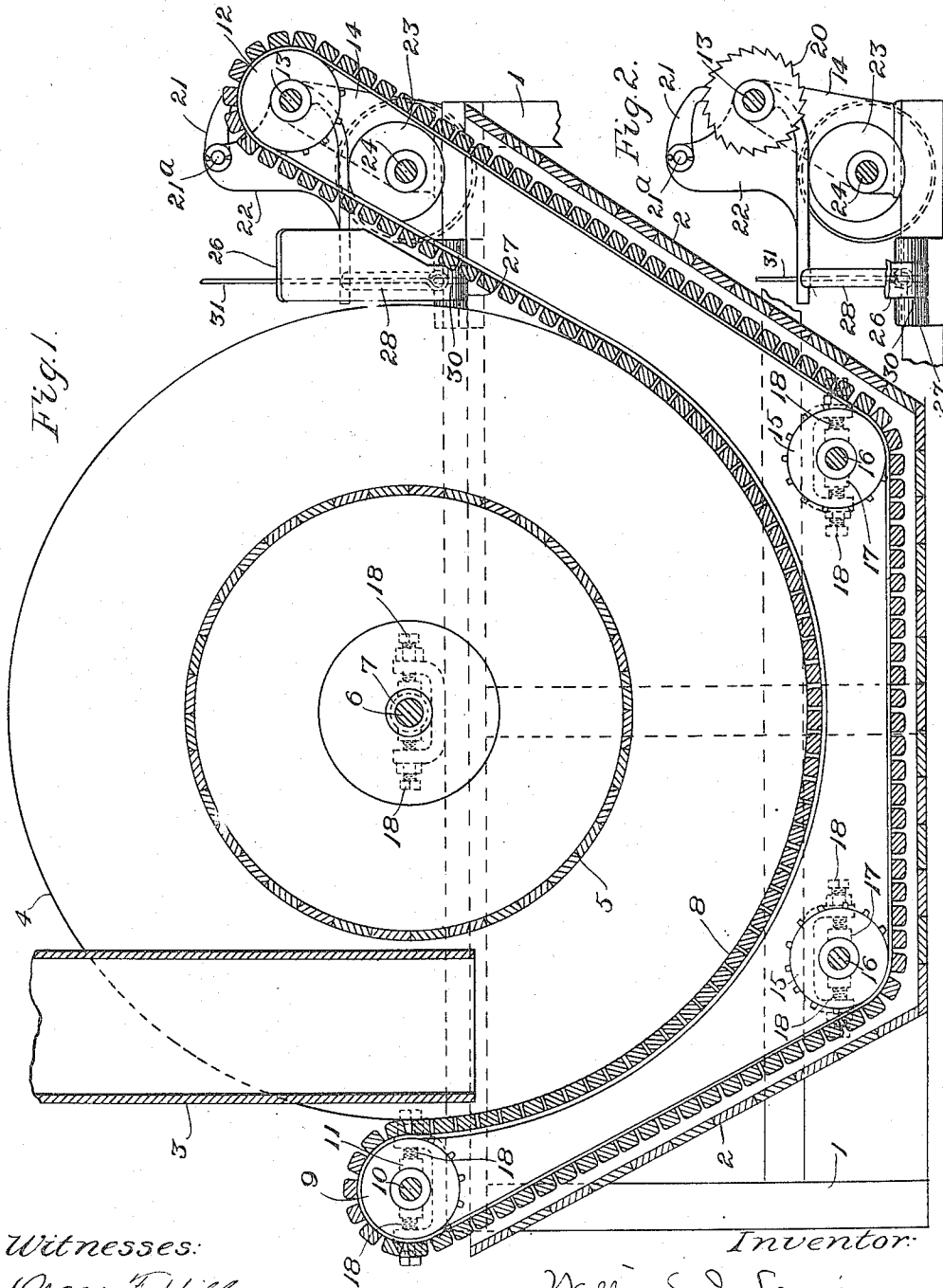


W. I. LEWIS.
CLOTH HANDLING APPARATUS.
APPLICATION FILED DEC. 4, 1913.

1,123,768.

Patented Jan. 5, 1915.

