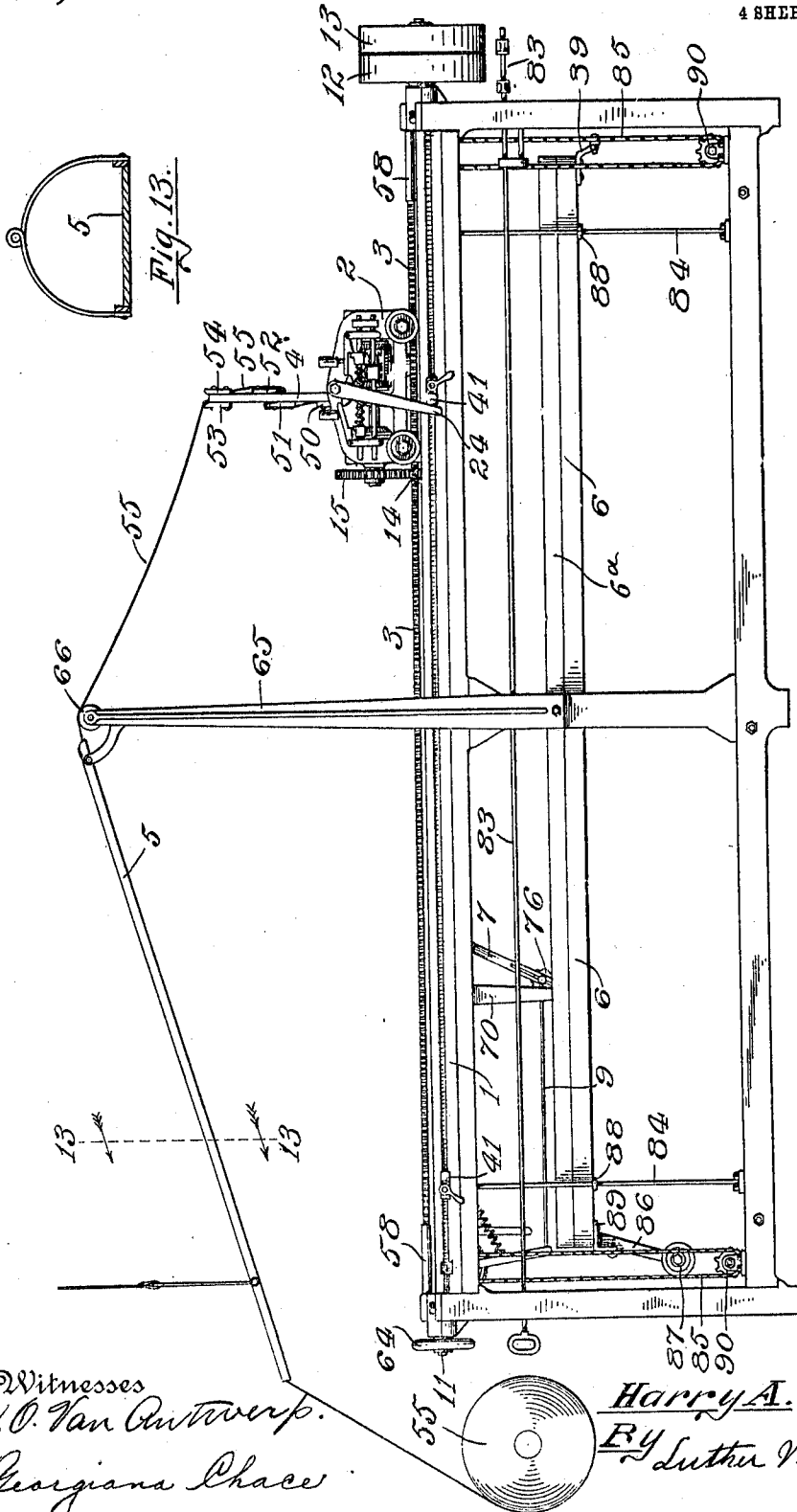


H. A. SHIELDS.
CLOTH PILING MACHINE.
APPLICATION FILED JAN. 11, 1909.

Patented Jan. 4, 1910.

4 SHEETS—SHEET 1.

945,249.



