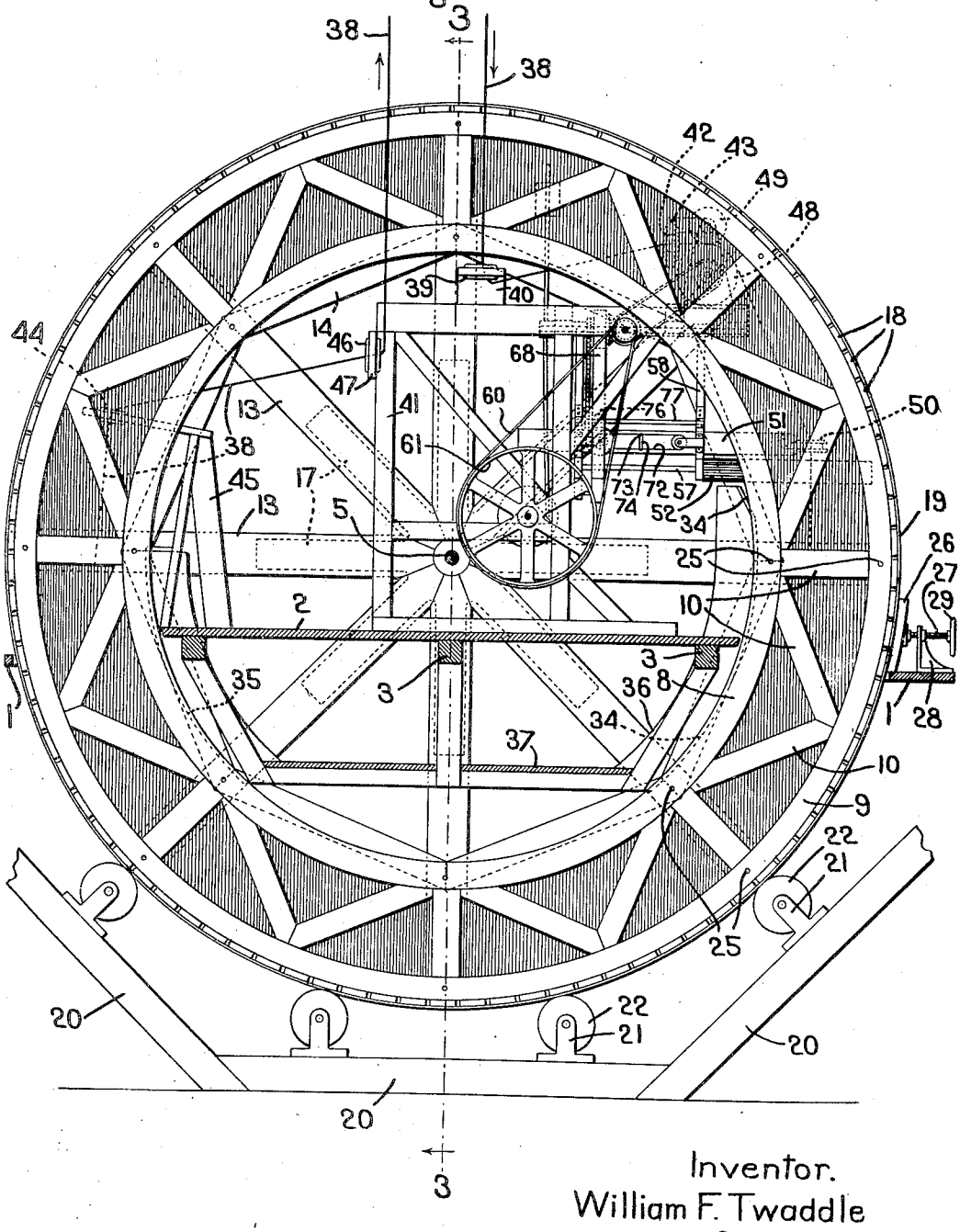
March 5, 1929. W. F. TWADDLE 1,704,066

CLOTH PILING MACHINE

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Fig. 1.