5 SHEETS—SHEET 1.



Witnesses:

Oscar F. Hill

Ellen O. Sprung

Inventor:

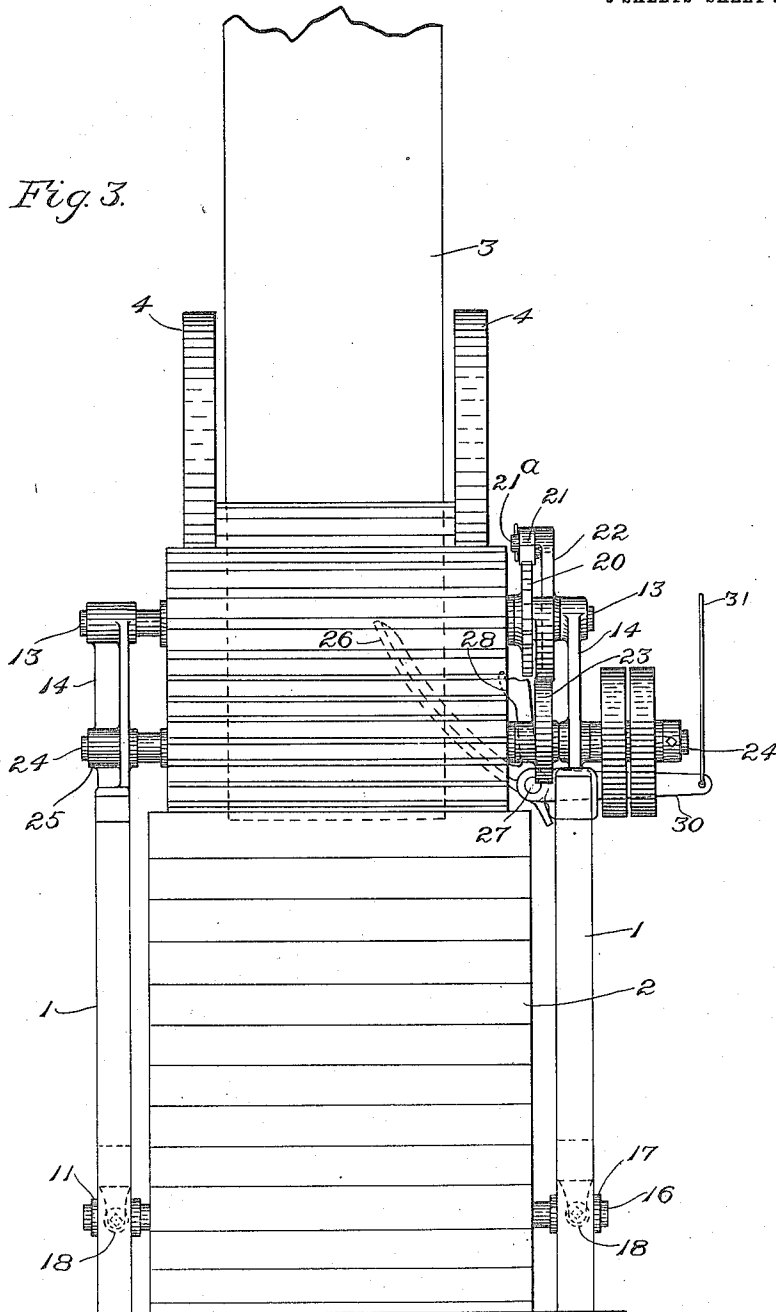
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6 SHEETS—SHEET 2.