Witnesses
H. O. Van Antwerp.
Georgiana Chace

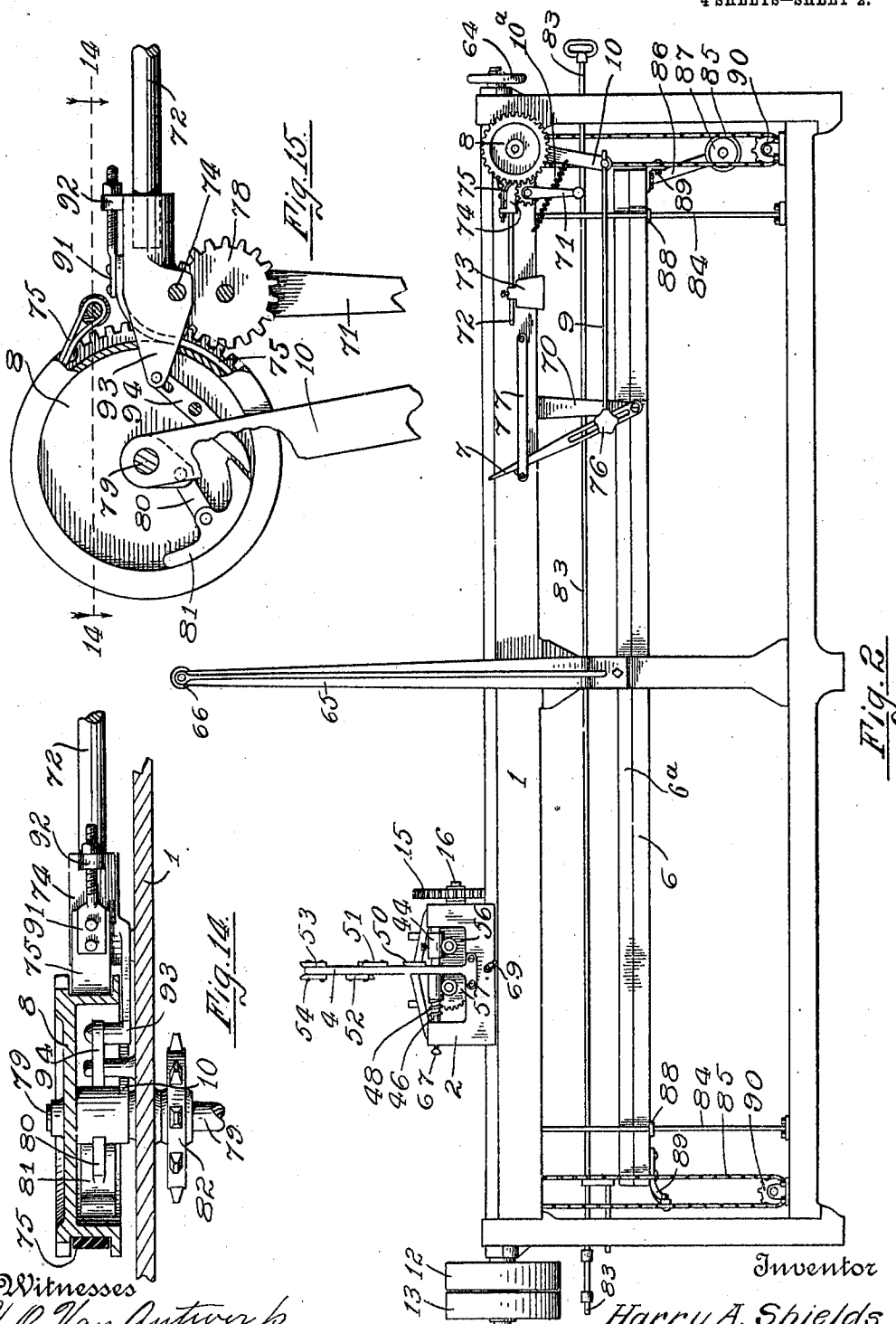
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4 SHEETS—SHEET 2.



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4 SHEETS—SHEET 3.

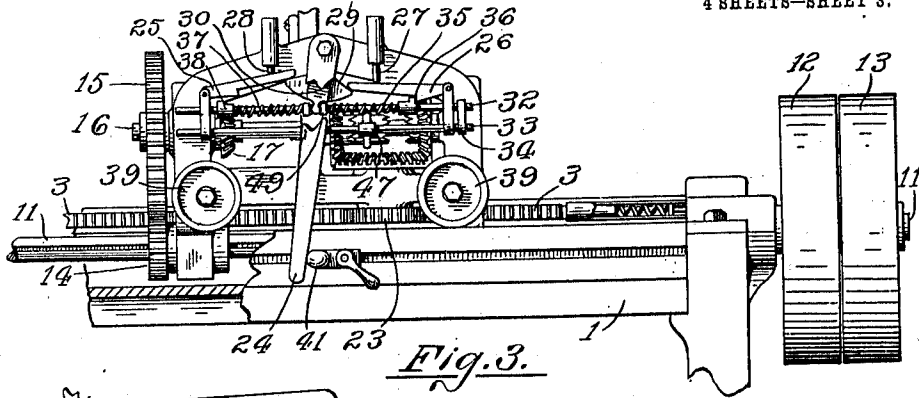


Fig. 3.