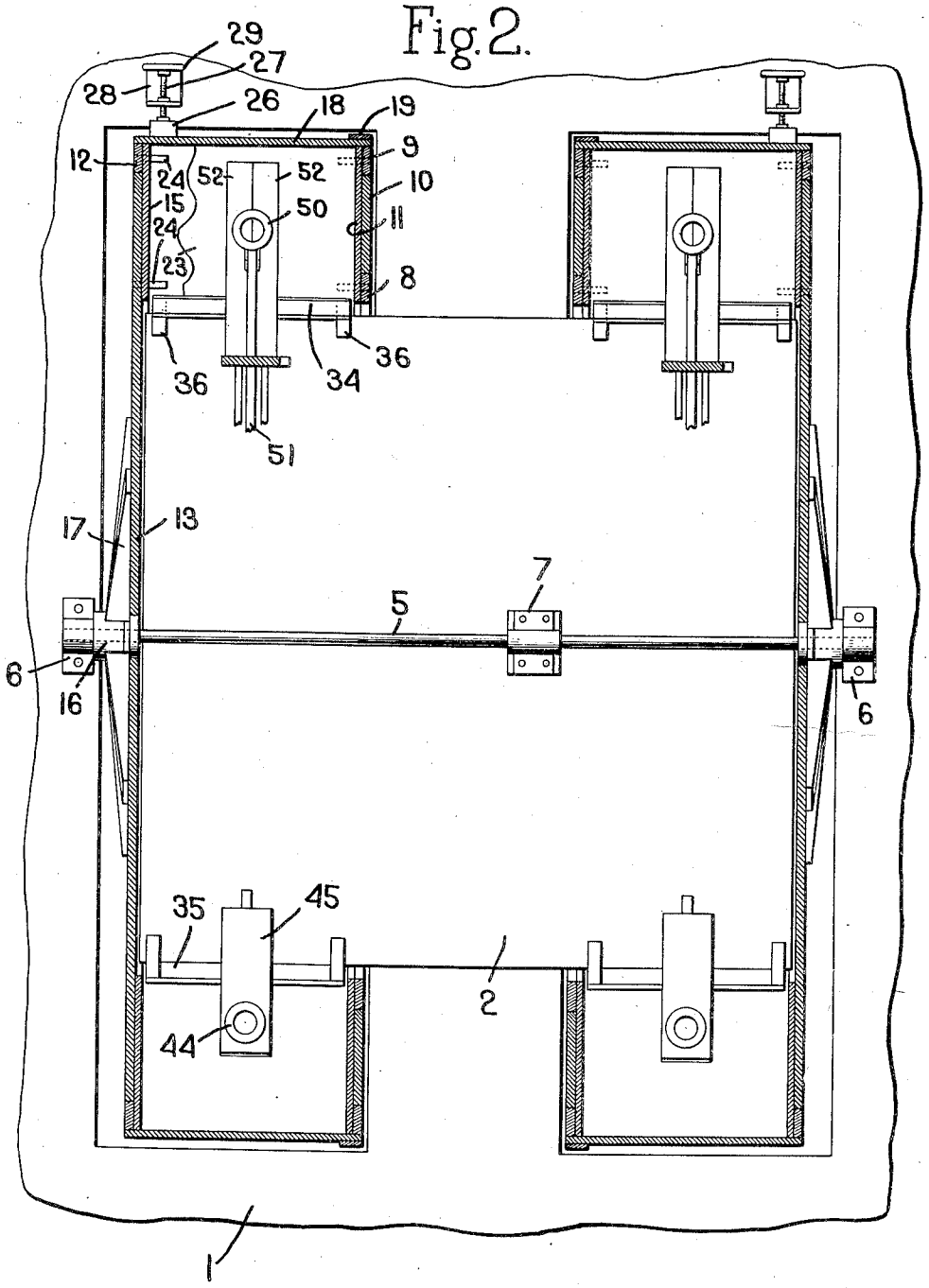

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CLOTH PILING MACHINE

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Fig. 2.