Witnesses:
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Ellen O. Spring

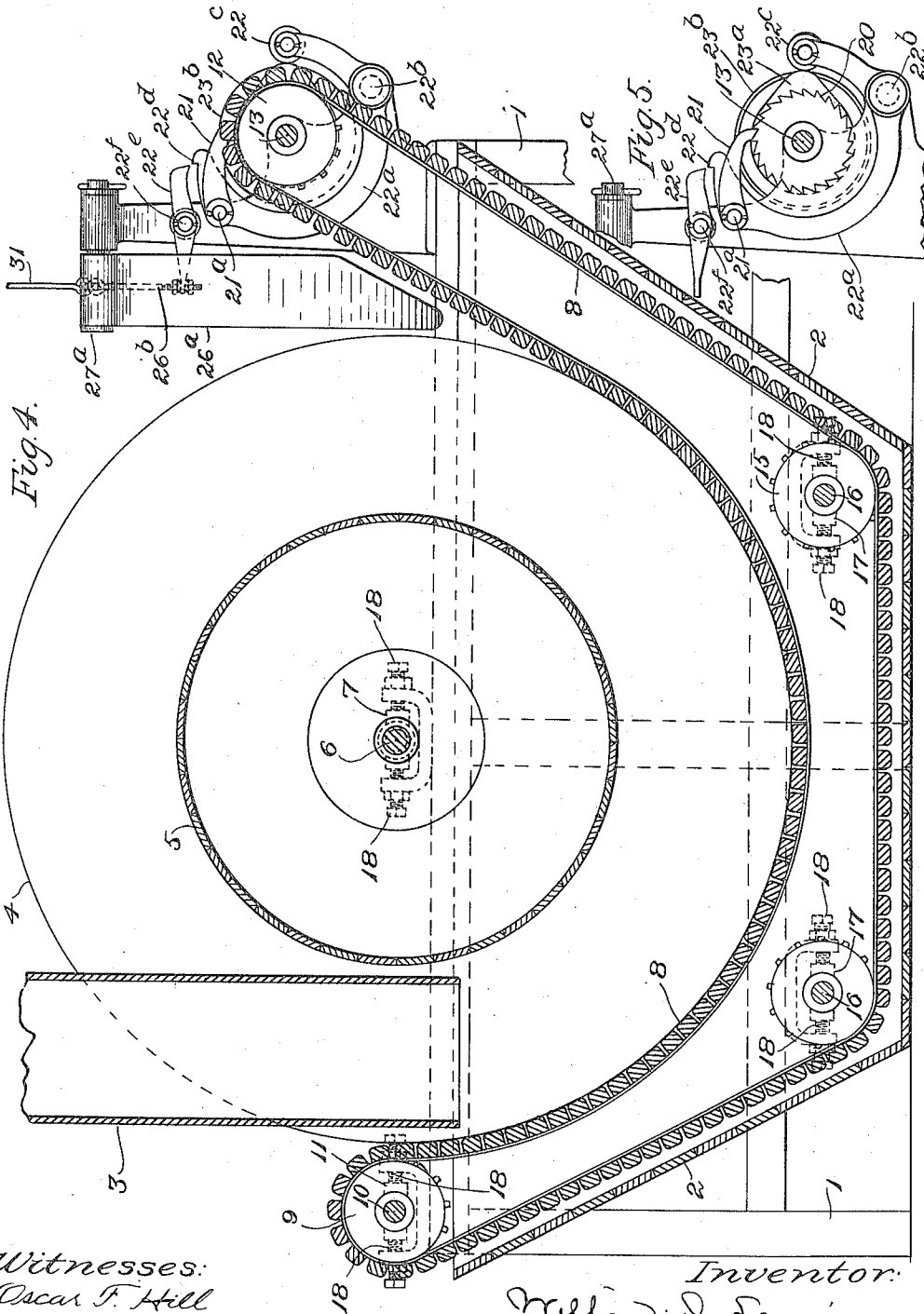
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6 SHEETS—SHEET 3.



Witnesses:
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Ellen O. Spring

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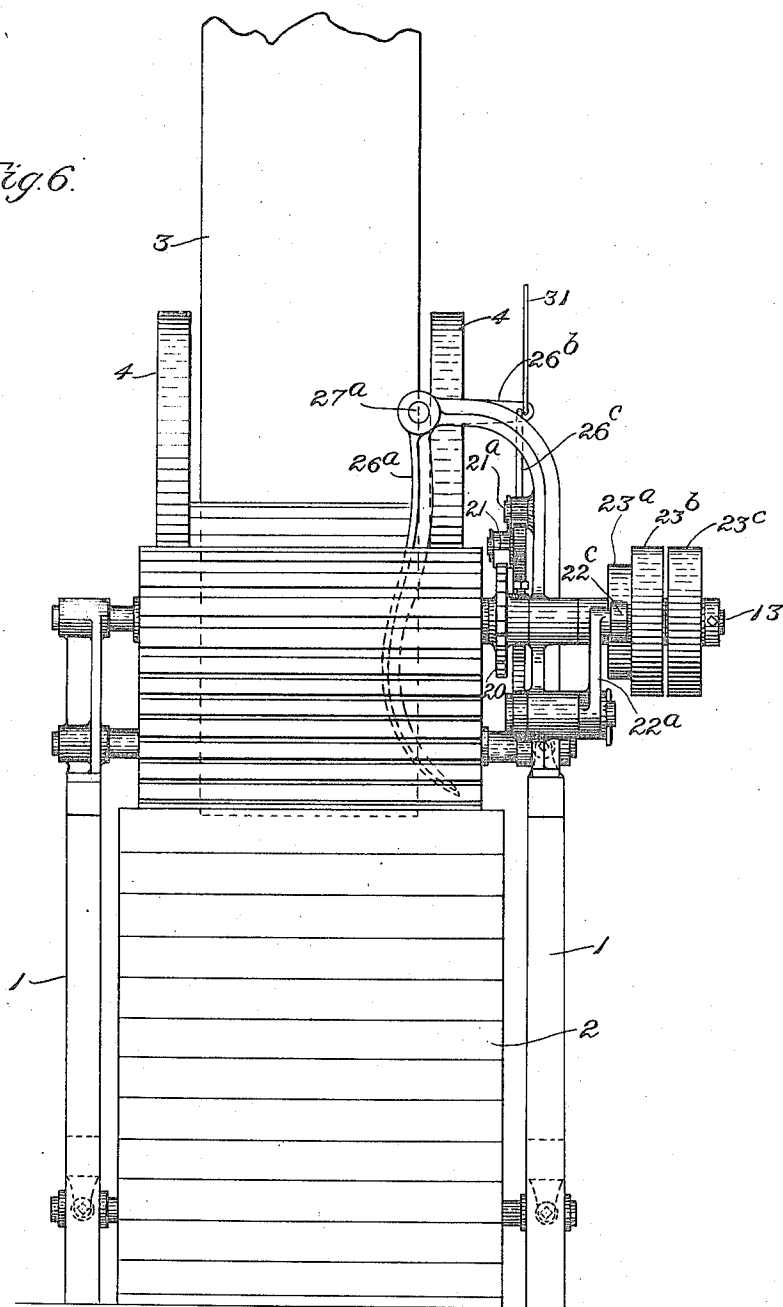
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6 SHEETS-SHEET 4.

