

March 9, 1948.

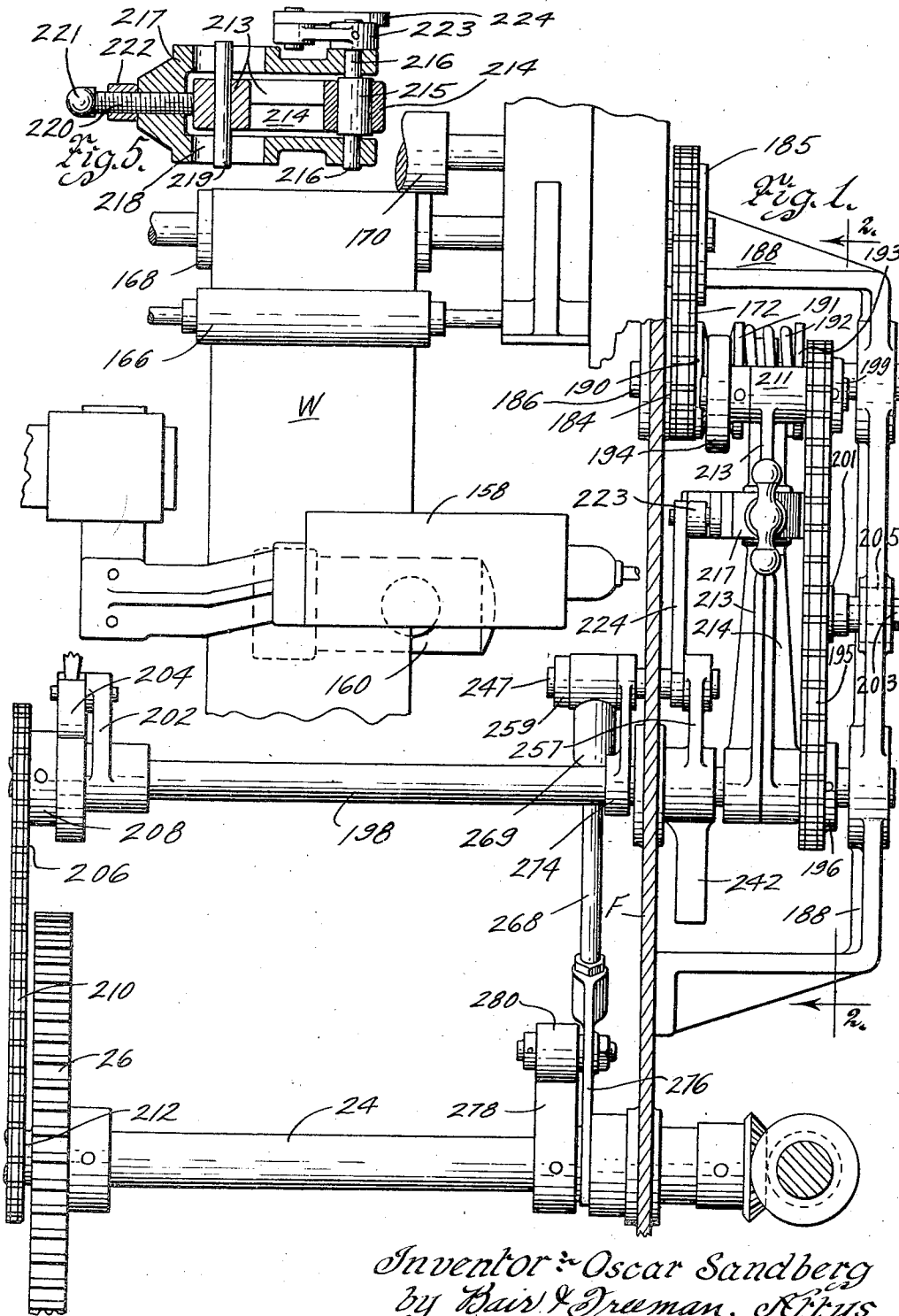
O. SANDBERG

2,437,560

WRAPPING PAPER CONTROL MECHANISM

Filed Nov. 3, 1943

2 Sheets-Sheet 1



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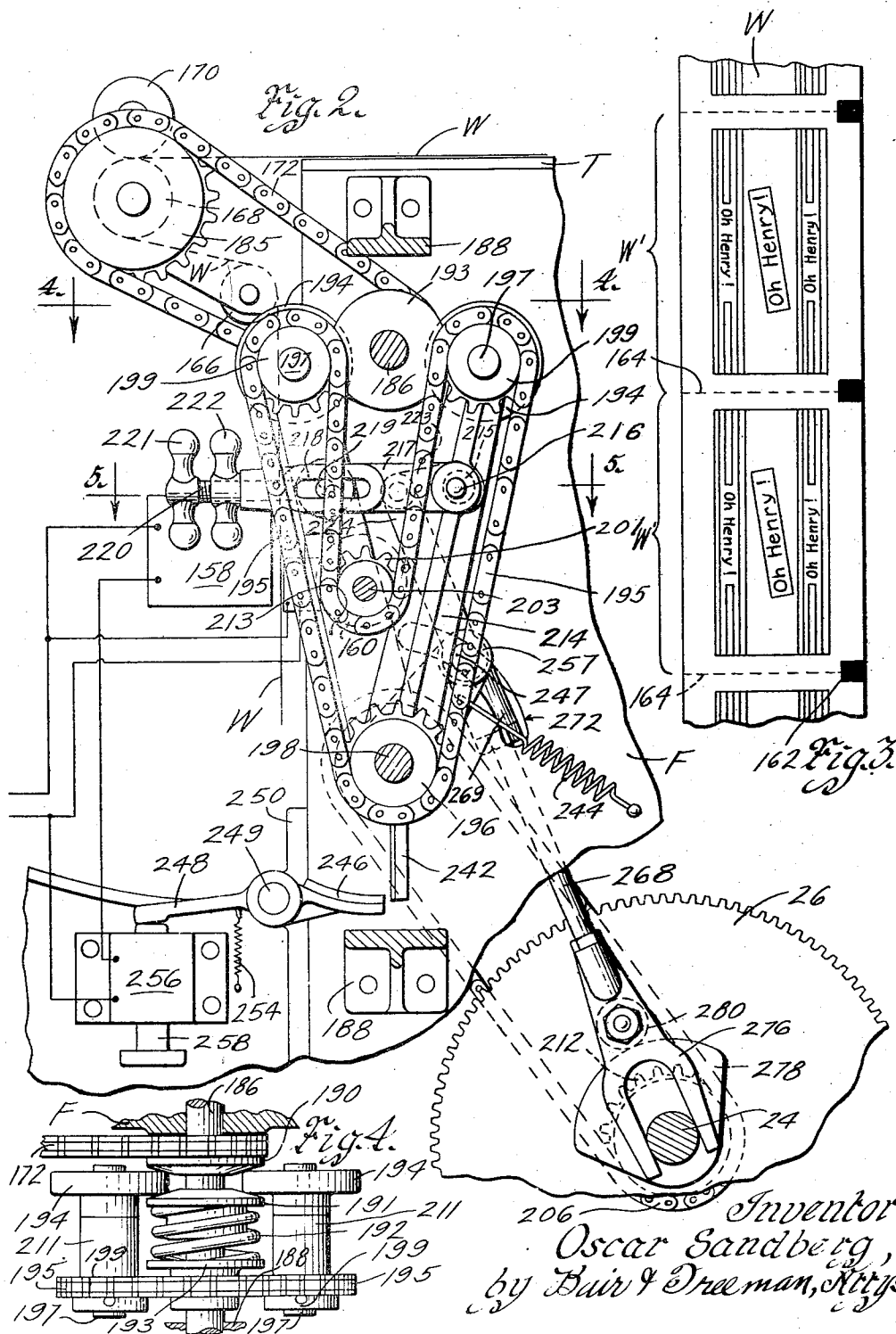
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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WRAPPING PAPER CONTROL MECHANISM

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My present invention has to do with a mechanism for controlling wrapping paper supplied to a machine for wrapping articles, such as candy bars or the like, the mechanism being applicable to a wrapping machine of the general character disclosed in my Patent No. 2,283,097, dated May 12, 1942.