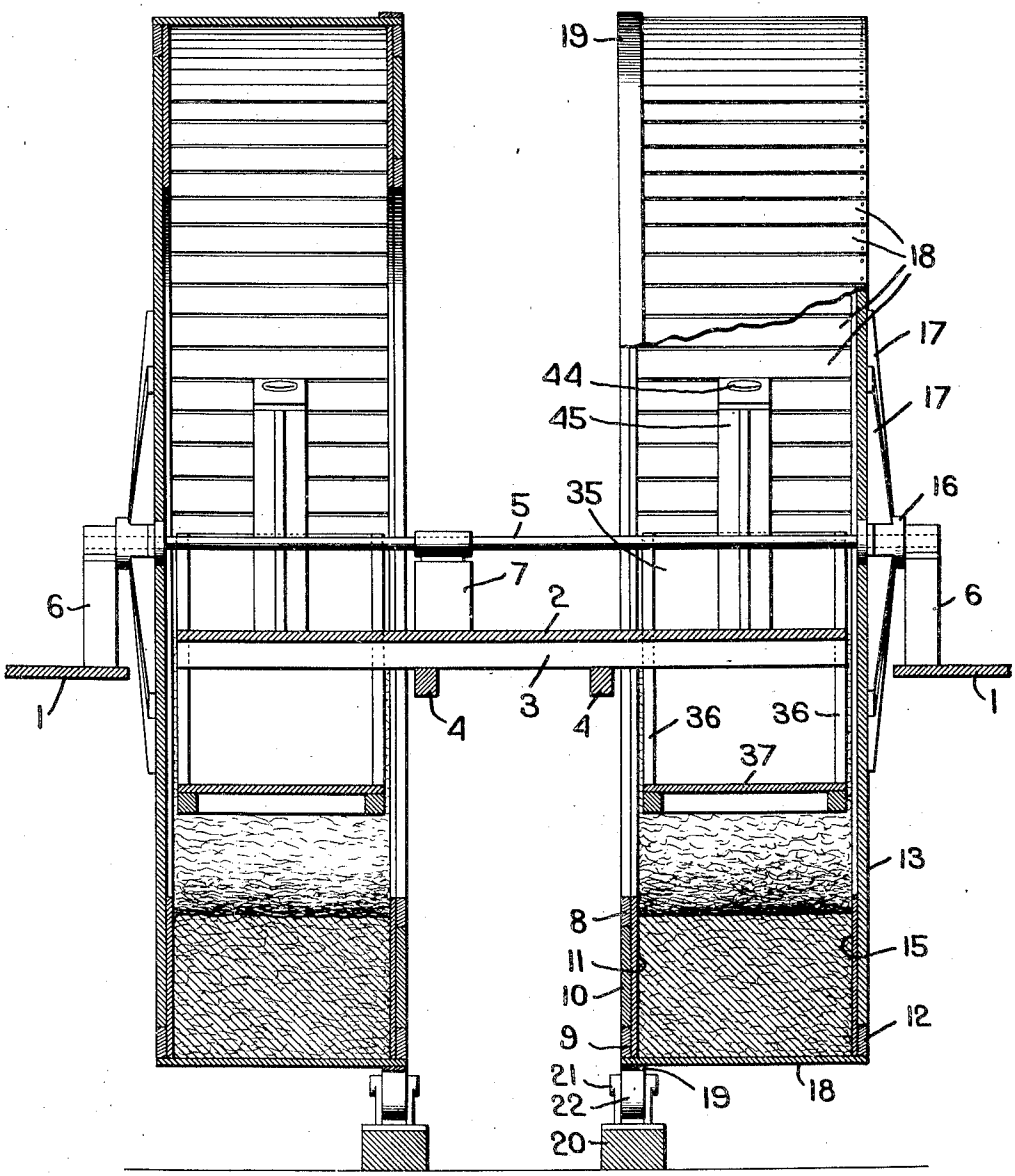

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Fig.3.




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CLOTH PILING MACHINE

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Fig. 4.

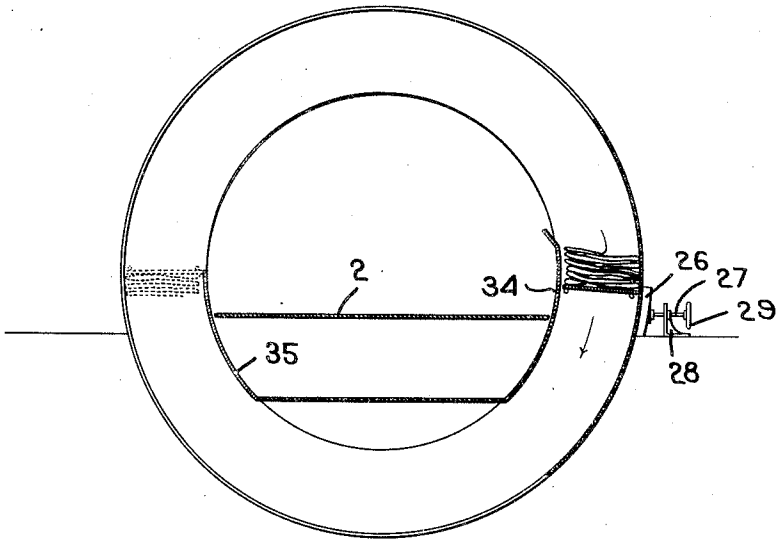



Fig. 5.

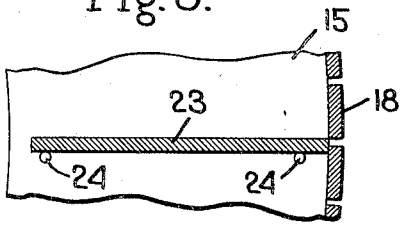
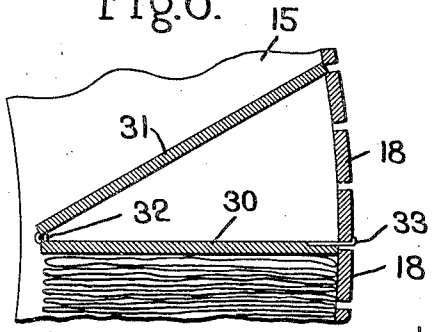



Fig. 6.




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CLOTH PILING MACHINE

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Fig. 7.