Fig. 6.



Witnesses

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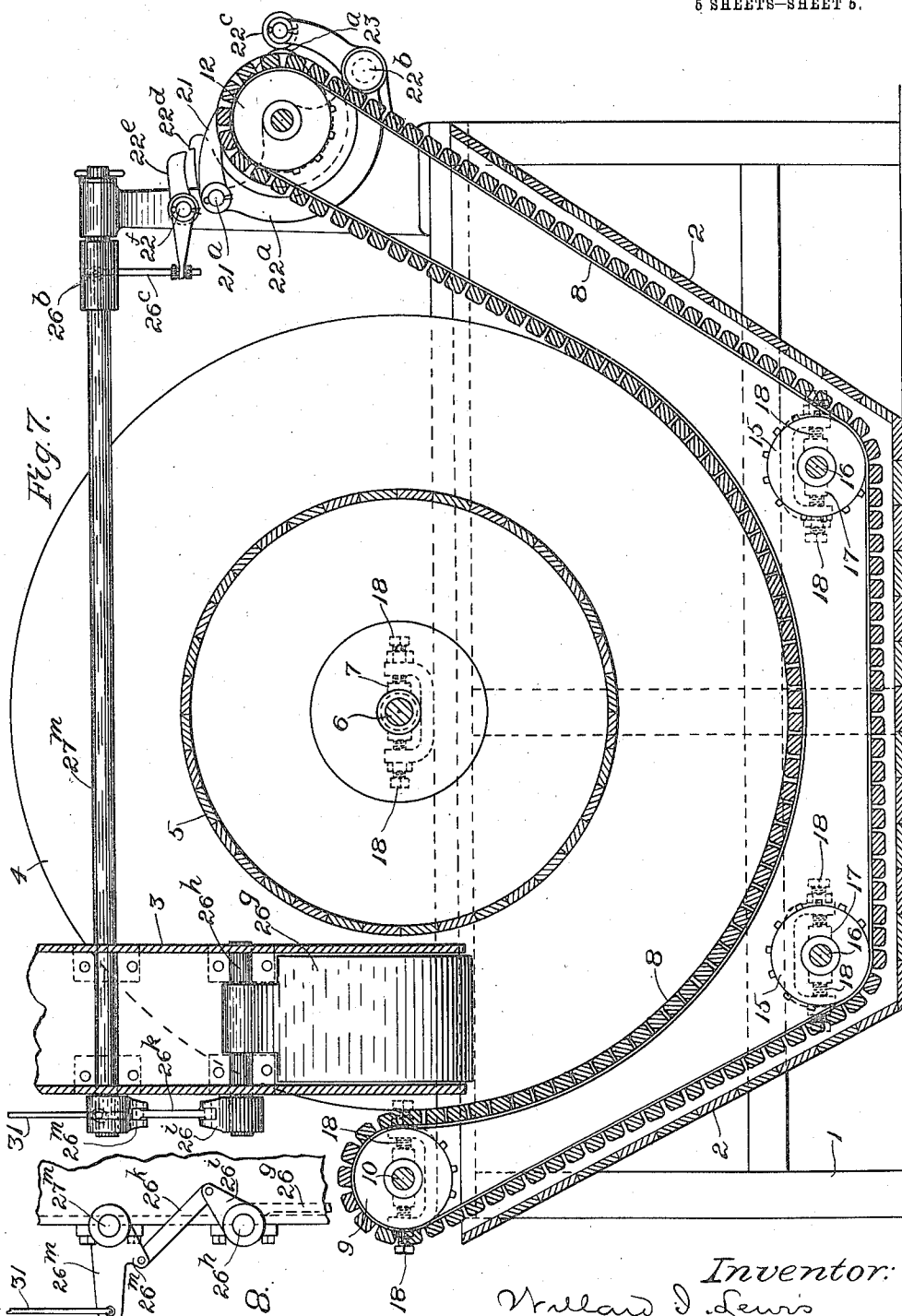
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6 SHEETS—SHEET 5.