One object of the invention is to provide simple mechanism, which can be used in connection with the wrapping machine of said patent, and which is an improvement over my Patent No. 2,283,096, also dated May 12, 1942, wherein are shown means for supporting a web of wrapping paper, means for cutting the web into wrappers, means for feeding the web to a cutter, and means for feeding the wrappers cut thereby to the wrapping machine proper, an electric eye viewing mechanism of said patents being operated by marks on the web of wrapping paper to effect, through speed change gearing, the propulsion of the web of paper at a proper speed into the wrapping machine, thereby keeping periodic advertising material on the wrapping paper in step with the candy bars, as they are fed to wrapping position, so that the advertising material will always be centered on the bars, regardless of irregularities in paper feed, as caused by slippage and other factors.

The mechanism of my present application has to do particularly with the electric eye controlled speed changing mechanism, and comprises an adjustable speed friction drive operable normally at one speed, and its speed is changed per cycle of operation of the wrapping machine if called for by the electric eye.

Another object is to provide the speed changing mechanism in the form of a drive shaft and a driven shaft, one driven from the other through variable speed friction drive mechanism normally operating at a slightly lower speed than required to conform to the cycling of the wrapping machine, a high speed operation being utilized as a modifying factor if required for each of the wrappers to be cut from the web, the electric eye viewing mechanism being operatively associated with the friction drive mechanism to bring it into play and to vary the time period of such play depending upon requirements determined by the amount that each wrapper is out of step with the wrapping machine.

More particularly, an object of my present invention is to provide a simple speed changing mechanism of all metal character, and eliminating the use of V-belts as in my patents, the present mechanism comprising two sets of friction discs normally operating at a slightly lower speed

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than required and relatively adjustable to a higher speed than required, a simple arrangement of disc shifting means being provided, whereby the discs are so shifted in response to the passage of complete patterns on the web past a photoelectric viewing means.

Still another object is to provide a cam means to reset the friction discs to normal position after the photoelectric viewing means has caused them to shift from low speed to high speed position, the relation of the cam and the period of actuation by the photoelectric viewing means determining the period of time during which the mechanism is operated at high speed in proportion to the period of time during which it is operated at low speed.

With the foregoing and other contemplated as well as obvious objects in view, the invention comprises the combination of elements and the arrangement of parts which are so combined with each other as to cooperate in the performance of the functions and accomplishment of the results herein contemplated. The invention comprises in one of its adaptations the species or preferred form illustrated in the accompanying drawings,

wherein
Figure 1 is a rear elevation of a wrapping paper control mechanism embodying my invention.

Figure 2 is a side elevation thereof and partly in section as taken on the line 2—2 of Figure 1.

Figure 3 illustrates a section of the wrapping paper or web used in my machine and controlled by the control mechanism herein described.

Figure 4 is a sectional view on the line 4—4 of Figure 2; and

Figure 5 is a sectional view on the line 5—5 of Figure 2.

The wrapping machine of my patents above-mentioned are adapted for wrapping articles of irregular shape, such as candy bars or the like. The mechanism of this application is adapted to feed a web of wrapping material to the wrapping machine, such web to be cut by the machine into individual wrappers, and the present mechanism being synchronized with the cutting mechanism, so that cutting of the wrappers from the web is performed at the desired point, even though the web of material may slip at times relative to its feeding means, all as shown in the patents, the patents, however, showing a double V-belt drive instead of a friction disc drive, as will be described in connection with the present invention.

Referring to the specific construction of the present mechanism, I show a vertical frame member F, two of which are used in the machine for supporting opposite ends of the various shafts of

the machine. Only one of these frame members is shown in the attached drawings, reference being had to my previous patents for other details of construction.