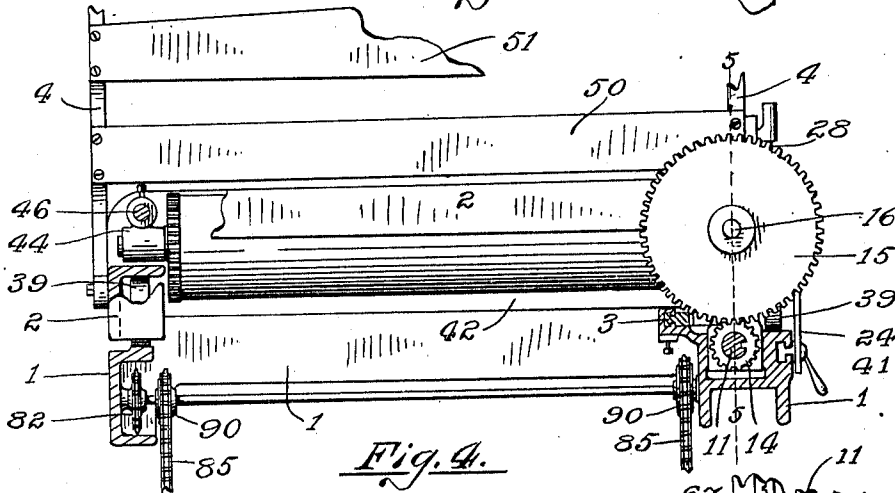


Fig. 4.

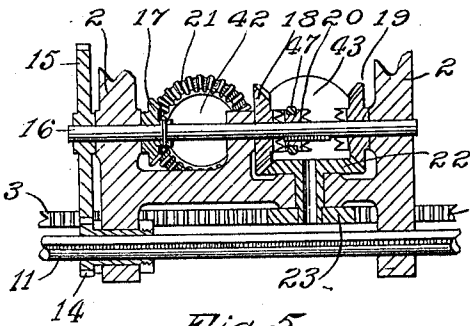


Fig. 5.

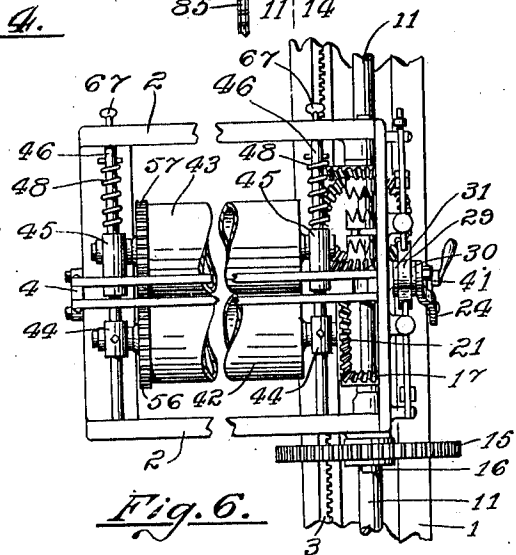


Fig. 6.

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4 SHEETS—SHEET 4.

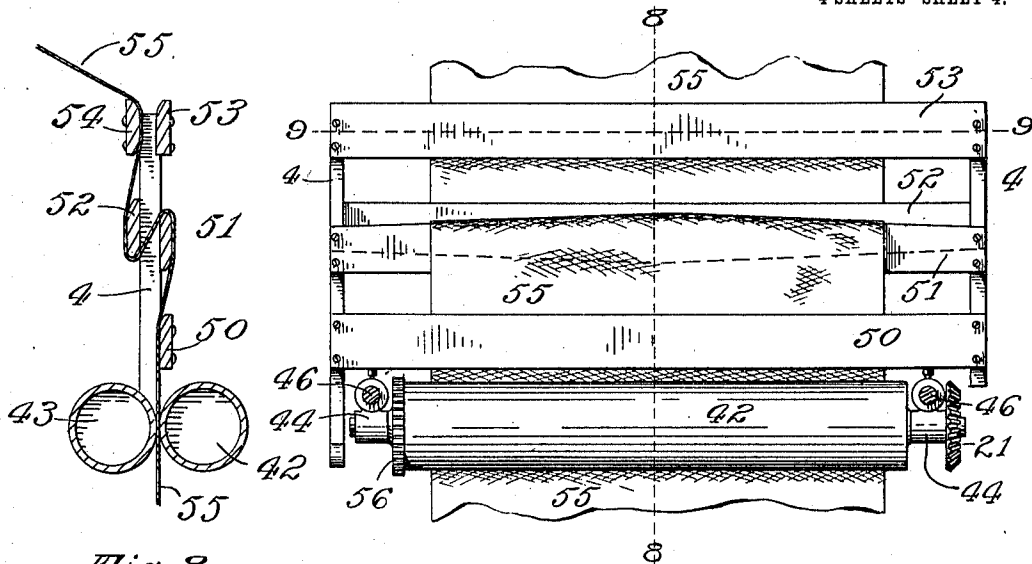


Fig. 8.

Fig. 7.

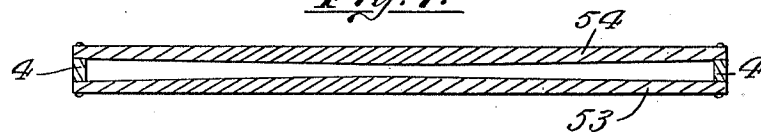


Fig. 9.