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Fig. 8.

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UNITED STATES PATENT OFFICE.

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CLOTH-HANDLING APPARATUS.

1,123,768.

Specification of Letters Patent.

Patented Jan. 5, 1915.

Application filed December 4, 1913. Serial No. 804,571.

To all whom it may concern:

Be it known that I, WILLARD I. LEWIS, a citizen of the United States, residing at Walpole, in the county of Norfolk, State of Massachusetts, have invented a certain new and useful Improvement in Cloth-Handling Apparatus, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention is designed more particularly for employment in the treatment of cloth in continuous web form, it being applicable also in that of yarns in continuous skein form.

It has relation to apparatus or machines of a class used more especially in dyeing, bleaching, and the like processes, and constructed with a storage-chamber of large capacity in which a web of cloth in rope-form, for instance, or a series of webs joined together end to end, is piled and accumulated until a large quantity occupies the chamber, wherein it undergoes the action of the solution with which it is treated, the web being continuously fed into the chamber at the receiving end of the latter and continuously withdrawn at the delivering end thereof so that the operation is continuous and progressive.

One aim of the invention is to provide for effecting positively the gradual advance of the general pile or accumulation of cloth toward the point at which the withdrawal from the storage-chamber takes place.

Another aim is to provide for automatically regulating the rate of such advance.

Another aim is to provide for automatically regulating the rate of travel of the cloth in being withdrawn from the storage chamber or being supplied thereto, as the case may be, so as to guard against an over-accumulation in the storage-chamber, or too rapid withdrawal therefrom.

The drawings show embodiments of the features of the invention.

Figure 1 shows in vertical longitudinal section an apparatus or machine containing one embodiment of the features of the invention. Fig. 2 is a detail view showing certain of the parts of the devices by which the rate of advance of the pile of cloth within the storage-chamber is automatically regulated. Fig. 3, Sheet 2, is an end elevation of the apparatus or machine of Fig. 1, looking at the delivering end thereof. Figs. 4

and 5, Sheet 3, and Fig. 6, Sheet 4, are views like Figs. 1, 2 and 3, showing a second embodiment of the features of the invention. Fig. 7, Sheet 5, shows in vertical longitudinal section an apparatus or machine in which the detector is located at the receiving end of the apparatus or machine. Fig. 8, Sheet 5, is an elevation of certain parts at the said receiving end.

Having reference to the drawings,—and first to Figs. 1, 2 and 3,—at 1, is a supporting framework, at 2 a vat or tank within said framework, and at 3 a chute through which the cloth passes continuously to the storage-chamber, from a source of supply or from some apparatus or machine in which the cloth is treated or operated upon. The discharging end of the said chute enters between the opposite flanges 4, 4, of a drum having a cylindrical barrel 5, Fig. 1, and having a supporting shaft 6 which is journaled in bearings 7 fixed upon framework 1 at opposite sides of the vat or tank 2. The greater part of the barrel and flanges of the drum below shaft 6 dips down into the vat or tank. The lower portion of the circumference of the drum is encircled by one run of a slatted apron 8, the said run making contact with the peripheries of the flanges 4, 4, so as thereby to close the lower portion of the annular space between the said flanges. The annular space of the flanged drum thus constitutes a storage chamber into which the web is deposited through the chute 3, and within which it remains until withdrawn at the delivering end of the apparatus or machine. In lieu of the chute 3, any approved means of depositing the web within the storage chamber may be employed in practice, as, for instance a folder arrangement of one of the types used in cloth and yarn handling apparatus and machines. At the receiving end of the apparatus or machine, the slatted apron extends upward and over and partly around sprocket-wheels 9 on a supporting shaft 10 mounted in bearings 11 on the framework 1. At the delivering end, the slatted apron passes upward and outward, and around sprocket-wheels 12 upon a supporting shaft 13 mounted in bearings in stand 14, 14, rising from framework 1. The lower or idle run of the slatted apron passes under sprocket-wheels 15, 15, on supporting shafts 16, 16, mounted in bearings 17, 17, at the bottom of vat or

tank 2. The bearings of the sprocket-wheel supporting shafts 10, 16, 16, and of the drum-supporting shaft 6, are adjustable by means of screws 18, 18, to regulate the tension of the slatted apron and the closeness of its fit against the peripheries of the flanges of the drum.

