May 15, 1934. J. E. PETERSON 1,958,676

MACHINE FOR TREATING FABRICS WITH LIQUID

Filed Dec. 31, 1931 3 Sheets-Sheet 1

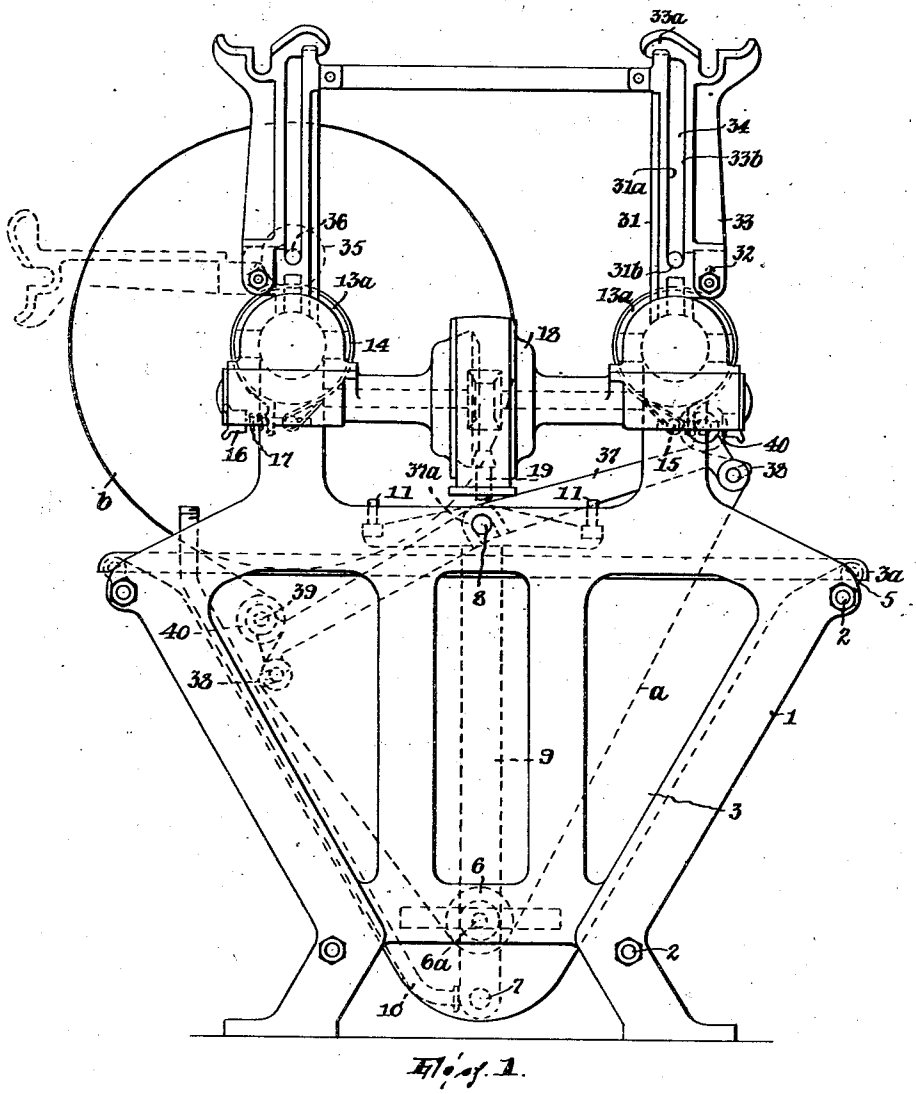


Fig. 1.