A table top T connects the tops of the frames F together and the web of wrapping material is fed onto the table top as will hereinafter appear. The web itself is shown at W, and in Figure 2 as a single line.

Journalled in the frame member F is a main shaft 24 having a gear 25 secured thereto. The gear 25 is driven in any suitable manner, as from a motor, as illustrated in my previous patents.

Wrappers for the articles wrapped in the wrapping machine are supplied by the device of the present application in the form of the web W of the proper width, and of continuous length, wound on a reel (not shown in this application). The web W extends upwardly from the reel between an electric eye mechanism 158 and a light source therefor indicated at 160. The purpose of the electric eye mechanism is to have marks 162 on the web (see Figure 3) pass the electric eye, and the eye in turn regulates the speed of feeding the web and determining the position at which to cut it into individual wrappers W' before the wrappers are wrapped around the articles by the wrapping machine. The desirable point of cutting is indicated by dotted lines 164, so that the web printed with a repeated pattern (one for each article) will be cut exactly between the patterns. The web W may be either Cellophane or wax paper printed with the trade-name of the company which makes the contents and the name of the dealer or distributor thereof, as is usually done.

The web W after leaving the electric eye 158 passes over an idler roller 166 and then around a feed roll 168. Above the roll 168, a second roll 170 is provided. Said rolls may be made of rubber or the like to provide a good grip on the web W and propel it toward the table top T when the rolls are rotated as by sprockets 184 and 185 and a chain 172.

The sprocket 184 for driving the chain 172 is mounted on a driven shaft 186. The shaft 186 is journaled in the frame member F and in a bracket 188. The shaft 186 has secured thereto a driven friction disc 190. A second driven friction disc 191 is slidable and non-rotatable relative to the shaft and is urged toward the disc 190 by means of a spring 192. The spring 192 is interposed between the disc 191 and a backing disc 193 stationary with respect to the driven shaft 186.

For driving the driven shaft 186, I provide a drive shaft 198. The drive shaft in turn is driven through a clutch mechanism 202-204 from a sprocket 206. The sprocket 206 is loose on the shaft 198 and is retained in position by a collar 208. Both shafts 24 and 198 extend on toward the left in Fig. 1 and have been broken off. The sprocket 206 is driven by a chain 210 from a sprocket wheel 212, the sprocket wheel being secured to the main shaft 24. The clutch 202-204 is adapted to be released and the shaft 198 to thereby be operated only when there is an article approaching position to be wrapped, as fully shown in my previous patents, but forming no part of my present invention.

The operative connection between the drive shaft 198 and the driven shaft 186 consists of a pair of friction discs 194 coacting with the friction discs 190 and 191 and driven by a chain 195 from the drive shaft 198. The drive shaft has a sprocket 196 for this purpose, and each of the

discs 194 is mounted on a shaft 197 on which sprockets 199 are mounted. The single chain 195 extends around the sprocket 196 and both sprockets 197 as shown in Figure 2. For keeping the chain taut, an idler sprocket 201 is provided, and it is carried adjustably on the bracket 188. For this purpose, the sprocket 201 is mounted on a shouldered clamp bolt 203 which is slidable in a vertical slot 205 of the bracket.

The shafts 197 are journaled in bearings 211 carried by the upper ends of a pair of arms 213 and 214. These arms are journaled on the drive shaft 198 at their lower ends and are fixed in relation to each other by a yoke 217 (perhaps best shown in Figure 5).

The arm 214 has an eccentric 215 rotatable therein, the eccentric having pintle ends 216 rotatable in the yoke 217 itself. The yoke is U-shaped and has in each arm a slot 218, through which a pin 219 extends, this pin passing through the other arm 213. The pin 219 is thereby adjustable in the slots 218, but is limited in its movement away from the eccentric 215 by means of a set screw 220. A handle 221 is provided for rotating the set screw 220 and thereby adjusting the spread of the arms 213 and 214 to effect a change in the speed of operation of the wrapper feeding mechanism as will hereinafter appear. A lock nut 222 is provided for holding the adjustment wherever desired.