The cloth piled within the storage-chamber fills the space inclosed by the drum-barrel, the drum-flanges, and the portion of the slatted apron which fits against the peripheries of the drum-flanges. The leading portion of the cloth is withdrawn continuously from the said space, at the end of the machine opposite that at which chute 3 is shown, by suitable feeding or draft devices, which may deliver to a succeeding apparatus or machine to which the cloth passes from the illustrated apparatus or machine. For the purpose of positively advancing or shifting the mass of cloth bodily from the receiving end of the machine toward the delivering end thereof, I provide driving devices by means of which a traveling movement of the apron and rotation of the drum are produced. Thereby the mass of cloth is carried bodily around toward the delivering end of the machine. Such driving devices comprise in Figs. 1, 2 and 3 a ratchet-wheel 20 fixed on shaft 13, a pawl 21 engaging with said ratchet-wheel, a carrying-lever 22 to which said pawl is pivoted at 21^a, and an operating cam 23 for said lever, said cam being carried by a power-driven shaft 24 mounted in bearings 25, 25, supported on framework 1. As shaft 24 and cam 23 rotate, the high portion of the cam presses against lever 22 and swings the latter so as to advance the pawl 21 and thereby rotate the ratchet-wheel 20 a step, thereby actuating the slatted apron and drum in a forward direction. The low portion of the cam permits the return movement of the lever 22 and pawl 21 through the action of the gravity of lever 22.

It is intended that the pile of cloth shall be advanced toward the delivering end of the apparatus or machine only at a rate to compensate, or approximately compensate, for the piling of the oncoming cloth within the receiving end of the apparatus or machine, and the withdrawal of cloth at the leading end of the pile, there being substantial correspondence between the rate of inflow at the receiving end of the machine and the rate of outflow at the delivering end. The means for automatically regulating the rate of bodily advance of the pile comprises a detector that is arranged to be controlled by the mass of cloth, and which itself controls the means for actuating the storage-chamber. Figs. 1 and 3 show a detector 26 in the form of a swinging arm that is pivotally mounted at its lower end at 27 in connection with the framework 1.

This detector inclines transversely inward, as shown best in Fig. 3, past one of the drum-flanges and over the inner run of the slatted apron, into a position to be acted upon by the leading portion of the advancing mass of cloth. Connected with the detector is a detent-arm 28 which coacts with pawl-carrying arm 22. When the leading portion of the mass of cloth does not act against the detector, the latter occupies its normal position shown in Fig. 3, namely projecting inward transversely of the storage-chamber. In such position of the detector the detent occupies such relations to pawl-carrying arm 22 that the latter and the pawl are permitted to make a full recovery stroke, so that the pawl passes back over the maximum number of teeth of the ratchet-wheel. When, now, the cam actuates the lever 22 and pawl 21, the ratchet-wheel is turned to a corresponding extent. The result is that the actuating devices for the slatted apron operate the latter and the drum, to advance them and the mass or pile of cloth contained within the storage chamber at the maximum speed.

When the rate at which the mass or pile of cloth is advanced exceeds the rate at which the leading end thereof is reduced by withdrawal of the cloth, so that said leading end rises far enough to act against the detector 26 and move the same from its normal position, in this instance pressing it outward, the detent 28 is swung into position to engage with the pawl-carrying arm 22 and either prevent backward or recovery-movement of said arm and the pawl 21 carried thereby, so as to arrest the advance of the slatted apron, drum, and mass of cloth, or so limit the said backward or recovery-movement as to reduce the number of teeth passed over by the pawl in its recovery-movement, and in the latter instance reduce the rate at which the apron and drum are actuated and the mass of cloth advanced. The arrest, or the actuation at the reduced rate, will continue until the withdrawal of the cloth from the leading end of the mass or pile permits the detector to move to its normal position once more, whereupon the actuation of the apron, drum, etc., will be resumed or they will be actuated at an increased rate.

The detent 28 may be so shaped, substantially as indicated in Fig. 3, as to gradually reduce the rate at which the apron, drum, etc., are actuated.

Figs. 4, 5 and 6, Sheets 3 and 4, show an embodiment of the invention containing a detector 26^a which hangs downward from an elevated pivotal mounting 27^a, and also containing a modified construction and arrangement providing for the actuation of the apron and drum and for the control of such actuation by the detector. The lower

portion of the said detector 26^a projects inward past the adjacent flange 4 of the drum and over the upwardly extending portion of the slatted apron 8, into position to be acted against by the leading portion of the pile of cloth contained in the storage-chamber. The said modified construction and arrangement of actuating devices omits the separate power-driven shaft 24 of Figs. 1, 2 and 3.