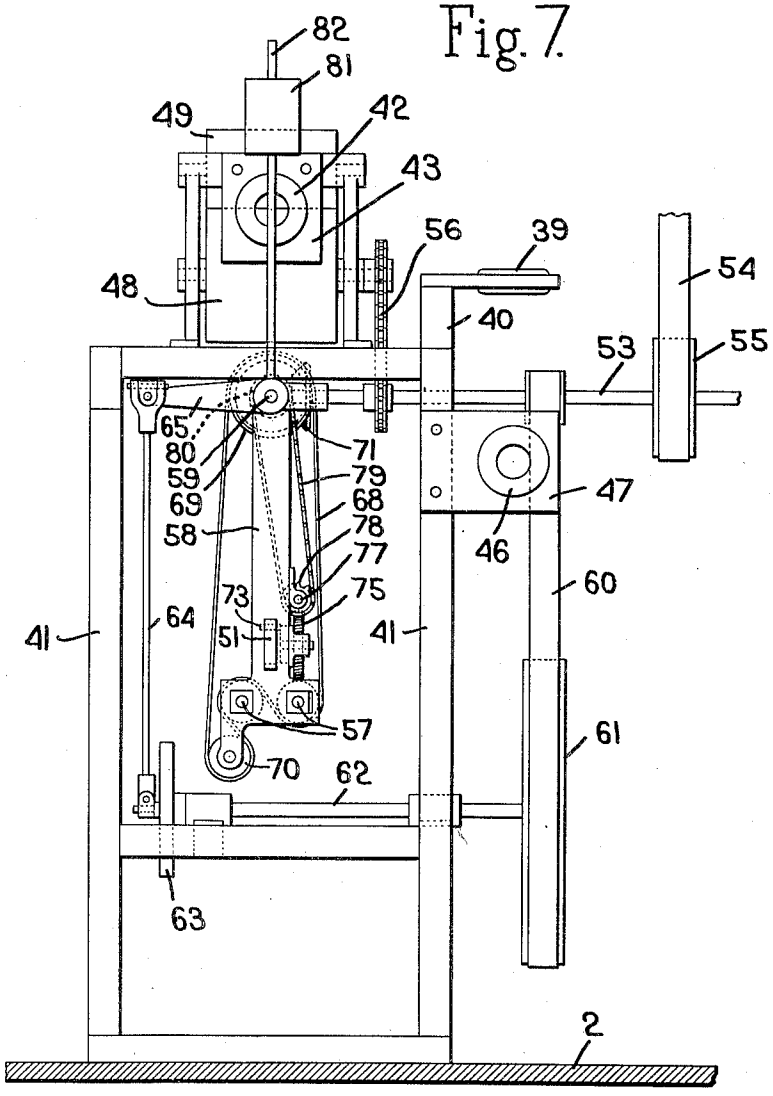
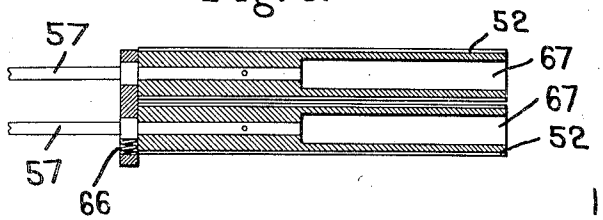



Fig. 8.




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# UNITED STATES PATENT OFFICE.

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## CLOTH-PILING MACHINE.

Application filed November 25, 1927. Serial No. 235,570.

This invention relates to a cloth piling machine or a machine for handling long strands or ropes of cloth or similar material. Such an apparatus is particularly useful in handling large quantities of cloth after it has been through a dyeing, bleaching or similar process and must be kept or stored for some definite predetermined time in order to allow the liquids with which it is impregnated to act or an ageing process to be carried on. Cloth piling machines have heretofore been used for this purpose, but this invention presents a novel type of machine which obviates objections heretofore existing in the use of such machines.

The object of the invention is to provide a cloth piling machine in which there shall be no relative movement between the pile of cloth and the container while in the container, thus preventing injury or damage to the cloth.

The object of the invention is further to provide a container of annular form into which the cloth is progressively piled at one side and from which it is progressively removed at the other side.

The object of the invention is further to provide such a container which requires no power for its operation but is operated entirely by the cloth.

The object of the invention is further to provide such a machine or apparatus which may readily be made of any desired size to correspond with the quantity of material to be handled.

These and other objects and features of the invention will appear more fully from the accompanying description and drawings and will be particularly pointed out in the claims.

In the drawings:

Fig. 1 is a side elevation of a construction embodying a preferred form of the invention.

Fig. 2 is a view chiefly in horizontal cross section of a pair of units, the left-hand one of which embodies the construction shown in Fig. 1 and the right-hand one of which is a similar but reversed construction.

Fig. 3 is a view chiefly in vertical cross section on the line 3—3 of Fig. 1 looking toward the left and showing the two units illustrated in Fig. 2.

Fig. 4 is a diagrammatic view of certain features of the construction shown in Fig. 1.

Fig. 5 is a detail showing the temporary supporting platform.

Fig. 6 is a detail showing the emptying platform.

Fig. 7 is an end elevation of the piling mechanism shown in Fig. 1.

Fig. 8 is a view in horizontal cross section of the feeding rolls.

