

Sept. 21, 1948.

B. A. PETERSON

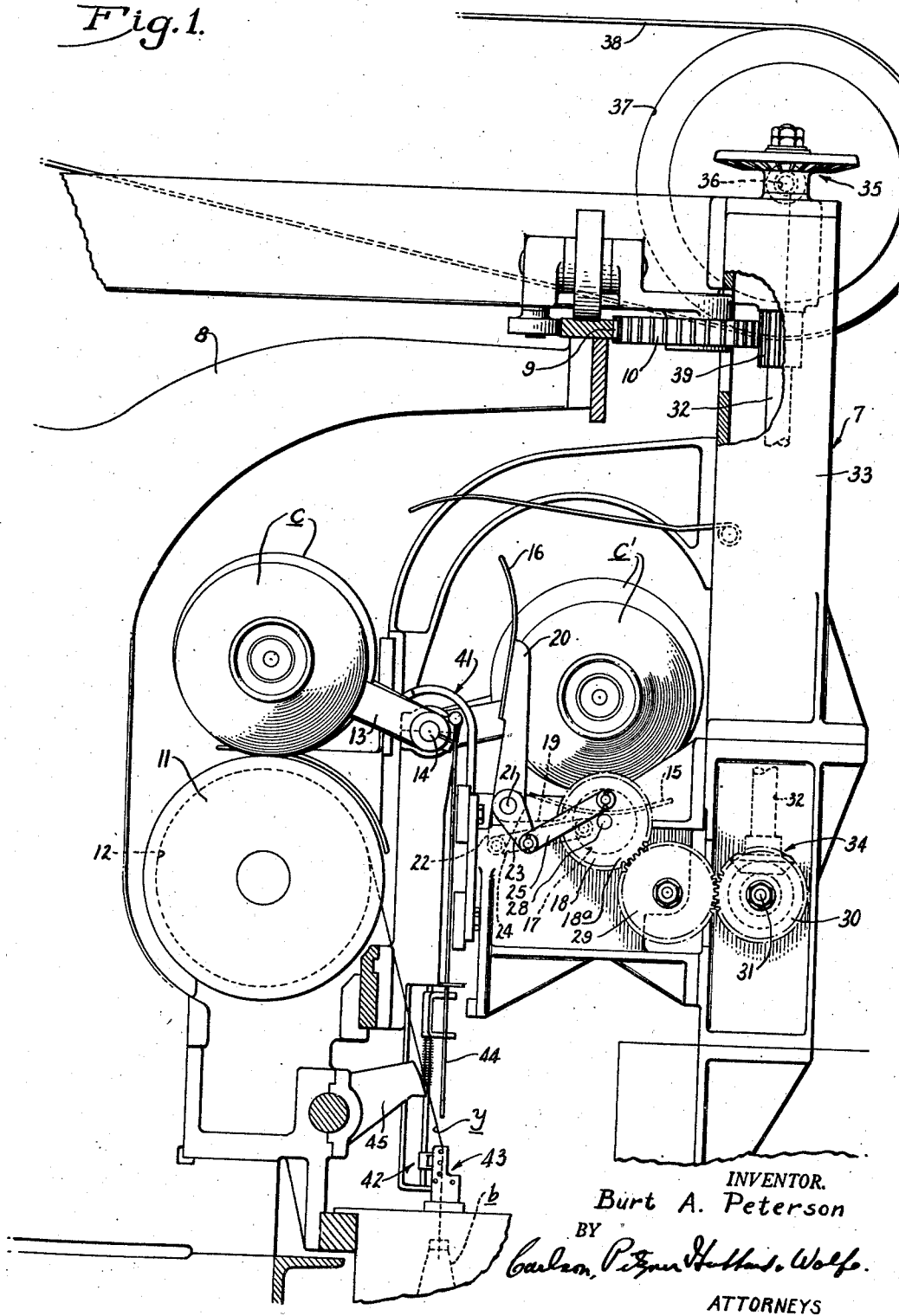
2,449,788

WINDER

Filed Feb. 7, 1945

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Fig. 1.