10 The actuating cam 23^a and a connected pulley 23^b to receive a suitable driving-band are mounted loosely upon the shaft 13 carrying the sprocket-wheels 12, as is also the loose band-pulley 23^c to which the said driving-band is shifted when it is desired to discontinue the rotation of said cam. The carrying lever, 22^a, of pawl 21 is pivoted at 22^b and furnished with an arm provided with an anti-friction roll 22^c, said roll being held up to the cam 23^a by the gravity of the main arm of the lever. The prominence of the cam 23^a acts against roll 22^c to move lever 22^a and thereby cause pawl 21 through its engagement with ratchet-wheel 20 to rotate the latter and the shaft 13 and sprocket-wheels 12 to move the slatted apron and drum to advance the pile of cloth occupying the storage-chamber. When such prominence has passed by the roll 22^c, the gravity of the lever 22^a occasions the recovery-stroke of said lever and the pawl. The detector 26^a in the case of this embodiment of the invention, also, regulates the rate of advance of the pile of cloth by suspending the recovery-stroke of the lever and pawl. To enable the said recovery-stroke to be suspended at times, the arm 22^a is formed with a detent-shoulder 22^d, and a detent 22^e is mounted upon a pivot 22^f upon a convenient fixed support in proper position for engagement with said detent-shoulder at times. The detector 26^a is furnished with an arm 26^b which is connected by a link 26^c with the detent 22^e. The parts and connections are so combined and arranged that so long as the detector occupies its normal position shown in Figs. 4 and 6 the detent 22^e occupies its inoperative position shown in Figs. 4 and 5, leaving pawl-carrying lever 22^a and pawl 21 free to make a complete recovery-stroke. Consequently, the slatted apron and drum are actuated at the maximum rate to advance the pile of cloth contained in the storage-chamber. Should, however, the withdrawal of cloth from the leading end of the pile not keep pace with the advance of such end, the actuation of the detector by the advancing cloth will cause the detent 22^e to become operative to prevent the recovery-stroke of the pawl-carrying lever 22^a and the pawl 21. The actuation of the apron and drum, and advance of the pile of cloth, thereby will be suspended until the continued withdrawal of cloth has operated to release the detector, which will render the

detent 22^e inoperative so that lever 22^a and pawl 21 will be permitted to actuate the slatted apron and drum.

Fig. 7, Sheet 5, shows an embodiment of the invention in which the detector, 26^a, is located at the receiving end of the apparatus or machine, and arranged to be controlled by the last-deposited portion of the pile. The said detector hangs down at one side of the chute 3 from a supporting rockshaft 26^b mounted in bearings upon the chute. Rockshaft 26^b is furnished with an arm 26^c located outside the chute and connected by a link 26^d with an arm 26^e on the adjacent end of a rockshaft 27^m. The rockshaft 27^m extends to the opposite end of the machine, and there carries an arm 26^f corresponding with the arm similarly designated in Figs. 4 and 6. The devices of Fig. 7 for actuating the slatted apron and drum, and the detent-contrivance, are the same as in Figs. 4, 5 and 6. As the cloth descending through the chute piles within the storage chamber, the last-deposited portion of the pile, filling the lower portion of the chute, presses against the detector 26^a and produces a change of position thereof. Such change of position operates through the described connections to render the detent 22^e inoperative, and consequently, so long as the rear portion of the pile controls the detector the actuating devices operate to advance the slatted apron and drum. Should the pile be advanced too rapidly, the rear end thereof will be carried away from the detector, and the latter will be permitted to change its position, the result of which will be that through the described connections the detent will be rendered operative to suspend the actuation of the slatted apron and drum and the advance of the pile of cloth. As soon as the cloth accumulates within the lower end of the chute to an extent sufficient to control the detector again, the detent will be rendered inoperative once more and the actuation of the slatted apron and drum, and advance of the pile, will be resumed.

It has been stated herein that one aim of the invention is to provide for automatically regulating the rate of travel of the cloth in being withdrawn from the storage-chamber, or being supplied thereto, so as to guard against an over-accumulation in the storage-chamber, or too early withdrawal of the cloth therefrom. This provision is made by connecting the detector with speed-varying devices in connection with the cooperating devices or machine by which the cloth is withdrawn from the pile or delivered thereto, as the case may be. Fig. 3 shows a portion of the connecting means, such portion comprising an arm 30 projecting from feeler 26, and a rod 31 extending upward from the said arm. In practice the upper portion of

said rod will be connected directly or indirectly to speed-varying devices in connection with the devices for withdrawing the cloth from the pile contained in the storage-chamber of the apparatus of Figs. 1 and 3, and the parts will be combined and arranged so that advance of the leading end of the pile beyond the normal extent will act through the feeler, etc., to increase the speed of the withdrawing devices, to thereby increase the rate of withdrawal of the cloth from the storage-chamber. As soon as the pile has become so far reduced by reason of the increased rate of withdrawal as to relieve the detector of the action of the leading portion of the pile thereagainst, the speed of the withdrawing devices will be reduced to the normal once more.