The location of the sprocket 201 is such as to result in a minimum of change in distance between the centers of the shafts 197 and the centers of the sprocket and the shaft 198 when the arms 213 and 214 are swung toward or away from each other. Specifically, the clamp bolt 203 on which the idler sprocket 201 is mounted has its axis lying in a plane through the axis of the shaft 198 and a point between shafts 197 for this purpose.

The arms 213 and 214 are T-shaped in cross section with their flat faces adjacent each other as shown in Figures 1 and 5, while at the eccentric 215 and pin 219 each is enlarged into a suitable hub. Obviously the set screw 220 predetermines the diameter on the friction discs 190 and 191 at which the peripheries of the friction discs 194 engage. All of the four discs are preferably made of hardened steel to minimize wear.

The eccentric 215 is approximately at its outer limit in Figure 2, so that it is obvious that any rotation thereof will move the arms 213 and 214 toward each other in opposition to the action of the spring 192 tending to move the disc 191 toward the disc 190. Therefore a speed-up of the drive shaft 186 can be effected since the peripheries of the discs 194 would then be contacting a smaller diameter of the discs 190 and 191. For accomplishing such speed-up of operation, an arm 223 is mounted on one of the pintles 216 of the eccentric 215 and is connected by a link 224 with a stub shaft 247. The stub shaft 247 is operated by the following described mechanism:

The stub shaft 247 extends from a lever 257 and through an arcuate slot 272 in the frame member F. The lever 257 is oscillatably mounted on the shaft 198. At its inner end a retaining collar 259 is mounted thereon as shown in Figure 1. Back of the frame member F, a lever 274, similar to the lever 257 is also oscillatably mounted on the shaft 198 and supports the stub shaft 247, so that it can be swung through its operating cycle without binding.

The main shaft 24 has a cam 278 thereon for propelling a rod 268 upwardly through the me-

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dium of a roller 280 carried by a fork 276. The roller engages the surface of the cam under constraint of the spring 244. The rod 268 is connected by means of a fitting 269 to the stub shaft 247.

The lever 257 is oscillatably mounted on the drive shaft 198 and has a downward extension 242 normally engaged with a stop 246 by a spring 244. The stop 246 is secured to a rocker arm 248 pivoted at 249 on a bracket 250. A spring 254 normally urges the rocker arm 248 downwardly to the position shown in Figure 2. For moving the arm 248 upwardly, I provide a solenoid 256 and a plunger or core 258 to be elevated thereby when the solenoid is energized.

Referring briefly to the operation of the parts just described, if the stop member 246 were to remain in a lowered position instead of the raised position shown in Figure 2, it is obvious that during a period extending over about two-thirds of the revolution of the main shaft 24, the lever 257 would be rotated clockwise by the spring 244 to pull downwardly on the link 224, and thereby rotate the eccentric 215 to a position for permitting the driving discs 194 to move toward each other. This would result in the disc 191 being moved away from the disc 190 against the bias of the spring 192, and the discs 194 engaging the discs 190 and 191 at a smaller circumferential line of contact. During this period of time, the drive shaft 186 would rotate at a higher speed. The duration of such period of time is shortened, however, by having the stop member 246 normally blocking the extension 242 of the lever 257 so that the spring 244 moves the eccentric 215 only a slight amount. By then actuating the solenoid 256, so that the stop 246 is removed from in front of the extension 242 after the beginning of the two-thirds period of revolution mentioned, the relative position in the two-thirds period when the solenoid 256 is energized constitutes the initiation of that period effective to shift from low to high speed for the shaft 186. The speed of the feed rolls 168 and 170 is thereby governed in accordance with the marks 162 on the wrapper web B, since the solenoid is under control of the electric eye viewing mechanism 158. The operation in detail of this part of the machine will appear later on in the specification. No attempt will be made to go into detail as to the electric eye viewing mechanism, the essential characteristics being continuous energization of the light source 160 and operation of the solenoid 256 only when the electric eye 158 is actuated, due to a mark 162 passing between the light source and the eye, the solenoid circuit being thereby established.