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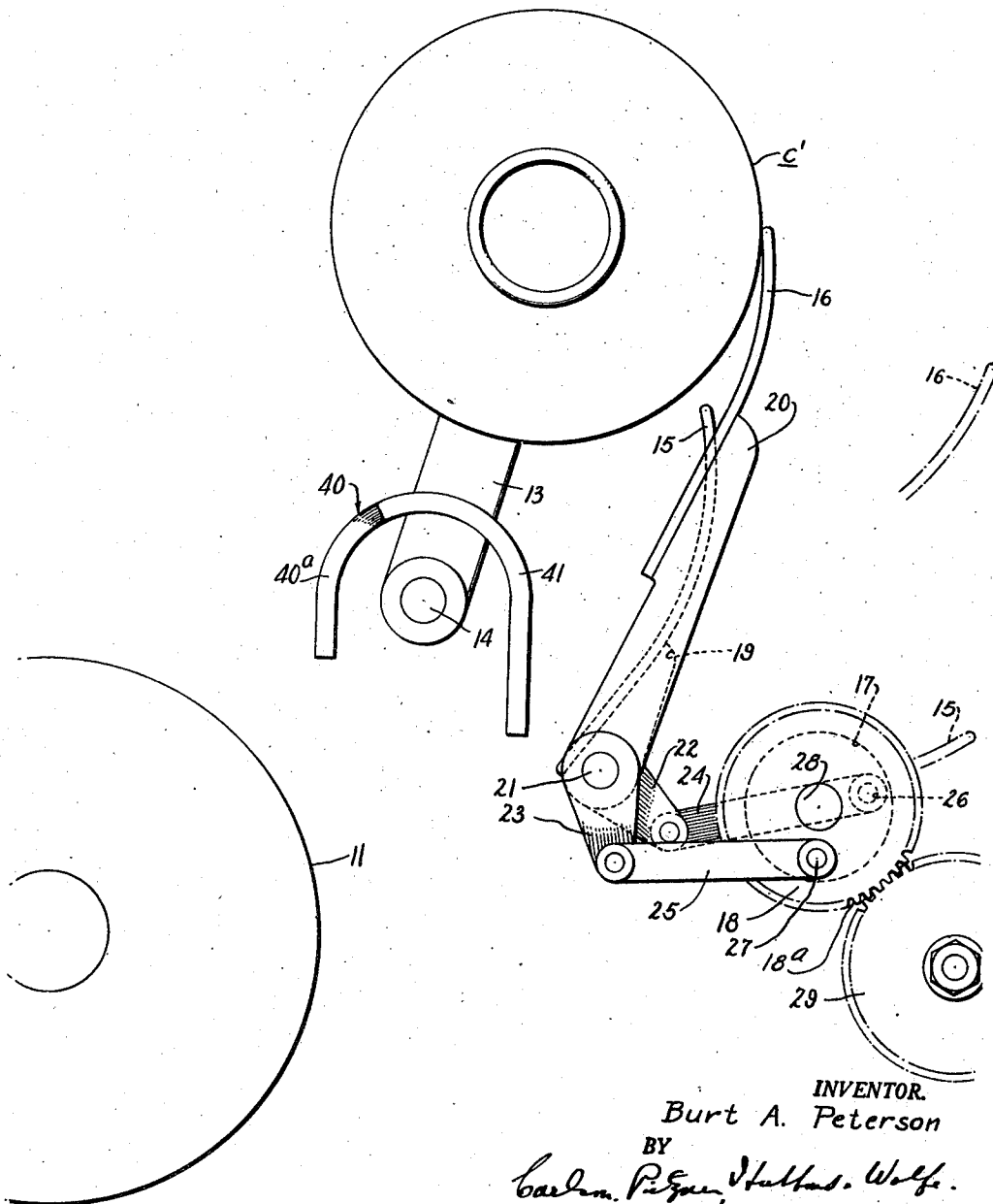
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Fig. 2.



