, the drum *c*, rigidly fixed in the said frame, the flanges *h h* upon the drum *c*, the frame *k*, having the roller *l* hinged above the drum *c*, the board *d*, hinged to the frame *a*, the pins *f* upon the board *d*, and means for moving the fabric over the board *d* between the pins thereon and between the drum *c* and the frame *k*, substantially as described.

5. In a machine of the class herein described, the combination of a movable frame *a*, the drum *c*, rigidly fixed thereon, flanges *h h* upon the drum *c*, the frame *k*, having the roller *l* hinged above the drum *c*, and the winding-reel *g* with the shaft *w*, the pulley x^2, mounted upon the shaft *w* and geared to the winding-reel, the lever *u*, also mounted upon the shaft *w*, the pulley *x*, mounted upon the lever *u* and geared to the pulley x^2, the disks *r* and *s*, secured to the pulley *x*, the disk *p* upon a driving-shaft, and means for moving the disks *r* and *s* into contact with the disk *p*, substantially as described, for the purpose specified.

6. In a machine of the class herein described, the combination of a frame *a*, the drum *c*, rigidly mounted thereon, the frame *k*, hinged above the drum *c*, the winding-reel *g* and means for operating the same with the bearings for the winding-reel, consisting of the body of the bearing C, the slotted cover D, hinge E, hinged bolt F, and spring G, substantially as described.

In testimony whereof we have hereunto set our hands in the presence of two witnesses.

ARCHER EDWARDS.
RICHARD JOHN EDWARDS.

Witnesses:
JANE GRAY RIDGWAY,
ALEXANDER RIDGWAY.