Figs. 4 and 6 show a portion of a rod 31 having its lower end connected to the arm 26^b of the detector. The action is intended to be similar to that in the case of Figs. 1 and 3. Fig. 7 shows a portion of a rod 31 connected to the arm 26^m on rockshaft 27^m. In this case, when the rear portion of the pile of cloth attains the predetermined maximum height of accumulation, the rod 31 will be caused to govern the speed-varying devices in connection with the devices or machine by which the cloth is delivered into the storage-chamber so as to render normal the rate of supply to the storage-chamber, should the pile in the latter be advanced far enough to release the detector, the rod 31 will operate the said speed-varying devices to increase the rate of supply to the storage-chamber.

The form, construction, and arrangement of parts may in some cases be varied in practice. While I have shown and described a slatted apron, other forms of flexible carriers adapted for cooperation with a flanged drum or the equivalent thereof may be employed instead. In some cases means for varying the rate of advance of the pile contained in the piling or storage apparatus or machine may be used without the means for varying the rate of delivery to the said machine or withdrawal therefrom, or vice versa. While I have described the employment of the apparatus or machine in operating upon cloth, I regard it as within the scope of my invention to employ the same in operation upon yarns in continuous skein form.

I claim as my invention:

1. Cloth piling apparatus employed in bleaching, dyeing, and the like processes, comprising a flanged drum, an endless apron extending partly around the drum-flanges peripherally and cooperating to form a storage-chamber inclosed by the drum, its flanges, and the said apron, into which the cloth may be continuously piled, within which it remains stored and undergoing the

action of the solution with which it is charged, and from which it may continuously be withdrawn, a vat or tank inclosing said drum and apron, and means for actuating the apron and drum to slowly revolve the storage-chamber and advance the pile of cloth bodily therewith from the receiving point to that of withdrawal.

2. Cloth piling apparatus comprising a movable storage-chamber into which the cloth may be continuously piled at one end of a store or accumulation therein and from which the cloth may be continuously withdrawn from the leading end of such store or accumulation, means for advancing the said store or accumulation bodily, and means controlled by the store or accumulation itself acting to govern the rate of the advance.

3. Cloth piling apparatus comprising a flanged drum, an endless apron extending partly around the drum-flanges peripherally and cooperating to form a storage-chamber inclosed by the drum, its flanges, and the said apron, means for actuating the apron and drum to slowly revolve the storage-chamber and advance the pile of cloth therein bodily therewith from the receiving point to that of withdrawal, and means controlled by the store or accumulation itself within said storage-chamber for governing the action of the apron and drum.

4. Cloth-piling apparatus having a storage-chamber into which a continuous web may be piled, within which the cloth may become accumulated or stored, and out of which the cloth may be continuously withdrawn from the accumulation or store, pawl-and-ratchet means for advancing the accumulation or store bodily, and means through which the store or accumulation itself controls the said pawl-and-ratchet means and thereby governs the rate of the advance.

5. Cloth piling apparatus comprising a flanged drum, an endless apron extending partly around the drum-flanges peripherally and cooperating to form a storage-chamber inclosed by the drum, its flanges, and the said apron, pawl-and-ratchet devices for actuating the apron and drum to slowly revolve the storage-chamber and advance the pile of cloth bodily from the receiving point to that of withdrawal, and a detector controlled by the store or accumulation itself within the storage-chamber and operatively controlling the action of the said pawl-and-ratchet devices and the movement of the apron and drum.

6. Cloth piling apparatus having a storage-chamber into which a continuous web may be piled, within which the cloth may become accumulated or stored, and out of which the cloth may be continuously withdrawn, and means controlled by the store or

accumulation itself for regulating the rate of travel of the web externally of the said store or accumulation, to thereby control the volume of the latter.

- 5 7. Cloth piling apparatus having a storage-chamber into which a continuous web may be piled, within which the cloth may become accumulated or stored, and out of which the cloth may be continuously with-
10 drawn from the accumulation or store, means for advancing the accumulation or store bodily, and devices through which the

accumulation or store itself controls the said advance and regulates the rate of travel of the web externally of the accumulation or store to thereby control the volume of the latter.

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

WILLARD I. LEWIS.

Witnesses:

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