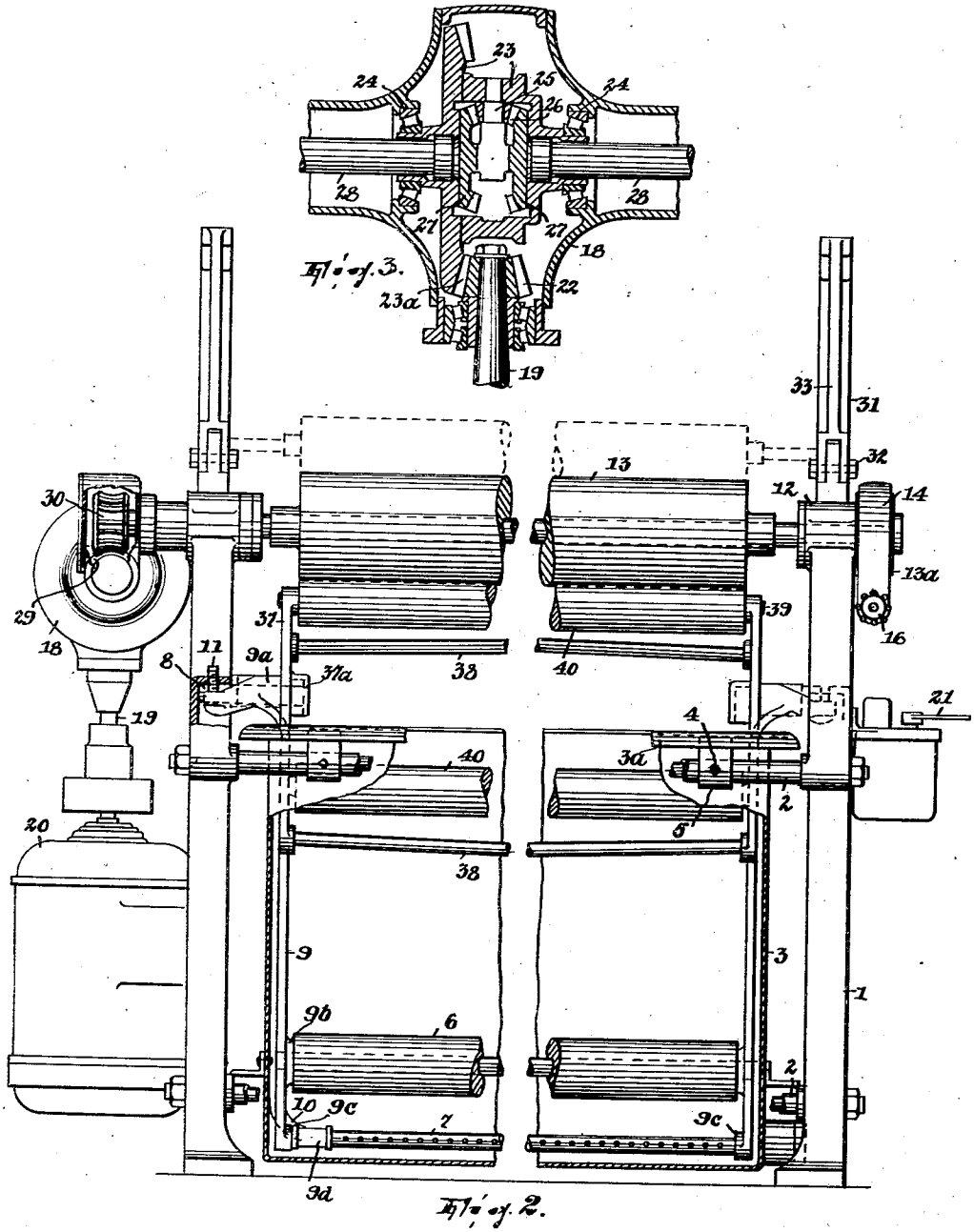
INVENTOR,
John E. Peterson,

BY HIS ATTORNEY

May 15, 1934. J. E. PETERSON 1,958,676

MACHINE FOR TREATING FABRICS WITH LIQUID

Filed Dec. 31, 1931 3 Sheets-Sheet 2



INVENTOR,

John E. Peterson,

BY HIS ATTORNEY

John E. Peterson.