The container into which the strand of cloth is piled, in which it remains for a predetermined time, and from which it is removed is, in this invention, of annular form. This annular container has an exterior peripheral wall and side walls but is open at its interior periphery. It is mounted to rotate about its horizontal axis. When it is in operation, the strand of cloth is progressively fed through the interior of the container at one side of the horizontal axis and is progressively withdrawn from the container through the interior periphery at the opposite side. Thus the lower segment, practically the lower half, of the container, when it is in operation, is piled full of the cloth and thus each portion of the cloth remains in the container for that period of time required by the container to make substantially a half rotation and this period will depend upon the size of the container, the size of the strand of cloth, and the speed with which the strand of cloth is fed to, and removed from, the container.

When the container is in operation, its rotation is caused by the weight of the cloth itself piled in the container. The gradual addition of the cloth at the feeding side and the gradual removal from the opposite side causes the feeding side to be slightly heavier and this effects the rotation of the container.

It will be observed also that the body of the cloth piled within the container throughout its lower segment has no movement with respect to the container so that there is no friction between the cloth and the walls of the container. The strand of cloth is piled into the container at one side of the horizontal axis and keeps the same position with respect to the container until it arrives at the other side of the horizontal axis when it is withdrawn from the container. This is a very important feature of the invention because it eliminates all danger from damage to the cloth while it is in the container.

While the details of construction of the container may obviously be varied widely within the scope of the invention, there is herein shown and illustrated a simple and

practical form of construction as a preferred embodiment of the invention.

The annular containers are preferably quite large structures so as to enable a large amount of cloth to be handled in an efficient manner. A diameter of sixteen feet has been found a desirable and practical size. Preferably also where the conditions are such as to require more than one such annular container, they are arranged in pairs facing each other and this construction of a double unit is illustrated in the drawings.

The container should be made of materials which will not injure or strain the cloth being treated. In the ordinary use of this apparatus, the cloth comes to the container in the form of a loosely twisted rope or strand and impregnated with dyeing, bleaching or other liquids. If brought into contact with metals or materials which are attacked or affected by moisture or chemicals employed in the treatment of the cloth, it is obvious that the cloth may be damaged or stained and the container structure itself may be injured. It is found in practice, therefore, that the container is best made of wood and its parts secured together by brass screws or other fasteners that will not rust or corrode under the conditions to which the apparatus is subject in use.

The annular container shown in the drawings is made up chiefly of a wooden framework and is shown as having one side wall journalled on a horizontal shaft, while the container is further supported for rotation upon anti-friction rolls. Such a container is preferably mounted with its horizontal axis above the floor of the room in which it is located and with its lower segment extending beneath the floor.

The main floor 1 of the building is therefore shown cut away to provide for the passage of the annular container therethrough. Access is had to the annular container through its central opening and preferably from one side only. Accordingly a platform 2 is provided which is preferably located slightly above the level of the main floor 1 and which extends laterally into the central opening of the container. With the double unit construction shown in Figs. 2 and 3, a single platform 2 answers for two annular containers mounted to face each other. This platform is shown as supported upon cross beams 3 carried by girders 4 extending parallel with the container to the main floor.

A horizontal shaft 5 is mounted in journal boxes 6 and 7 supported from the floor and platform.

As the containers are the same in construction, except that when they are arranged in pairs they face each other, it will only be necessary to describe the one shown in Fig. 1 and at the left of Fig. 2 and at the right of Fig. 3. In this form, one side wall is a frame structure comprising the annular member 8, the annular member 9 and the intermediate struts 10. The inner face of this structure is sheathed at 11 to present a closed annular side wall. The other side wall is also a frame structure made up of the annular member 12 and a series of radial arms 13 extending therefrom, and these radial arms are connected by the struts 14 forming a polygonal inner member. This side wall is also closed by a sheathing 15. The members 13 at their inner ends extend to a hub 16 mounted on the shaft 5 and are secured to the radial arms 17 of a spider-like structure projecting from the hub 16. The exterior peripheral wall of the container is preferably formed by slats 18 fastened transversely to the annular members 9 and 12 and spaced slightly so as to allow for drainage. It will thus be seen that the annular container presents an annular chamber formed by the exterior peripheral wall made up of the slats 18, the two side walls made of the sheathing 11 and 15 and open throughout at its interior annular periphery.

This annular container must be capable of free rotation about its horizontal axis. In the construction described, one side wall is shown as mounted through the medium of the spider 17 and hub 16 on the shaft 6. But as this would produce an unbalanced structure, a provision is also made for supporting the container by anti-friction means therebeneath at the opposite side. For this purpose the exterior peripheral wall of the container is shown as provided with a track 19 surrounding and secured to the container, while the substructure of the building is provided with the timbers 20 arranged adjacent the lower segment of the container and carrying a plurality of bearing blocks 21 in which are mounted anti-friction rolls 22 cooperating with the track 19.

The container, in the construction illustrated, is arranged to rotate clockwise, the strand of cloth being fed to the container at the right, viewing Figs. 1 and 4, and withdrawn therefrom at the left.