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Fig. 3.

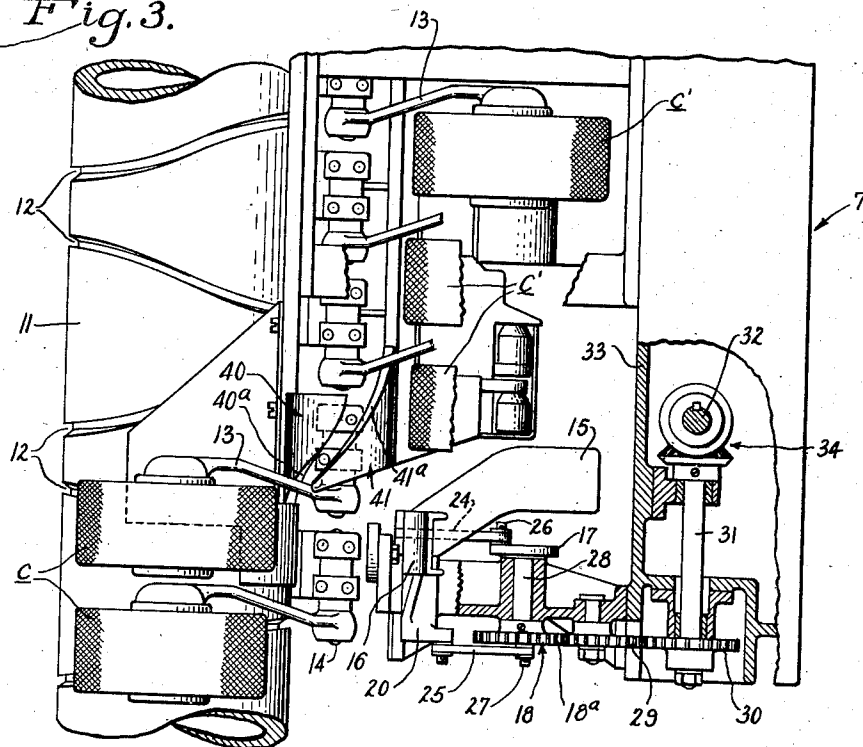
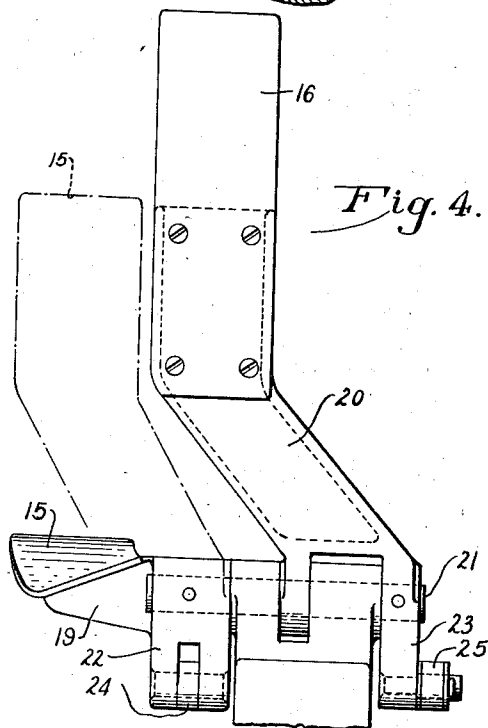


Fig. 4.



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UNITED STATES PATENT OFFICE

2,449,788

WINDER

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Application February 7, 1945, Serial No. 576,546

13 Claims. (Cl. 242—35.5)

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The invention pertains to automatic yarn winding machines of the type commonly known as spoolers and exemplified in Colman Patent No. 1,267,977 issued May 28, 1918. In such winders a mechanism known as a winder tending mechanism is arranged to travel into association successively with a series of units for winding yarn from bobbins onto cheeses. In the operation of the machine, when the yarn supply from a given bobbin is interrupted through exhaustion or breakage, or when the yarn mass attains a predetermined diameter, the cheeses are shifted automatically from a running position to a thrown-out position. One of the functions of the winder tending mechanism is to restore to running position the cheeses that have been thrown out due to exhaustion or breakage of the yarn, and the present invention relates to an improved means for accomplishing this result.