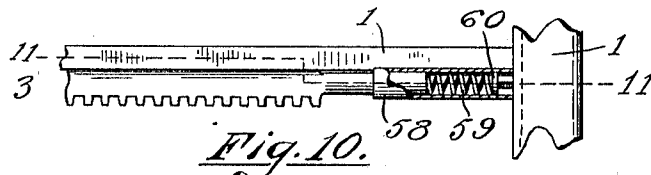


Fig. 10.

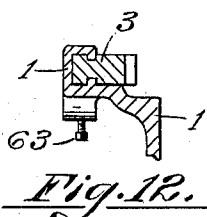


Fig. 12.

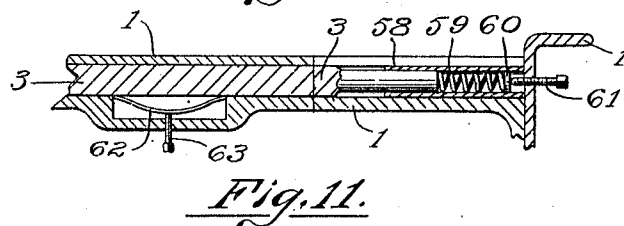


Fig. 11.

Witnesses
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UNITED STATES PATENT OFFICE.

HARRY A. SHIELDS, OF GRAND RAPIDS, MICHIGAN, ASSIGNOR TO L. C. F. MACHINERY COMPANY, OF NASHVILLE, MICHIGAN, A CORPORATION OF MICHIGAN.

CLOTH-PILING MACHINE.

945,249.

Specification of Letters Patent.

Patented Jan. 4, 1910.

Application filed January 11, 1909. Serial No. 471,781.

To all whom it may concern:

Be it known that I, HARRY A. SHIELDS, a citizen of the United States of America, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Cloth-Piling Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to cloth piling machines and more particularly to machines for piling flat fabrics.

It is customary in the manufacture of various cloth goods to first weave or knit a continuous flat fabric, and then to pile the same in superposed layers of the proper length for cutting. Unless this fabric is evenly spread when piled the several portions after cutting will be uneven in size and distorted in shape.

The object of my invention is to overcome this difficulty by providing a device having means for uniformly and evenly smoothing the material and for automatically piling the same in superposed layers of uniform dimensions one above the other, and also for varying the length of the layers at the will of the operator, and to provide the same with various new and useful features hereinafter more fully described and particularly pointed out in the claims, reference being had to the accompanying drawings, in which:

Figure 1 is a side elevation of a machine embodying my invention; Fig. 2 is a side elevation of the same seen from the opposite side; Fig. 3 is an end view of the reciprocating carriage showing a portion of the main frame with parts broken away; Fig. 4 is an elevation of the carriage at right angles to Fig. 3 showing a portion of the frame in cross section; Fig. 5 is a sectional elevation on the line 5—5 of Fig. 4; Fig. 6 is a plan view of the carriage with a portion broken away; Fig. 7 is an elevation of the cloth smoothing device showing the carriage rollers and cloth in position; Fig. 8 is a sectional view on the line 8—8 of Fig. 7; Fig. 9 is a sectional view on the line 9—9 of Fig. 7; Fig. 10 is a plan view of one end of

a portion of the frame carrying the sliding rack and cushion spring; Fig. 11 is a sectional elevation on the line 11—11 of Fig. 10; Fig. 12 is a transverse section of the rack bar and a portion of the frame; Fig. 13 is a sectional view on the line 13—13 of Fig. 1; Fig. 14 is a sectional view on the line 14—14 of Fig. 15; Fig. 15 is an enlarged detail of a part of the table operating mechanism seen from the opposite side from that shown in Fig. 2.

Like numbers refer to like parts in all of the figures.

1 represents the main frame of the machine, along the top edges of the upper members of which traverses the reciprocating carriage, of which 2 is the frame. Mounted on the carriage are a pair of rollers 42 and 43, between which the fabric is fed downward as the carriage reciprocates.

Above the rollers and supported on the frame of the carriage is the cloth smoothing device. This consists of the upright members 4 which are fastened to the frame of the carriage and the smoothing bars 51, 52, 53 and 54, which are bolted to the upright members. To properly direct the fabric to this smoother, stationary arms 65 extend upward at each side of the machine to a suitable distance above the same and a stationary roller 66 is mounted upon these arms. A chute 5 is also provided, which is preferably the same width as of the fabric to be folded. This chute is fastened in any convenient location with one end near the roller 66 and the fabric is drawn along the chute and over the roller into the smoother. The two top smoother bars 53 and 54 are convex on the inner surfaces as shown in sectional view in Fig. 9, to aid in spreading the wrinkles out of the fabric, and also to keep it in the center of the machine. The bars 51 and 52 are convex on their upper and lower edges respectively for the same purpose.