May 15, 1934. J. E. PETERSON 1,958,676

MACHINE FOR TREATING FABRICS WITH LIQUID

Filed Dec. 31, 1931 3 Sheets-Sheet 3

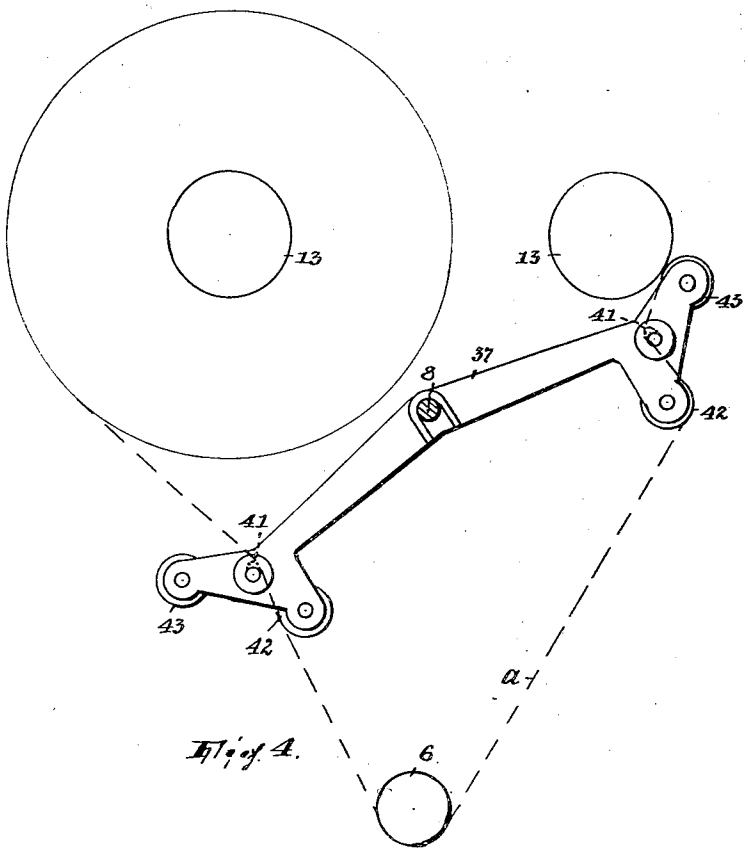


Fig. 4.

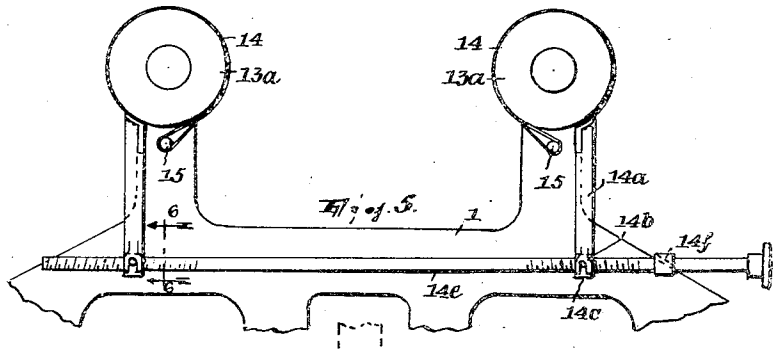


Fig. 5.

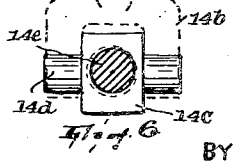


Fig. 6.

INVENTOR,
John E. Peterson,
BY HIS ATTORNEY,
John E. Peterson
ATTORNEY

Patented May 15, 1934 1,958,676

UNITED STATES PATENT OFFICE

1,958,676

MACHINE FOR TREATING FABRICS WITH LIQUID

John E. Peterson, Irvington, N. J., assignor to Van Vlaanderen Machine Company, Paterson, N. J., a corporation of New Jersey

Application December 31, 1931, Serial No. 584,090

9 Claims. (Cl. 242—55)

This invention relates to machines in which a fabric or other flexible sheet is passed from one revoluble beam or other core (herein termed a "beam"), on which it is already wound and which is subjected to resistance against rotation so as to tension the sheet, to another on which it becomes wound. One type of machine in which this is done, being that herein shown and described by way of example, is a dyeing machine of the kind known as a "jigger", in which the mentioned operation is usually performed back and forth several times and the fabric in its traverse passes through the dyeing liquid. On account of the mass on the receiving beam increasing and that on the delivering beam decreasing in diameter in any pass of the goods the tension on and speed of the sheet of course tend to increase if the axial speed of the receiving beam remains constant. One object of this invention is to provide a mechanism for performing this operation which, while involving the highest degree of simplicity and efficiency, will automatically preserve the tension on the sheet and its speed constant from start to finish, both of which are especially desirable in certain operations, as in dyeing. A further object is to improve a machine of the class indicated in respect to the guiding of the sheet from one beam to the other and keeping it spread as it approaches the receiving beam, and where the operation involves treating the fabric, in respect to support of the liquid receptacle. A still further object is to provide improved means for supporting a rolled mass of the sheet, or batch, preliminarily and subsequent to the actual pass of the sheet from one beam to the other, or back and forth between them. Another object is to provide an improved braking means for maintaining the desired tension on the sheet and which shall be especially applicable where the passes are effected back and forth.