Practical operation

In the operation of my wrapping paper control mechanism, assuming that the shaft 24 is rotating when the article reaches a position to be wrapped, the clutch 202—204 is operated to cause the shaft 198 to rotate one revolution if only one article operates the clutch or to keep it continuously rotating as long as there are articles passing in succession to wrapping position. In this way, a wrapper is cut from the web and fed to wrapping position only when an article also comes to wrapping position.

The web feeding mechanism is normally operated at a speed somewhat lower than required to feed one wrapper to the machine during one cycle of operation. This can be adjusted by means of the set screw 220 which changes the outer limits of spread of the arms 213 and 214.

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Whenever one of the marks 162 of the web W passes the electric eye 158, it effects energization of the solenoid 256. This results in depression of the stop 246 to permit the spring 244 to move the roller 280 toward the shaft 24, the rise of cam 278 at this time being out of registry with the roller. This results in the eccentric 215 effecting a swinging of the arms 213 and 214 toward each other for speeding up the shaft 186. The speed up continues until the rise of cam 278 engages the roller 280 and raises it to the normal speed position for the driving mechanism for the shaft 186.

A variation in the time of speed up is had due to the solenoid 256 operating at different times depending upon the position of the marks 162 on the web W in relation to the operating cycle of the machine. Whenever one of the marks is a maximum distance behind where it should be, then the maximum period of speed increase is effective. When the mark is a minimum distance behind where it should be, then the mark will not be so far behind its required position for proper operation and consequently the solenoid 256 will be energized at a relatively later point in the rotation of the shaft 24, thereby reducing the time period of speed-up of the mechanism. During each revolution of the shaft 24, the solenoid will be energized to permit the spring 244 to move the eccentric 215 to high speed position. The cam 278 at each revolution of the main shaft will reset the mechanism to the low speed position until the solenoid is again energized.

The present mechanism, I find much longer lasting and fool-proof than the double V-belt arrangement in my previous patents. An all-metal mechanism is here disclosed, wherein the change in speed is adjustable and effected by friction means of all-metal construction. The metal parts can be hardened to minimize wear, and when once set for a particular wrapper the machine may operate for an indefinitely long period of time without the necessity of any further adjustment.

Having described one specific embodiment of my invention together with the operation thereof, I desire it to be understood that this form is selected merely for the purpose of facilitating disclosure of the invention rather than for the purpose of limiting the number of forms, which it may assume. It is to be further understood that various modifications, adaptations and alterations may be applied to the specific form disclosed to meet the requirements of practice without in any manner departing from the spirit and scope of the present invention except as set forth in the claims appended hereto.

I claim as my invention:

1. In a drive mechanism, a drive shaft, a driven shaft, and means for transmitting power from said drive shaft to said driven shaft, said transmitting means being adapted to drive said driven shaft at different speeds and comprising a pair of arms pivoted on said drive shaft, a friction drive disc carried by each arm, and a pair of friction driven discs on said driven shaft and normally engaged at one diameter by said friction drive discs, said arms when moved relative to each other changing the diameter at which said friction driven discs are engaged and thereby driven at a different speed.

2. In a drive mechanism of the character disclosed, a drive shaft, a driven shaft, and power transmitting means including a friction drive between said driven shaft and said drive shaft, which friction drive has co-acting frictionally en-

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gaged wheels movable to vary the effective diameter at the driving point between said wheels, said friction drive normally driving said driven shaft at a lower speed than required to conform to the cycles of a machine to which the drive mechanism is applied, means to periodically increase the speed of said driven shaft to a speed higher than required to conform to the cycling of the machine comprising means to re-position said wheels to a different effective diameter so that a higher speed is in effect, electromagnetic means adapted to initiate such re-positioning of said wheels, and a continuously driven rotary cam to effect termination of such re-positioning by said second means to cause said wheels to assume their lower speed position.