In operation the fabric is drawn along the chute 5 over the roller 66; between the bars 53 and 54 and under the lower convex edge of the bar 52, thence upward over the upper convex edge of the bar 51. The convexity of the bars operates to smooth the wrinkles of the fabric moving the same from the middle

toward the margins thereof. This form also serves to guide the fabric toward the middle of the bars, the same as a belt tends to run to the highest part of a pulley. The friction
 5 also puts a slight tension on the goods smoothing the wrinkles out of the same and stretching it evenly. It then passes downward over the bar 50, as shown, and is thus fed evenly and smoothly between the rollers
 10 42 and 43.

11 is the main driving shaft of the machine and is driven by the pulley 12. This shaft is journaled in bearings on the frame 1 and lies in a channel in one of the top
 15 members of the frame. Downwardly projecting portions of the carriage also extend into the channel in the frame. One of these projections forms a bearing for the shaft 11 and is slidable thereon. The other projection
 20 carries a sleeve which is splined to the shaft 11 and revolves with the same and also slidable thereon. On one end of this sleeve is a pinion 14 which drives the gear 15. This gear 15 is mounted on and drives
 25 the shaft 16 which is journaled in the frame 2 of the carriage. Fastened to this shaft is the bevel pinion 17, which drives the roller 42 through the bevel gear 21, which is attached to the same. The roller 43 is
 30 driven through the roller 42 by the gears 56 and 57, which are attached respectively to the adjacent ends of the rollers 42 and 43. The roller 42 is journaled in bearings 44, which are fixed on rods 46. The roller 43 is
 35 journaled in bearings 45, which are slidable on the rods 46.

48 are tension springs which force the roller 43 toward the roller 42, thus insuring a firm grip on the fabric.
 40 67 are thumb screws for adjusting the tension of the springs 48.

The shaft 16 being positively driven by the shaft 11, always revolves in the same direction consequently the rollers are rotated
 45 in the same direction, this being with their adjacent sides moving downward.

18 and 19 are bevel gears revolving freely on the shaft 16 and driven alternately by the clutch 20, which is splined to the shaft
 50 16, revolving with the same and slidable thereon. Each end of this clutch is provided with teeth which mesh alternately with corresponding clutch teeth on the gears 18 and 19.

22 is a bevel gear journaled in the frame of the carriage and driven alternately and in opposite directions by the gears 18 and 19. To the lower end of the gear 22 is attached a pinion 23, which meshes with the
 60 teeth on the rack and drives the carriage. It will be seen that when the clutch 20, which rotates always in the same direction with the shaft 16 is thrown into mesh with the gear 18, the gears 22 and 23 will be made to ro-

tate and drive the carriage in one direction 65 and the opposite gear 19 will turn idly on the shaft 16 and when the clutch is thrown into mesh with the opposite gear 19, the gear 18 will turn idly on the shaft and the rotation of the gears 22 and 23 will be reversed
 70 also changing the direction of the travel of the carriage.

To shift the clutch a shifter arm 24 is provided, pivoted at its upper end to the frame of the carriage, its lower end coming in contact at each end of the travel of the carriage with one of the stops 41, which are in a T-slot in the main frame and adjustable therein to adjust the distance of travel of the carriage thereby determining the length of the layers of the fabric. Behind the upper end of the arm 24 and swinging on the same pivot are cam levers 30 and 31 and between these levers is a shouldered rocker 29 all three being fastened to the arm 24 and oscillating with the same. The yoke 47 is fastened to a shifter rod 33, which is slidable in lugs on the frame and is moved with the rod 32 through the connecting block 34.
 75 80 85

36 and 38 are collars fastened to the rod 32 and engaged by the springs 35 and 37. A sliding collar is provided on the rod 32, which is actuated by the levers 30 and 31, and which engages the springs 35 and 37 which operate to slide the rod 32 back and forth. Latches 25 and 26 are provided pivoted to the frame and with shoulders which alternately engage the collars 36 and 38, and hold the same till released by the action of the shouldered rocker 29, which engages the free end of each of the latches.
 90 95 100

27 and 28 are spring push rods, which hold the latches in position.

In operation during one stroke of the carriage, the clutch 20 is held in position by the engagement of the shoulder on one of the latches 25 or 26 against one of the collars 36 or 38 through the parts 32, 34, 33 and 47. At the extreme end of the stroke, the arm 24 engages one of the stops 41, oscillating the arm and its attached parts 29, 30 and 31. The collar 49 is shifted on the rod 32, putting a tension on one of the springs 35 or 37. The latches are also moved by the action of the shouldered rocker 29, one up and the other down. At the end of the oscillation of the arm, the latch engaging the collar suddenly releases its hold allowing the rods 32 and 33 to shift under spring tension of the spring 35 or 37, as the case may be, thus suddenly shifting the clutch 20 and instantly reversing the motion of the carriage as heretofore described, the other latch springing into place and holding the clutch in position. This sudden and unyielding reversal of the driving mechanism of the carriage puts such a strain on the device that any high speed is impossible without heavy shocks and risk of
 105 110 115 120 125

breaking such parts as the rack and pinion, or the gears. To overcome said difficulties due to this sudden changing of the motion of the carriage, the rack 3 is made slidable in a slot in the frame 1 of the machine, and is provided at each end with cushion springs 59. The tension of these springs may be adjusted by screws 61.