Heretofore the restoration of the cheeses from thrown-out to running position has been accomplished by means of a device known as a plow mounted upon the tending mechanism and operative in the travel of such mechanism past the winding units. In this operation, the plow engages each cheese arm at a point relatively close to the pivot, and with a cam action swings the arm upwardly over center to its running position.

The primary object of the present invention is to provide a lifting device of a character such as to avoid the wear incident to the camming action of the plow upon the cheese arms.

Another object is to provide a lifting device driven in timed relation to the travel of the mechanism and active in an upward direction to lift the cheeses bodily for movement from the thrown-out position into their running positions.

Still another object is to provide a cheese lifting device of the character last above referred to in which the actuating means is operative through a stroke which is short as compared to the range of movement through which the cheese passes.

A further object is to provide for the performance of the lifting function in two steps by successively operating lifting members so arranged that while one of the members is acting to impart the final thrust to a cheese being operated upon, the other member is being restored to retracted position for engagement with the cheese of the next winding unit as the tending mechanism advances along the winder.

The objects of the invention thus generally stated, together with other and ancillary advantages, are attained by the construction and ar-

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angement shown by way of illustration in the accompanying drawings wherein:

Figure 1 is a fragmentary end elevational view of a winder tending mechanism equipped with the improved cheese lifting or positioning means, parts being broken away and shown in section to show details of construction.

Fig. 2 is a fragmentary end elevational view of a cheese and its pivotal support illustrating the operation of the improved lifting or positioning device.

Fig. 3 is a fragmentary plan view of a portion of the winder and its associated traveling mechanism, the latter being shown partially in section to illustrate details of construction.

Fig. 4 is a face view of the lifting device and illustrating details of its construction and mounting.

Referring now to Figs. 1 and 3 of the drawings, the winder tending mechanism comprises generally a carriage 7 arranged to travel upon a main supporting frame 8 for successive association with a series of winding units, the main frame having a rack 9 with which meshes a drive gear 10 of the traveling mechanism. Each of the winding units comprises a support for a cross wound yarn mass or cheese *c* produced by the winding of yarn *y* from successive bobbins *b*, the cheeses being normally supported upon a rotating drum 11 provided with a traversing groove 12 (Fig. 3). The cheeses *c* are suitably supported upon cores mounted upon the ends of arms 13 pivotally supported at 14 upon the main frame. Thus the cheeses are swingable from their normal positions in running contact with the drum 11 into their thrown-out positions, in which latter positions the winder tending mechanism is operative to perform its several functions including that of restoring the cheeses to their running positions following the tying of reserve threads onto exhausted threads.

The means provided pursuant to the objects of the invention hereinbefore set forth for restoring the cheeses to their running positions, comprises in general power driven lifting means operative with respect to the thrown-out cheeses successively in the advance of the winder tending mechanism, whereby to impart a transverse lifting force to each cheese, through a range of such amplitude as to swing the cheese supporting arm over center and thus position the cheese in running contact with its supporting and driving drum. And for the purpose of minimizing the speed with which the lifting devices are required to be actuated in order to operate upon suc-

sive cheeses without reducing the rate of travel of the tending mechanism, the lifting function is preferably accomplished in two successive steps by successively operating members so timed that during the final portion of the lifting operation performed by one member the other member is being retracted into position for engagement with the next succeeding cheese.

In the present exemplary embodiment of the invention, the improved cheese lifting and positioning means comprises two lifting members 15 and 16 pivotally mounted on the carriage 7 and arranged for operation in timed relation to each other and to the travel of the carriage. The actuating means for the two members comprise two crank disks 17 and 18, the latter being provided on its periphery with teeth 18^a to form a spur gear for driving purposes.