In the drawings,

Fig. 1 is a side elevation of a jigger embodying this invention, the motor 20 being removed;

Fig. 2 is a right-hand elevation thereof, certain parts appearing in section;

Fig. 3 is a vertical sectional view of the differential drive;

Fig. 4 shows a modification of the means for guiding the sheet and maintaining it transversely stretched;

Fig. 5 illustrates a modification of the braking means, being a fragmentary elevation of the machine opposite to that shown by Fig. 1; and

Fig. 6 shows a detail of Fig. 5 in section on line 6—6 Fig. 5.

The supporting structure or frame of the machine comprises two side standards 1 which are rigidly connected by bars 2, the side standards in side elevation converging downwardly and the upper two of the four bars shown being spaced more widely than the lower two.

A sheet metal vat or tank 3 for dye or other liquid which is V-shaped in side elevation is suspended from the two upper bars by providing it with an outwardly rolled flange 3*a* and securing, as by set-screws 4, to each of said bars two or more lugs 5 penetrated thereby and which project upwardly and engage in the concave under side of said lip. The lugs will adjust themselves to the channel at the under side of the lip and when this is done and they are secured to the bars the receptacle will rest squarely on all four lugs.

The sheet *a* to be passed is to be made to travel through liquid placed in this vat and for this purpose there is usually a guiding roller 6 within the vat near its bottom for the support of which and also of a fluid pipe 7, as for steam for heating the liquid, for which purpose it is shown perforated as usual, there is the following structure: In the vertically central plane of each side standard there projects inwardly therefrom a stud 8. 9 designates two angular, here generally T-shaped brackets each of which has a bearing 9*a* midway between the ends of its head and its depending or vertical leg provided with a bearing 9*b* and with a socket 9*c*, one socket being developed at 9*d* to form a fitting to which a pipe 10 for supplying steam to heat the liquid in the vat may be connected. Each bracket has its bearing 9*a* journaled on a stud 8 and it is brought to vertical position and there secured by two set-screws 11 tapped into an overhanging flange of the adjoining side standard and bearing down against its head at both sides of the bearing. In the bearings 9*b* of the two brackets is journaled the shaft 6*a* of the roller 6 and in the sockets 9*c* are fitted the ends of the pipe 7. This construction permits ready adjustment of each bracket independently of the other with the purpose of placing the roller 6 with its axis perfectly parallel with the mentioned beams, it being known that if such parallelism does not exist there is a tendency for the sheet, if a fabric, to skew or wind with undesired helical traverse one way or the other on the receiving beam or core or perhaps to undergo creasing in the winding thereon.

In bearings 12 of the side standards and above the vat are journaled the shafts of the beams 13 which are subjected to variable resistance by

any known braking means so as to tension the sheet, for example, as follows: Brake-drums 13*a*, one fixed to one end of each shaft, are embraced by brake-straps 14 each of which is held at one end by a stud 15 on the adjoining side standard and at its other end is penetrated by a hand-screw 16 tapped into the standard and between the head of which and such end of the strap is a compression spring 17. Since each brake-strap is held to a fixed point 15 at one end and elastically supported at 16—17 at the other it is of the type in which the braking action is applied when the rotation is in one direction (or such that the pull comes on the fixed point 15) and is substantially unapplied when the rotation is in the opposite direction. The brake for each beam is reversed with respect to that for the other beam. Wherefore when either beam is the delivering one the brake therefor is active whereas the brake for the other is substantially inactive.

Bridging upright bearing portions of one side standard as in Fig. 1 and forming part of the supporting structure is a housing 18, enlarged at its mid-portion. In this is journaled the upper end of a vertical drive shaft 19 which may be the output shaft, or a continuation thereof, of any prime mover, as an electric motor 20, whose switch for controlling the current thereto is indicated at 21. Fixed on shaft 19 within the housing is a bevel pinion 22. With this meshes the bevel gear portion 23*a* of a rotary casing or carrier 23 journaled in bearings 24—24 of the housing and having journaled on a radial stud 25 thereof within the carrier a bevel pinion 26. With this pinion mesh the bevel pinions 27 fixed on the adjoining ends of two horizontal alined shafts 28 which are journaled at such ends in the carrier and at their outer ends in the ends of the housing 18, where they are respectively connected with the two beam shafts by worms 29 (here of the same hand) thereon meshing with worm-wheels 30 on said beam shafts. We have thus within the housing 18 a differential drive from the drive shaft 19 to the driven means comprising shafts 28 and the beams 13 intergeared therewith.