62 is a friction spring (several of which are used) which spring acts as a brake to hold the rack in position with the spring 59 under tension until shifted by the momentum of the carriage. Either the springs 59 or 62 will operate to control the rack movement, but I prefer to use both. Located beneath the carriage is a platform 6^a which is automatically lowered step by step as the material is accumulated thereon. This platform is mounted upon ways 6 attached at their respective ends to vertically extended sprocket chains 85, which chains pass around sprocket wheels 90 at the top and bottom of the frame and extend near the respective corners of the platform. These ways are connected to the chains by brackets 89 and are guided in their vertical movement by eyes 88 fastened to the ways and sliding upon guide rods 84 fastened to the frame. The platform is slidable on these ways so that when filled, it can be run out from beneath the carriage and outside of the frame for removal of the material thereon. To support the outer end of the platform when so removed, it is provided with legs 86 having rollers 87 to engage the floor. The upper sprocket wheels 90, which support the chains 85 are connected in pairs at the respective ends of the machine by shafts 79. These shafts being connected by sprocket wheels 82 and a chain passing around these wheels to cause them to rotate simultaneously.

The platform is lowered step by step, and held by means of a drum 8 which is fastened to the shaft 79. The inner surface of this drum is engaged by a shoe 81, which is pivotally connected to the arm 10 by means of a link 80.

7 is a lever pivoted at its lower end to a bracket 70 on the frame, its upper end moving freely and being guided by ways 77 so that at each reciprocation of the carriage a pivoted dog 69 on the carriage engages the upper end of this lever and moves it in one direction. When released, the lever is returned to its former position by the spring 10^a and a rod 9. On the return stroke of the carriage, the dog 69 on the carriage being pivoted to move in one direction only passes freely over the lever. The lever is provided with a slot near its pivoted end in which is an adjustable pivot 76. The rod 9 is attached to this pivot and is also attached to and moves the arm 10 with the lever 7. By moving the pivot 76 on the slotted lever

7, the length of the stroke of the arm 10 can be varied. The arm 10 is pivoted at its upper end on the shaft 79, and swings freely thereon.

The link which connects the shoe to the arm 10 is pivoted a little below and at one side of the pivot of said arm, so that when the arm is oscillated in one direction, the shoe is brought in frictional contact with the inner surface of the drum and operates to rotate the same. During the reverse stroke of the arm, the shoe is released and moves freely.

Surrounding the drum is a band 75, one end of which is fastened to the frame, the other end being fastened to a lever 72 by means of a screw threaded member 91 extending through a leg 92 on the lever, and provided with an adjusting nut to adjust the band. This lever is pivoted to the frame at 74 and carries an adjustable weight 73 on its outer end. This band acts as a friction brake to hold the drum when the shoe 81 is not in action.

71 is a crank connected to a pinion 78, which pinion is in mesh with gear teeth on the drum 8 to manually rotate the same and for manually raising and lowering the platform. To clear the shoe 81 from the drum when so manually operating the same, the lever is prolonged inward as at 93 and slidably connected at its inner end to one end of an auxiliary lever 94 intermediately pivoted on the frame and engaging the shoe 81 at the other end to lift the same clear of the drum when the lever 72 is manually lifted to slacken the band 75.

83 is a belt shifter which is provided with a handle to manually shift a driving belt (not shown) from the tight pulley 12 to the loose pulley 13 and vice versa.

64 is a hand wheel on the shaft 11 to manually operate the same.

In operation the carriage is reciprocated on the frame, the rollers 42 and 43 are rotated downward at their adjacent sides at each stroke of the carriage at the same speed that the carriage travels, thus feeding the material evenly to and from upon the platform. At the termination of each stroke of the carriage as the driving mechanism thereof is suddenly reversed, the shock is relieved by the sliding movement of the rack and the springs and brake thus enable the machine to be run at a high speed without undue strains, shock or breakage. At each alternate traverse of the carriage the platform is lowered sufficiently to accommodate the increasing stock thereon. The smoother bars spread and smooth the fabric evenly before reaching the feed rolls, thus laying the same uniformly and smoothly, both longitudinally and transversely, whereby when cut, each superposed piece will be of the

same size and shape. When the platform reaches its lower limit, it may be run out from beneath the carriage and the material thereon removed. The platform is then re-
 5 placed and restored to its elevated position, and the operation of the machine repeated.

What I claim is:—

1. A cloth piling machine comprising a reciprocable carriage, a pair of rollers on
 10 the carriage to feed the fabric, means for rotating the rollers, and a series of fixed bars mounted on the carriage, each bar having a convex surface to engage the fabric to spread and smooth the same.

15 2. A cloth piling machine comprising a reciprocable carriage, rollers journaled on the carriage to engage and feed the fabric, means for rotating the rollers, posts mounted on the carriage, and bars carried by the
 20 posts and having longitudinally and transversely convex surfaces to engage, smooth and spread the fabric.