The members 15 and 16 preferably engage directly with the cheeses themselves and are therefore in the form of curved polished plates. The latter are mounted upon arms 19 and 20 pivotally supported in spaced parallel relation on a shaft 21 and respectively having rigid therewith crank arms 22 and 23. The arms 19, 22, and 20, 23 constitute two bell cranks respectively connected by links 24 and 25 with studs 26 and 27 on the disks 17 and 18. The disks are fast upon a shaft 28 suitably supported in the carriage 7, and the studs are so positioned relative to each other as to cause the members 15 and 16 to operate successively. The two members are spaced apart in the direction of travel of the carriage and so timed that while the member 16 approaches its vertical position (Figs. 1 and 2) whereby to shift the cheese over center, the other member 15 has completed its portion of the lifting function and started to move reversely into position beneath the succeeding cheese (see Fig. 1). As shown in Figs. 3 and 4, the arms 15 and 16 are offset in the direction of travel of the carriage. This is to permit the arm 15 to occupy a position in advance of its actuating disk 17 and link 24 so as to clear the latter in the fully retracted position of the arm (see Fig. 2).

It will be understood that the shaft 28 carrying the disks 17 and 18 is driven in timed relation with the travel of the carriage. For this purpose the spur gear constituting the disk 18 is driven through gears 29 and 30 (Fig. 5), the latter fast on a shaft 31 parallel with the shaft 28 and suitably journaled in the carriage. For driving the shaft 31 a shaft 32 extends vertically through a frame member 33 of the carriage, being connected at its lower end with the shaft 31 by bevel gearing 34. At its upper end the shaft 32 is connected by bevel gearing 35 with a drive shaft 36 carrying a pulley 37 which is driven by a belt 38 running to a drive motor (not shown) mounted on the carriage. The vertical shaft 32 has a pinion 39 fast thereon and meshing with the drive gear 10 which coacts with the rack 9 in advancing the carriage relative to the several winding units.

Upon movement of the cheese over center through the operation of the lifting device, its supporting arm 13 moves into engagement with a stop member 40 (Fig. 3). The latter preferably has a cam surface 40^a shaped to control the descent of the yarn mass into its position on the winding drum as an incident to the advance of the carriage, all in the manner set forth in said Colman Patent No. 1,276,977.

While the improved cheese lifting and positioning device performs the function of the cam

or plow heretofore employed, it is contemplated that as a safety measure such plow may advantageously be employed together with the improved lifting device. The plow is preferably of the type shown in said Colman patent and comprises a cam member 41 (Fig. 3) having a sloping surface 41^a inclined upwardly and rearwardly with respect to the direction of travel of the carriage. It is adapted to engage with the cheese arms when the latter project outwardly from their pivotal supports 14 (Fig. 1), and is so proportioned as to cause the arms to swing upwardly somewhat beyond dead center as an incident to the movement of the carriage. In the event of failure on the part of the operator to place a cheese core upon any of the supporting arms 13 and thus render the members 15 and 16 of the lifting device ineffective, the plow 41 will engage with such arm and shift the same out of the path of the lifting device and thereby avoid damage to the machine due to movement of the members 15 and 16 of the lifting device into engagement with the arm. It will be understood that the lifting member 15 is timed to operate upon a given cheese to lift it somewhat in advance of the engagement of the corresponding lever arm 13 by the plow. Thus the lifting operation is performed by the devices 15, 16, except in cases where the operator has inadvertently failed to place a cheese or core upon the arm 13.

It will be understood that as in the case of said Colman patent, the cheeses are shifted from their running positions in contact with the driving drum or drums 11 into their thrown-out positions automatically during the operation of the machine in response to thread failure due to exhaustion or breakage or upon the attainment of the cheese to a predetermined size. The means employed to perform such throwing out function may be the same as that disclosed in said patent and therefore need not be described in detail. In brief it comprises a sensitive feeler 42 responsive to the presence or absence of the strand *y* passing from the bobbin *b* through a yarn clearing device 43 and thence over the drum 11 to the cheese. Upon interruption of the strand, the feeler 42 permits movement of a bail 44 into the path of movement of a pawl 45. The bail is connected to the cheese arm 13 at a point eccentrically with respect to the shaft 14 thereof, and in the downward movement of the actuator the arm is swung upwardly, forwardly and thence downwardly, its downward movement being limited by suitable interengaging stops (not shown).