Assume that the sheet *a*, shown in Fig. 1 as wound in a mass *b* on the left-hand beam, is now to be passed to the other beam, being of course partially wound on or otherwise attached to the latter, and that the braking means are set so as to impose some desired degree of braking resistance to either beam when the other beam is rotated to wind the sheet on the latter. Upon shaft 19 and hence the two beams being driven, due to the differential gearing connecting said shaft with the shafts 28 the tension determined by the adjustment of the left-hand braking means will remain substantially of the same degree, or constant, as will also the speed of the sheet, during the pass of the sheet from the left-hand to the other beam, regardless of the changes in diameter of the two wound masses, assuming of course that the adjustment of said braking means is not disturbed. In other words, instead of the power being applied only to the receiving beam and to the delivering beam through the sheet, as usual, it is applied to both beams, each always receiving the power necessary to rotate it according to the leverages represented by the wound masses thereon. When the sheet has in this way been passed to and wound on the right-hand beam upon reversing the motor switch the described operation will be repeated. The sheet may be passed back and forth in this way as many times as the particular treatment—dyeing in the example—requires.

The invention contemplates the combination last stated when the system thus involved is rotatable in either direction and when characterized by an adjustable braking means for each beam, and also when characterized by a braking means of the type that is operative when the corresponding beam is rotating in one direction and substantially inoperative when such beam is rotating in the reverse direction. In the mechanism already described each brake is adjustable independently of the other; but as hereinafter described the brakes are subject to a common adjusting means.

In Fig. 5 the free end of each brake strap 14 is prolonged as a stiff arm 14*a* depending therefrom and terminating at its lower end in a fork 14*b* receiving a nut 14*c* having trunnions 14*d* by which it may articulate in the fork, the two nuts being engaged with the right- and left-hand threads of a hand-screw 14*e* revoluble in a bearing 14*f* on the frame. When the hand-screw is rotated one way or the other the two brake-straps are simultaneously adjusted; the screw is guided for any slight longitudinal movement incident to back and forth rotation of the beams in bearing 14*f*.

Each side standard comprises a pair of uprights 31, one over each beam bearing and each having a vertical outwardly facing surface 31*a* terminating at its lower end in a bearing 31*b*. On each upright is pivoted, by a slot-and-pin connection 32, an arm 33 formed with a hook 33*a* to engage over the top of the upright and maintain the arm in the position where its inner surface 33*b* forms with the surface 31*a* a guideway 34; the slot-and-pin connection permits the arm to be raised to unhook it from the upright so that it may be swung outward and down. When the rolled mass or "batch" of the goods to be treated in the machine is brought thereto, wound on a roller 35 having a removable axial shaft 36, the arms are swung down, shaft 36 is seated thereon and the arms returned and hooked to the upright, whereupon the free end of the sheet is attached to one of the beams and the machine preliminarily operated to wind the sheet on such beam. After the sheet has undergone the treatment described, involving winding from such beam onto the other beam, or it may be back onto the first beam and so on alternately a number of times, the batch is reformed on the roller 35, which is arranged with its shaft 36 in that guideway 34 which adjoins the beam on which the sheet was last wound, by again operating the machine to drive the latter beam, which by friction rotates the batch as it is formed.

The sheet should be guided between each beam and roller 6 and also kept spread transversely, particularly where it approaches the receiving beam. For this purpose I provide a rocking frame comprising two levers 37 each having a U-shaped bearing 37*a* straddling one of the studs 8 and each joined at each end to the corresponding end of the other lever by a bent spreader-bar 38 presenting an outward curved surface in plan and affording a bearing for a trunnion 39 of a roller 40. The sheet extends inward of each roller and outward of each bar. When the operation of passing the sheet from one beam to the other is performed the drag on the guiding means 38—40 of the rocking structure (formed

by its rollers and spreader-bars), which is accentuated by the zig-zag bend each guiding means forms in the sheet, causes it to rock toward the receiving beam so that the corresponding bar is close to that beam and in favorable position for the spread condition of the sheet which it produces to be retained while the sheet is wound on the beam, roller 40 turning with the sheet. However, regardless of its action to spread the sheet, the rocking structure also plays a part in tensioning the sheet in each direction and in controlling it in its travel.