3. A cloth piling machine comprising a reciprocable carriage, a pair of rollers jour-
 25 naled on the carriage, means for rotating the rollers, a pair of bars having opposing convex surfaces to alternately engage the fabric, a second pair of bars having oppositely acting convex edges to successively engage the
 30 fabric posts, mounted on the carriage and supporting said bars, and a stationary guide roller mounted above the path of said bars and carriage.

4. A cloth piling machine comprising a
 35 reciprocable carriage, rollers mounted on the carriage, a smoother also mounted on the carriage and having bars provided with convex surfaces to engage the fabric, a stationary
 40 guide roller located above the path of said smoother and carriage, and a fixed chute to guide the fabric to the guide roller.

5. A cloth piling machine having a reciprocable carriage, and means for reciprocating the carriage comprising a rack, a driving
 45 shaft extending parallel with the path of the carriage, a shaft mounted on the carriage, and connected to the driving shaft and driven thereby, two gears loose on the shaft, a gear oppositely engaged by the loose gears,
 50 a pinion driven by said last named gear and engaging the rack, a clutch adapted to alternately connect the loose gears with the shaft, and means for automatically shifting the clutch at each end of the traverse of the
 55 carriage.

6. A cloth piling machine comprising a reciprocable carriage, a shaft mounted on the carriage, a driving shaft, a sleeve jour-
 60 naled in the carriage slidably connected to the driving shaft and driven thereby, a pinion on the sleeve and driving the shaft on the carriage, two bevel gears loose on said shaft and spaced apart, a bevel gear between said loose gears and oppositely engaged

thereby, a clutch on the shaft between the
 loose gears and alternately connecting the
 same to the shaft, means for shifting the
 clutch at the end of each traverse of the car-
 riage, a pinion driven by the bevel gear, and
 a rack engaged by said pinion. 65

7. A cloth piling machine having a re-
 ciprocable carriage, means for driving the
 carriage comprising a shaft journaled on
 the carriage, means for continuously rotat-
 ing the shaft, two gears loose on the shaft
 and spaced apart, a bevel gear oppositely
 engaged by said loose gears, a clutch adapt-
 ed to alternately connect the loose gears with
 the shaft, means for automatically shifting
 the clutch at the end of each traverse of the
 carriage, a pinion driven by the bevel gear,
 and a rack engaged by the pinion; a pair of
 rollers on the carriage, and gears connecting
 the rollers and the shaft. 70

8. A cloth piling machine comprising a
 reciprocable carriage, a driving shaft and a
 rack near the path of the carriage and par-
 allel therewith, a sleeve on the carriage sur-
 rounding the driving shaft and splined
 thereto, a pinion on the sleeve, a shaft jour-
 naled on the carriage, a gear on the shaft
 and engaged by the pinion, a pair of rollers
 driven by the shaft, two bevel gears loose on
 the shaft and spaced apart, a bevel gear op-
 positely engaged by the loose gears, a pin-
 ion connected to the bevel gear and engag-
 ing the rack, a clutch between the loose gears
 and adapted to alternately connect said
 gears with the shaft, and means for shifting
 said clutch at the end of each traverse of the
 carriage. 85

9. A cloth piling machine comprising a re-
 ciprocable carriage, a shaft mounted on the
 carriage, means for constantly rotating said
 shaft, two gears loose on said shaft and
 adapted to drive the carriage in opposite
 directions, a clutch splined on the shaft and
 alternately connecting said gears to the
 shaft, a longitudinally movable rod connect-
 ed to the clutch to move the same, collars on
 the rod, latches to alternately engage the
 collars and hold the clutch in engagement
 with the respective gears, springs engaging
 the collars to move the rod, an arm adapted
 to alternately compress the springs and to
 alternately release the latches, and means for
 shifting the arm at the end of each traverse
 of the carriage. 90

10. A cloth piling machine comprising a
 reciprocable carriage, a shaft mounted on
 the carriage, means for constantly rotating
 the shaft, two gears loose on said shaft and
 adapted to drive the carriage in opposite
 directions, a clutch splined to said shaft and
 adapted to alternately connect the said gears
 with the shaft, springs to shift said clutch,
 latches to alternately hold said clutch in en-
 gagement with the respective gears, and an
 105 110 115 120 125

arm adapted to alternately compress said springs and to alternately release said latches.

11. A cloth piling machine comprising a reciprocable carriage, two gears adapted to alternately drive the carriage in opposite directions, a shaft on the carriage, means for rotating the shaft, a clutch adapted to alternately connect said gears with said shaft, a spring to shift the clutch, a latch to hold the clutch in engagement with a gear and also to hold the spring under tension, and an arm to release the latch at the end of the traverse of the carriage.

12. A cloth piling machine comprising a reciprocable carriage, a shaft journaled on the carriage, means for rotating the shaft, two gears loose on the shaft and adapted to drive the carriage in opposite directions, a clutch on the shaft adapted to alternately connect the gears with the shaft, a longitudinally movable rod connected to the clutch to move the same, two fixed collars and a slidable collar on the rod, springs between the fixed collars and the slidable collar, latches alternately engaging the fixed collars, and a shifting arm to operate the latches and the sliding collar.