3. In a drive mechanism, a driven element, a pair of cone shaped axially aligned friction wheels operatively connected thereto and biased toward each other, means for driving said friction wheels normally at a lower speed than required to conform to the cycling of a machine to which the drive mechanism is applied and including transmitting means including a second pair of friction wheels located between said first pair and on opposite sides of the axis thereof, means for periodically changing the distance between said second friction wheels and thereby the operating diameter of said first friction wheels in relation to the diameter of contact between said first and second friction wheels, and electromagnetic means adapted to initiate such periodic changes.

4. In a drive mechanism of the type described, a driven element and means for driving said element comprising a drive shaft, a second shaft, means for drivably connecting said driven element with said second shaft, a pair of friction discs mounted on said second shaft and movable axially thereof relative to each other, a pair of arms oscillatably carried on said drive shaft, a pair of friction discs, one carried by each of said arms, chains connecting said drive shaft with said last friction discs, a connection between said arms predetermining the diameter that said last friction discs engage the friction discs on said second shaft, means for changing the position of the arms and thereby the diameter at which engagement occurs, and means for selectively shifting said arms by changing the length of said connection to one position or the other, whereby said driven element is selectively driven at different speeds.

5. Drive mechanism of the class described comprising a driven element, a drive shaft, a driven shaft for driving said driven element, said drive and driven shafts being provided with co-acting friction discs variable in diametric relation to thereby change the speed of operation of the driven shaft in relation to the drive shaft, and means to cause said friction discs to be relatively shifted to effect a change in speed of said driven element, said last means comprising an arm carrying one of said friction discs, a roller connected with said arm, a cam, a spring for moving said arm in one direction to effect such shifting of said friction disc, and for engaging said roller with the

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lobe of said cam when said lobe registers with said roller, said cam returning said friction disc to its initial diameter of operation against the bias of said spring at a predetermined point in the cycle of operation of said drive shaft.

6. Drive mechanism of the kind disclosed comprising a driven element, a drive shaft, a driven shaft for driving said driven element, said drive and said driven shafts being provided with co-acting friction disks variable in diametric relation to thereby change the speed of operation of the driven shaft in relation to the drive shaft to a different-than-normal speed, spring means associated with said friction disc means to shift it to its position of different diameter and thereby effect operation of said driven shaft at said different-than-normal speed, rotary cam means to prevent said spring means from effecting such shifting during one portion of a revolution of said cam means, said cam means, during another portion of revolution thereof, permitting such shifting, blocking means to prevent such shifting, and electro-responsive means to render said blocking means inoperative.

7. In a friction drive mechanism, a driven element, means for driving said driven element normally at a lower speed than required to conform to the cycling of a machine to which said friction drive mechanism is applied and including a variable friction drive means comprising a pair of drive discs, a drive shaft therefor, arms pivoted on said shaft and rotatably supporting said drive discs, sprockets on said drive shafts and for each of said drive discs, a chain around all three of the sprockets, an idler sprocket mounted on an axis lying in a plane through the axis of said drive shaft and a point between the axis of said drive discs, said chain extending from one of said drive disc sprockets and back to the drive disc sprocket, means for periodically changing the operating diameter of said friction drive means by swinging said arms, and means for adjusting the speed of said friction drive mechanism comprising a link having pivotal connection with one of said arms and slidable connection with the other of said arms, and an adjusting screw carried by said link and engaging said other arm to move it slidably relative to said link.

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

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Number	Name	Date
326,861	Gass	Sept. 22, 1885
2,208,776	Sandberg	July 23, 1940
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2,283,096	Sandberg	May 12, 1942
2,283,097	Sandberg	May 12, 1942

FOREIGN PATENTS

Number	Country	Date
809	Great Britain	Aug. 23, 1878
358,764	Italy	Apr. 29, 1938