In the modification of this supporting means shown by Fig. 4 the sheet with respect to each end portion of the rocking structure extends from the guiding means formed by the spreader member 41 to the adjoining mass in tangent relation to the latter and the guiding means formed by the roller 43 contacts with the mass where such tangent meets the periphery thereof. Therefore the sheet has no tendency during the winding of either mass and as an incident of its tension to hold the guiding means 43 spaced from the mass, but such means bears constantly against the mass so as to pack the windings as the mass builds up. Since in the form shown the sheet bears against the inner side of the means 41 the latter in this example has its convex side inward. An additional roller 42 is employed to guide the sheet below each spreader-bar and the arrangement of the spreader-bar and two rollers in each case is such that, even in the position of these parts illustrated at the right of Fig. 4, the angularity of the bends in the sheet is much reduced, thus avoiding considerable friction between the spreader-bar and wet fabric and in many cases an undesirable incidental whining.

Having thus fully described my invention what I claim is:

1. A machine of the class described comprising in combination with supporting structure including upright bearing portions and a housing bridging said portions, two substantially horizontal and parallel beams journaled in the respective bearing portions, a pair of alined rotary transmission members journaled in said housing and respectively geared with the beams, a rotary drive shaft journaled in said structure at right angles to said beams and differential gearing connecting said drive shaft with the pair of beams.

2. A machine of the class described comprising, in combination with supporting structure including spaced side standards, two substantially horizontal rotary beams journaled at their opposite ends in the respective standards, an electric motor, differential transmission means operatively connecting the motor with the two beams, said motor and means being carried by one standard, adjustable brakes for the respective beams, and reversing means for the motor, said brakes being connected with and the reversing means carried by the other standard.

3. In combination, with supporting structure, a rotary system comprising two rotary driven means respectively including rotary beams on either of which a flexible sheet may be wound while unwinding from the other, a rotary driving means rotative in either direction, and differential transmission gearing operatively connecting the driving means with each of the two driven means, and separate braking means for the beams, each braking means being permanently settable to brake the corresponding beam when the latter is delivering the sheet and to be ineffective to brake such beam when the same is receiving the sheet.

4. In combination, with supporting structure, mechanism therein for passing a sheet back and forth comprising two substantially parallel rotary beams onto which in alternation the sheet is to be wound as in each such winding it unwinds from the other, means to control the travel of the sheet in each direction comprising a rocking structure fulcrumed between its ends in the first structure on an axis substantially parallel with the beams and having sheet-guiding means at each side of its fulcrum each maintaining two reverse bends in the sheet.

5. In combination, with supporting structure, mechanism therein for passing a sheet back and forth comprising two substantially parallel rotary beams onto which in alternation the sheet is to be wound as in each such winding it unwinds from the other, a freely rocking structure fulcrumed between its ends in the first structure on an axis substantially parallel with the beams and having each side of its fulcrum sheet guiding means from one of which the sheet extends in tangent relation to the mass being wound on the adjoining beam and the other of which is arranged to contact with said mass substantially where such tangent meets the periphery of said mass.

6. In combination, with a frame, mechanism therein for passing a sheet back and forth comprising two substantially parallel rotary beams onto which in alternation the sheet is to be wound as in such winding it unwinds from the other, a roller around which the sheet travels from either beam to the other, and brackets in which the roller is journaled adjustable in the frame around an axis also substantially parallel with the beams and independently of each other.

7. In combination, with a frame, mechanism therein for passing a sheet back and forth comprising two substantially parallel rotary beams onto which in alternation the sheet is to be wound as in such winding it unwinds from the other, a roller around which the sheet travels from either beam to the other, T-shaped brackets having their head-portions adjoining the beams and each pivoted on an axis substantially parallel with the beams, said roller being journaled in the leg portions of the brackets, and means, operatively connecting each head-portion both sides of its pivot with the frame, for adjusting each bracket.

8. Means to support in substantially horizontal position the axial projecting portion of a wound sheet mass comprising a pair of uprights and upright arms having hooks at their upper ends hooked over the uprights, each upright and arm forming a guideway for said axial portion and each arm having its lower end pivoted to the upright and being shiftable lengthwise of itself relatively to its pivoting axis, whereby the arm may be unhooked from the upright and swung down on said pivot.

9. In combination, supporting structure, two substantially parallel rotary beams therein on either of which a flexible sheet may be wound while unwinding from the other, means to rotate either beam to wind the sheet thereon, brake straps secured each at one end to said structure and extending a screw revoluble in said structure and having reversely threaded portions, and nuts engaged with such portions, the nuts being respectively operatively connected with the other ends of said straps reversely around the respective beams.

JOHN E. PETERSON.