Summarizing the operation, it may be assumed that the parts occupy the relation shown in Fig. 1, with the first lifting member 15 about to move into position beneath a thrown out cheese *c'*, the immediately preceding cheese *c* having been restored to its running position in contact with the drum 11. At this time the first lifting member 15 occupies its retracted position so as to be free to move beneath the cheese *c'* and the second lifting member 16 occupies a vertical position partially retracted from its extreme forward position (Fig. 2). As the carriage advances, member 15 is swung upwardly into engagement with the cheese *c'* while the member 16 swings downwardly to its extreme retracted position (Fig. 2) and then reverses for movement into engagement with the cheese *c'* to complete the lifting movement started by the member 15. In short, the arrangement is such that the lifting operation is performed in two steps. Were it not for this, the speed of operation required of a single lifting

member would be doubled. Thus, by the construction and arrangement employed the cheeses are lifted rapidly and without necessitating any slowing up in the advance of the carriage.

It will also be seen that the objectionable wearing of the plow heretofore experienced is eliminated. At the same time the power required to perform the lifting operation is reduced, one of the factors in such economy of power resulting from engagement with the cheese or its support at a point remote from its pivotal supporting axis 14 rather than adjacent thereto as in the prior construction. Finally, engagement of the cheeses directly by the members 15 and 16 is advantageous in that it serves to hold the cheeses against rotation during the lifting operation.

I claim as my invention:

1. A winder having, in combination, a drum, a plurality of winding units each comprising a pivotal cheese support, and a traveling mechanism having means operative to swing the cheeses of successive units from thrown-out position into running position relative to said drum including a lifting device and an actuator therefor, said device being movable by said actuator directly into engagement with each of the cheeses in their thrown-out positions to lift the same upwardly and rearwardly toward their running position.

2. A winder comprising, in combination, a series of winding units each including a pivotal support for a cheese, a drum engageable by the cheese during the winding operation, means for shifting the cheeses away from said drum and into a thrown-out position relative thereto, and a winder tending mechanism having means for restoring the cheeses to position relative to the drum operative as an incident to the travel of said mechanism past said winding units successively, said restoring means comprising a lifting device reciprocable in the advance of the traveling mechanism into engagement with the thrown-out cheeses and thence upwardly and rearwardly to carry such cheeses into engagement with said drum.

3. A winder comprising, in combination, a series of winding units each including a support for a cheese, a drum engageable by the cheese during the winding operation, means for shifting the cheeses away from said drum and into a thrown-out position relative thereto, and a winder tending mechanism arranged to travel into association with said winding units successively and having a cheese lifting device movable in a direction transversely of the path of travel of said mechanism, and means operating in timed relation to the travel of the mechanism for actuating said device.

4. A winder comprising, in combination, a series of winding units each including a support for a cheese, a drum engageable by the cheese during the winding operation, means for shifting the cheeses away from said drum and into a thrown-out position relative thereto, and a winder tending mechanism arranged to travel into association with said winding units successively and having cheese restoring means comprising a constantly driven shaft, lifting means movable transversely of the path of movement of said mechanism, means connected with said shaft for actuating said lifting means, and means for driving said shaft in timed relation to the travel of the mechanism.

5. A winder having, in combination, a series of winding units each including a support for a cheese, a drum engageable by the cheese during

the winding operation, means for shifting the cheeses away from said drum and into a thrown-out position relative thereto, and a winder tending mechanism having means for restoring the cheeses to running position relative to the drum and operative as an incident to the travel of said mechanism past the winding units successively, said restoring means comprising a pair of driven members operating successively with respect to each of the thrown out cheeses whereby to effect the restoring operation in successive steps.