13. A cloth piling machine comprising a frame, a reciprocable carriage, a rack and a driving shaft mounted on the frame, a pinion on the carriage driven by the driving shaft and slidable thereon, a shaft on the carriage, a gear on the last named shaft driven by the pinion, two gears loose on the said shaft and spaced apart, a bevel gear and a clutch between the loose gears, a longitudinally movable rod connected to the clutch, two fixed collars and a slidable collar on the rod, springs between the slidable collar and the fixed collars, latches to alternately engage the fixed collars, an arm to alternately shift the latches and to move the slidable collar, and a pinion driven by the bevel gear and engaging the rack.

14. A cloth piling machine comprising a reciprocable carriage, a pinion on the carriage, a rack capable of limited longitudinal movement engaged by the pinion, springs engaging the ends of the rack, and means for reversibly rotating the pinion to drive the carriage in opposite directions.

15. A cloth piling machine comprising a reciprocable carriage, a pinion on the carriage, a rack capable of limited longitudinal movement engaged by the pinion, springs alternately compressed and released by the movement of the rack, a friction brake also engaging the rack, and means for reversibly rotating the pinion to drive the carriage in opposite directions.

16. A cloth piling machine comprising a reciprocable carriage, a pinion on the carriage, a rack capable of limited longitudinal

movement engaged by the pinion, a friction brake engaging the rack to retard the movement of the same, and means for reversibly rotating the pinion to drive the carriage in opposite directions.

17. A cloth piling machine having a reciprocable carriage, means for driving the carriage comprising a rack and a driving shaft near the path of the carriage, a pinion on the carriage engaging the rack, means for reversibly connecting the pinion with the driving shaft, an arm to operate said means, adjustable stops in the path of said arms, rollers mounted on the carriage, means for connecting the rollers with the driving shaft, a smoother mounted on the carriage above the rollers and having bars to alternately engage the fabric, and a stationary guide roller supported above the path of the smoother and carriage.

18. A cloth piling machine comprising a vertically movable table, means for raising and lowering the table, a shaft to operate said means, a drum on the shaft, a lever pivoted on the shaft, a shoe engaging the interior of the drum, a link connecting the shoe and the lever, a second lever adjustably connected to the first lever, a reciprocable carriage, and a dog on the carriage to engage the second lever and move the same.

19. A cloth piling machine, comprising a vertically movable table, a reciprocable carriage above the table, means for raising and lowering the table, a shaft to operate said means, a drum on the shaft, a band surrounding the drum, a lever and weight attached to one end of the band, a fixed support for the other end of the band, a lever pivoted on the shaft, a shoe slidably engaging the inner surface of the drum, a link connecting the shoe and lever, and means for reciprocating the lever at each reciprocation of the carriage.

20. A cloth piling machine, comprising a vertically movable table, means for vertically adjusting the table, a crank connected to said means to operate the same, a drum to operate said means, a reciprocating shoe and a brake engaging the drum, and a lever adapted to apply the brake when moved in one direction, and also adapted to simultaneously release the brake and shoe when moved in the opposite direction.

21. A cloth piling machine, comprising a vertically movable table, a shaft for vertically adjusting the table, a drum on the shaft, a friction shoe engaging the drum, a lever to operate the shoe, a brake band engaging the drum, a lever to operate the brake band, an auxiliary lever operated by the first named lever and engaging the shoe to disengage the same from the drum, and a crank to manually operate the shaft when the shoe and band are released.

22. A cloth piling machine, comprising
a frame, a table vertically movable in the
frame, a shaft journaled in the frame and
adapted to vertically adjust the table, a drum
5 and gear on the shaft, a pinion engaging the
gear, a crank connected to the pinion to man-
ually operate the same, a lever pivoted on
the shaft, a friction shoe connected to the
lever and engaging the interior of the drum,
10 a brake band surrounding the drum and at-
tached to the frame at one end, a lever piv-
oted on the frame and adjustably attached

to the other end of the brake band, said lever
also having an inward extension, and an
auxiliary lever intermediately pivoted to the 15
frame at one end and operated by the first
named lever and also engaging the shoe at
the other end to release the same.

In testimony whereof I affix my signature
in presence of two witnesses.

HARRY A. SHIELDS.

Witnesses:

GEORGIANA CHACE,
LUTHER V. MOULTON.

Correction in Letters Patent No. 945,249.

It is hereby certified that the name of the assignee in Letters Patent No. 945,249, granted January 4, 1910, upon the application of Harry A. Shields, of Grand Rapids, Michigan, for an improvement in "Cloth-Piling Machines," was erroneously written and printed "L. C. F. Machinery Company," whereas said name should have been written and printed *S. C. F. Machinery Company*, as shown by the record of assignments in this office; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 25th day of January, A. D., 1910.

[SEAL.]

C. C. BILLINGS,
Acting Commissioner of Patents.