When the operation is first started with the container empty, means must be provided for supporting the pile of cloth until the container has rotated sufficiently to permit the withdrawal of the cloth or to prevent any relative movement between the cloth and the container. To provide for this, there is shown a temporary supporting platform, together with means for removably mounting it transversely and radially in the container. Such a platform is shown as a shelf-like structure 23 insertable through the interior periphery of the container and fitting between the side walls and against the exterior peripheral wall. This platform is supported upon pins 24 which are insertable in holes 25 provided at a plurality of points in the side walls of the container. The cloth as it enters the

container is piled on this temporary supporting platform, as shown in Fig. 4, in full lines. As the container rotates and the platform reaches the opposite side, or the position shown in dotted lines in Fig. 4, the platform is removed.

During such initial operation of the container, the weight of the cloth first piled into the container is very substantial and the container would move with great rapidity, resulting in tangling up the strand of cloth and subsequent injury thereto. To prevent this, means are provided for applying a braking action to the container. Any suitable means may be provided for that purpose such, for example, as a brake shoe 26 carried on a spindle 27 threaded through the supporting bracket 28 mounted on the floor and having the handle 29 by which the brake shoe may be forced against the exterior periphery of the annular container. Such a brake may be applied to the extent required to control the rotation of the container until the cloth has reached the opposite side and the temporary supporting platform has been removed, when the braking action will be withdrawn.

Again when it is desired to stop the continuous, progressive passage of cloth through the container, it is desirable to support the end of the pile of cloth last fed to the container. For this purpose an emptying platform is provided and a preferred construction is shown in Fig. 6. This platform is shown as a shelf-like structure 30 having a strut 31 hinged at 32 to its inner edge and having hooks 33 projecting from its outer edge. Such an emptying platform may therefore be placed in position over the end of the pile of cloth at any point in the container. All it is necessary to do is to place the hooks in the space between the slats next adjacent the end of the pile of cloth and place the strut in another space, pressing the shelf 30 against the pile of cloth. This will support the end of the pile until the container has rotated to bring the emptying platform to the discharging position, where it is readily removable.

In order to prevent any danger of the cloth piled in the lower segment of the container from falling out through the interior periphery, means such as a guard wall is provided opposite the interior peripheral segments of the container below the horizontal diameter at each side of the axis. Such guard walls 34 and 35 are shown as supported from the platform 2 and its supporting structure. The guard wall 34, for example, extends between vertical, segmental struts 36 secured to the platform 2 and extending below the platform and connected at their lower ends to a lower platform 37 suitably mounted beneath the platform 2. The guard wall 35 is supported in a similar manner. These guard walls will therefore prevent the piled cloth descending with the container at the right-hand side, viewing Fig. 4, and ascending with the container at the left-hand side, viewing Fig. 4, from falling out of the container under any conditions.

The strand of cloth is directed into and out of the container preferably by means of suitable strand guiding eyes mounted in fixed position with respect to the container. In the construction illustrated, these strand guiding eyes are shown as supported from the platform 2 and each eye is preferably formed of porcelain or some vitreous material. The strand of cloth 38 is shown as passing down at the left of the container through the guiding eye 39 located outside the plane of the side wall and supported horizontally in a bracket 40 carried by a supporting structure 41 built up from the platform 2. From this guide eye the strand of cloth is directed inwardly through the central opening of the container and then through the interior periphery thereof to enter a similar guide eye 42 located within the container and mounted in a vertical plane in a bracket 43 carried by the same supporting structure 41. From this guide eye 42 the strand of cloth passes through a suitable feeding and piling mechanism which lays it back and forth and transversely over the entire radial area of the container.

At the opposite side of the container the strand of cloth as it passes from the pile is led through the guiding eye 44 mounted in a substantially horizontal plane within the container on a bracket 45 extending upward from the platform 2. From the eye 44 the strand of cloth passes out of the container through the inner periphery and thence out through the central opening of the container to the guide eye 46 located outside of the plane of the side wall of the container and mounted in a substantially vertical plane in a bracket 47 carried by the supporting structure 41. From this guiding eye the strand of cloth leads upwardly.

Any suitable mechanism may be employed in connection with the annular container of this invention for progressively feeding the strand of cloth into the container and piling it therein. The mechanism herein illustrated for that purpose is shown as carried on the supporting structure 41 and involves novel features which will be made the subject of a separate application. It is therefore sufficient here to describe this apparatus only in a general way. The construction of this apparatus will be seen from Fig. 1 and from the more enlarged and detailed elevation in Fig. 7.

The strand of cloth 38 passes from the guide eye 42 between a pair of feed rolls carried by the supporting structure 41 and located within the container. The lower of these rolls 48 is positively driven and the upper 49 is an idler resting against the lower

roll. These rolls therefore serve to advance the strand of cloth into the container. From these rolls the strand passes to a guide eye 50 carried by a traverse bar 51 which is reciprocated parallel with and between the side walls of the container. From this guide eye the strand passes between a pair of corrugated, positively driven, horizontally disposed feed rolls 52. These feed rolls are mounted from the supporting structure 41 to swing bodily laterally between the side walls of the container. Thus it will be seen that the combined movements of the guide eye 50 and of the rolls 52 act to lay the strand of cloth throughout the entire radial area of the container, thus piling the cloth in the container so as to fill its entire radial cross section in an even and regular manner.