6. A winder having, in combination, a continuously driven cheese supporting drum, a series of winding units each including a pivotal support for a cheese whereby the cheese may be swung from a normal position in running contact with the drum into a thrown-out position relative thereto, and a winder tending mechanism arranged to travel into association with said winding units successively, said mechanism having a shaft driven in timed relation to the travel of said mechanism, a pair of disks on said shaft, and cheese lifting means comprising a pair of lifting members respectively associated with said disks and timed to operate successively relative to each cheese.

7. A winder having, in combination, a continuously driven cheese supporting drum, a series of winding units, each comprising a member supporting the cheese for movement from a position in running contact with said drum outwardly into a thrown-out position relative thereto, a winder tending mechanism arranged to travel into association with said winding unit successively, and cheese lifting means on said mechanism comprising a constantly driven shaft, a pair of lifting members spaced apart in the direction of travel of said mechanism, and means on said shaft operatively associated with said lifting members, said members being timed for operation successively with respect to each cheese in the travel of said mechanism, with the leading one of said members moving into retracted position while the following member completes the restoring movement.

8. A winder having, in combination, a continuously driven cheese supporting drum, a series of winding units each including a pivotal support for a cheese whereby the cheese may be swung from a normal position in running contact with the drum into a thrown-out position relative thereto, and a winder tending mechanism arranged to travel into association with said winding units successively, said mechanism having a shaft driven in timed relation to the travel of said mechanism, a pair of disks on said shaft, and cheese lifting means comprising a pair of lifting members operatively associated with the respective disks for operation thereby in timed relation to the travel of the carriage, one of said members occupying a fully retracted position for movement into position with respect to one of the cheeses while the other one of said members is acting upon the preceding cheese to swing it into its normal running position.

9. A winder having, in combination, a continuously driven cheese supporting drum, a series of winding units each comprising a cheese pivotally supported for movement from a running position in contact with said drum outwardly into a thrown-out position relative thereto, a winder tending mechanism arranged to travel into association with said winding units successively, and a cheese lifting device on said mechanism comprising a constantly driven shaft, a pair of crank disks rigid with said shaft, a pair of bell

cranks respectively connected with said disks, and a pair of lifting members fixed relative to said two bell cranks respectively and disposed in laterally spaced relation with one of said members extending upwardly beyond the other, said members being relatively timed for engagement with a given thrown out cheese successively in the travel of said mechanism, with the leading one of said members moving into retracted position while the following member completes the restoring movement.

10. A winder having, in combination, a drum, a plurality of winding units each comprising a cheese support and means operative to swing the cheeses of successive units from thrown-out position into running position relative to said drum including a pair of lifting members and actuating means therefor operative to move said members into operative association with each of said cheeses successively, one of said members acting to impart an initial lifting movement to each of the cheeses and the other member serving to complete such movement while the first member is being retracted to its initial position.

11. A winder having, in combination, a drum, a plurality of winding units each comprising a cheese support, and means operative to carry the cheeses of successive units from thrown-out position into running position relative to said drum, including a traveling mechanism and cheese lifting means on said mechanism movable transversely of the direction of movement thereof, said means being driven in timed relation to the travel of said mechanism.

12. A winder having, in combination, a drum, means supporting a yarn mass for movement into and out of engagement with the drum, a traveling mechanism having cam means operable on said yarn mass supporting means to swing the yarn mass from a thrown out position away from the drum into a running position over the drum, and other means including a lifting device actuated in timed relation to the travel of said mechanism and operable directly upon the thrown out yarn mass to lift the same in advance of the engagement of said supporting means by said cam means.

13. In a winder having a plurality of swinging carriers for a series of yarn masses, drive means for supporting and rotating the yarn masses when in one position, a traveling mechanism, and means operable in the travel of said mechanism for imparting swinging movements to said carriers relative to said driving means including a member reciprocable in a direction transversely of the direction of travel of the mechanism.

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The following references are of record in the file of this patent:

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