This piling mechanism is operated from a shaft 53 journalled in the supporting structure 41 and driven from a suitable source of power such as a belt 54 applied to a pulley 55 on the shaft.

The positively driven feed roll 48 is conveniently driven by a sprocket wheel and chain connection 56 extending between the shaft 53 and the shaft of the feed roll.

The feed rolls 52 are secured to parallel shafts 57 journalled in a vertical frame 58 pivoted to swing about a shaft 59 carried in the supporting structure 41. This frame is oscillated on the shaft 59 to swing the rolls transversely between the side walls of the container. In the construction illustrated, this result is secured by a belt drive 60 from the shaft 53 to a pulley 61 on a shaft 62 mounted in the structure 41 and carrying the crank disk 63. A link 64 extends from the crank disk 63 to an arm 65 projecting laterally from the frame 58. Thus it will be seen that as the shaft 53 rotates, the frame 58 is oscillated.

The rolls 52 are preferably corrugated and made of wood and pressed together as by springs 66. These rolls are unsupported at their free ends adjacent the exterior periphery of the container and accordingly the end sections of the rolls are lightened by making them hollow, as shown at 67. These rolls are positively driven to feed the strand of cloth and for that purpose a belt 68 is shown running over a pulley 69 on the shaft 59 around pulleys at the ends of the shafts 57 and around an idler pulley 70 mounted in the frame 58. The shaft 59 is driven from the shaft 53 by beveled gears 71.

The traverse bar 51 is mounted to slide in the frame 58. A sprocket chain 72 extends alongside the traverse bar carried by sprockets mounted in brackets extending from the frame 58. This chain carries a laterally extending pin 73 projecting into a vertical slot 74 in the traverse bar so that if the chain 72 be continuously driven, the traverse bar 51 will be reciprocated by the pin. The chain 72 is driven from a sprocket wheel which has on its shaft a worm wheel 75 driven by a worm 76 carried by the shaft 77 mounted in the frame 58, which shaft carries a sprocket wheel 78 driven by a sprocket chain 79 from a sprocket wheel 80 on the shaft 59.

The frame 58 is shown as counterbalanced by a weight 81 mounted on an arm 82 projecting upwardly from the frame.

It will thus be seen that, as the shaft 53 is driven, the guiding eye 50 will be moved back and forth between the exterior and interior peripheries of the annular container and at the same time this guide eye with the feeding rolls 52 will be reciprocated laterally between the side walls of the container. The sprocket wheel nearer the outer periphery of the container, over which the sprocket chain 72 runs, is of larger diameter than the other sprocket wheel. Consequently the pin 73 travels more slowly when approaching and receding from the outer periphery of the container and piles the cloth in somewhat wedge-shaped layers, tapering toward the axis of the container.

The operation of the apparatus will be apparent from the foregoing description. When the machine is started, the operator standing on the platform 2 threads the strand of cloth through the strand guiding eyes 39 and 42, between the rolls 49 and 48 through the traverse eye 50 and between the corrugated rolls 52. The temporary supporting platform 23 is inserted beneath the rolls 52. The power is applied to the cloth piling mechanism through the belt 54 and the brake shoe 26 is set up against the container. The cloth is now piled by the action of the swinging frame 58 and the traversing bar 51 evenly throughout the entire area of the platform 23 and in successive layers thereon. The brake is controlled so that the annular container rotates under the weight of the cloth as the cloth is piled thereon. As the leading end of the pile reaches the opposite side of the container, the temporary platform is removed and the strand is threaded up through the eyes 44 and 46 and passes to the next machine or next treatment. The brake shoe 26 is withdrawn when its action is no longer necessary. The strand is now fed progressively and continuously and withdrawn in the same manner. There is no slippage or friction between the cloth piled in the container and the walls of the container, so that no damage or injury can be done to it. There is no danger of the strand of cloth becoming entangled because it is piled evenly and regularly and withdrawn in the same manner. The space between the slats allows ample drainage and the time of rotation can be varied as desired, depending upon the speed with which the cloth is fed, the size of the container, etc., so as to maintain the cloth in the container for any desired or predetermined time.

Whenever it is desired to stop the feeding of the cloth and empty the container, the emptying platform provided is inserted in the container when the end of the strand of cloth has been reached. This supports the pile so that it will not slip in the container and, when the emptying platform has reached the discharging side, it is removed.

When the amount of work to be performed is sufficient, it is desirable to operate the containers in pairs, as shown in Figs. 2 and 3, with the open sides facing each other. This enables a single platform such as 2 to be employed for both containers and a single shaft for supporting them. Thus one operator easily attends to both containers and as each rotates entirely independently of the other, the two containers may be employed for handling different kinds or qualities of goods.

It will be understood that the term "cloth" is used herein as illustrative merely, and that it is to be construed as including any kind of material which may be placed in rope or strand form and handled by the apparatus.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is:

1. A cloth piling machine comprising an annular container mounted to rotate on its horizontal axis and having an exterior peripheral wall and side walls and open at its interior periphery and means for progressively feeding a strand of cloth into the container through the open interior periphery at one side of the axis and for progressively withdrawing it at the other side of the axis, whereby as the cloth is thus progressively fed and withdrawn, the lower segment of the container is piled full with the cloth which does not move substantially with respect to the container but moves with, and acts progressively to rotate, the container.

2. A cloth piling machine comprising the construction defined in claim 1, in which the means for progressively feeding the strand of cloth into the container acts to distribute the strand of cloth throughout the radial area of the container.

3. A cloth piling machine comprising the construction defined in claim 1, together with a horizontal supporting shaft and in which one side wall of the container is extended to and journalled at its horizontal axis upon the shaft.

4. A cloth piling machine comprising the construction defined in claim 1, together with means for anti-frictionally supporting the lower segment of the container.

5. A cloth piling machine comprising the construction defined in claim 1, together with means for anti-frictionally supporting the lower segment of the container and means for applying a braking action to the container.

6. A cloth piling machine comprising an annular container having an exterior peripheral wall and side walls and open at its interior periphery and having a continuous track on its exterior periphery, anti-friction supporting means cooperating with the lower segment of the track, and means for progressively feeding a strand of cloth into the container through the open interior periphery at one side of its horizontal axis and for progressively withdrawing it at the other side, whereby, as the cloth is thus progressively fed and withdrawn, the lower segment of the container is piled full with the cloth which does not move substantially with respect to the container but moves with, and acts progressively to rotate, the container.

7. A cloth piling machine comprising an annular container having an exterior peripheral wall and side walls and open at its interior periphery, a horizontal supporting shaft, one side wall of the container being extended to and journalled at its horizontal axis upon the shaft, a continuous track on the exterior periphery of the container opposite the other side wall, anti-friction supporting means beneath the lower segment of the container cooperating with the track, and means for progressively feeding a strand of cloth into the container through the open interior periphery at one side of its horizontal axis and for progressively withdrawing it at the other side, whereby, as the cloth is thus progressively fed and withdrawn, the lower segment of the container is piled full with the cloth which does not move substantially with respect to the container but moves with, and acts progressively to rotate, the container.

8. A cloth piling machine comprising the construction defined in claim 7, together with means for applying a braking action to the exterior periphery of the container.

9. A cloth piling machine comprising the construction defined in claim 1, together with a temporary supporting platform and means for removably mounting it transversely and radially in the container to support the pile of cloth first fed into the container.

10. A cloth piling machine comprising the construction defined in claim 1, together with means fixedly mounted adjacent the path of the interior periphery of the container and extending over the interior peripheral segments of the container below the horizontal diameter at each side of the axis to prevent the piled cloth, descending with the container at one side and ascending with the container at the other side, from falling out of the container.

11. A cloth piling machine comprising an annular container mounted to rotate on its horizontal axis and having an exterior peripheral wall and side walls and open at its interior periphery, means for progressively feeding a strand of cloth into the container through the open interior periphery at one side of the axis and for progressively with-

drawing it at the other side, and a fixedly mounted horizontal platform extending laterally within the central opening of the container from which access may be had to the container through the interior periphery at each side of the horizontal axis.

12. A cloth piling machine comprising the construction defined in claim 11, together with strand guiding eyes supported from the said platform for guiding the strand of cloth in its passage into the container and in its passage out of the container.

13. A cloth piling machine comprising the construction defined in claim 11, together with a strand guiding eye located within the container above the horizontal plane at the exit side and supported from said platform and a second strand guiding eye located outside of the plane of the side wall of the container, the said eyes acting to guide the strand of cloth withdrawn from the container.

14. A cloth piling machine comprising the construction defined in claim 11, together with a strand guiding eye located within the container adjacent the feeding means and supported from the platform and a strand guiding eye located outside the plane of the side wall of the container and supported from the platform, the said eyes acting to direct the strand of cloth from outside the container to the feeding means.

15. A cloth piling machine comprising the construction defined in claim 1, together with an emptying platform and means for removably mounting it transversely and radially in the container close against the end of the pile of cloth to support the end of the said pile as the cloth is discharged from the container.

16. A cloth piling machine comprising the construction defined in claim 1, in which the exterior peripheral wall is formed of spaced, transverse slats to provide for drainage.

17. A cloth piling machine comprising the construction defined in claim 1 in which the exterior peripheral wall is formed of spaced, transverse slots, together with an emptying platform comprising a shelf having projections to fit in either of said spaces and having a strut to catch in another of said spaces.

18. A cloth piling apparatus comprising a pair of annular containers each having an exterior peripheral wall and side walls and an open interior periphery, the said containers being mounted parallel to each other on a single horizontal supporting shaft with the adjacent sides of the containers having unobstructed central openings and with the opposite sides supported at said shaft, and a common platform extending between the containers and within their central openings.

In testimony whereof, I have signed my name to this specification.

WILLIAM F. TWADDLE.