Dec. 27, 1955 G. T. HEMMETER 2,728,236

WHEEL SPINNING MACHINE

Filed Oct. 24, 1952 3 Sheets-Sheet 1

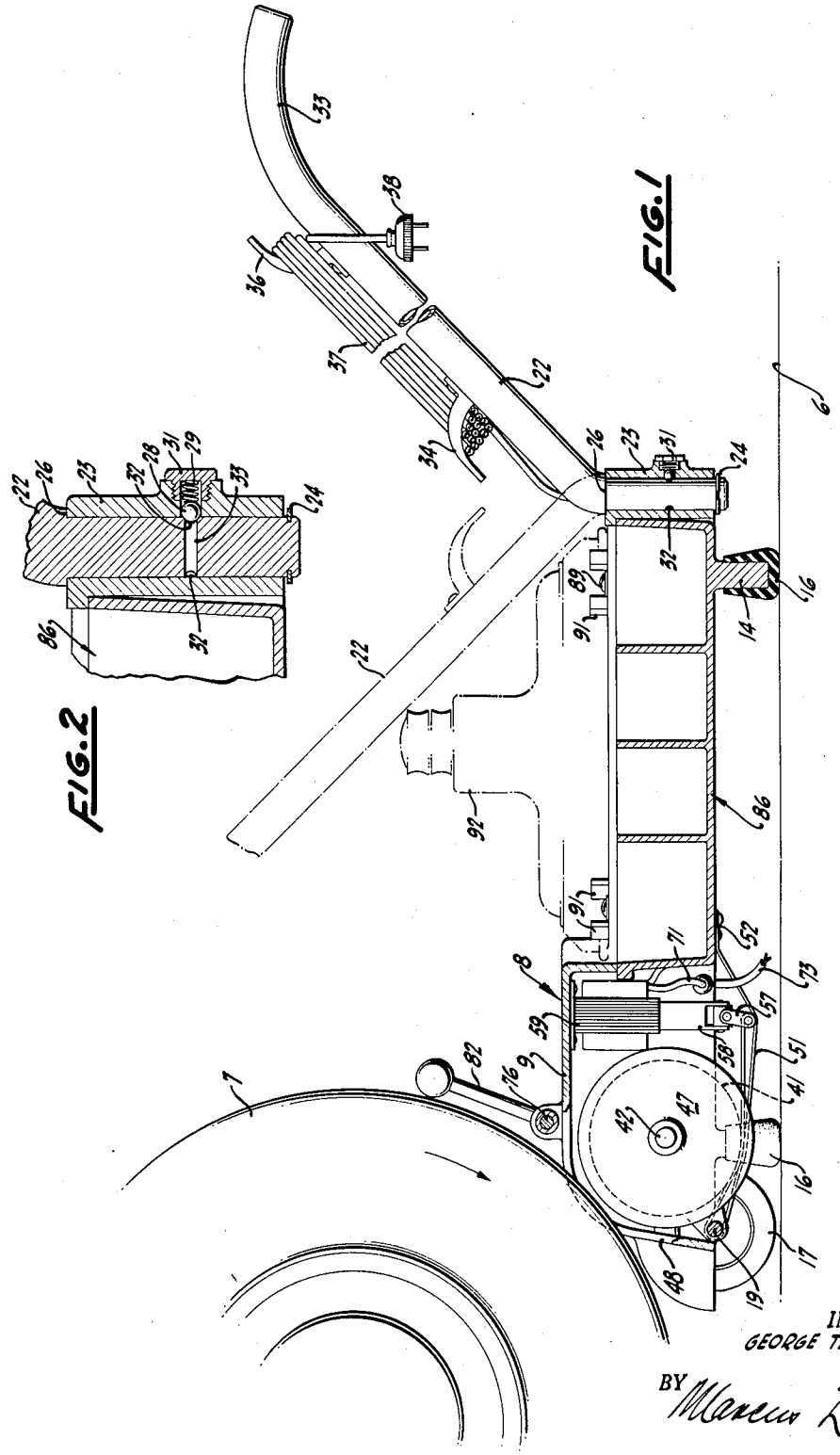


FIG. 1

FIG. 2

INVENTOR.
GEORGE T. HEMMETER

BY Marcus Lothrop

ATTORNEY

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WHEEL SPINNING MACHINE

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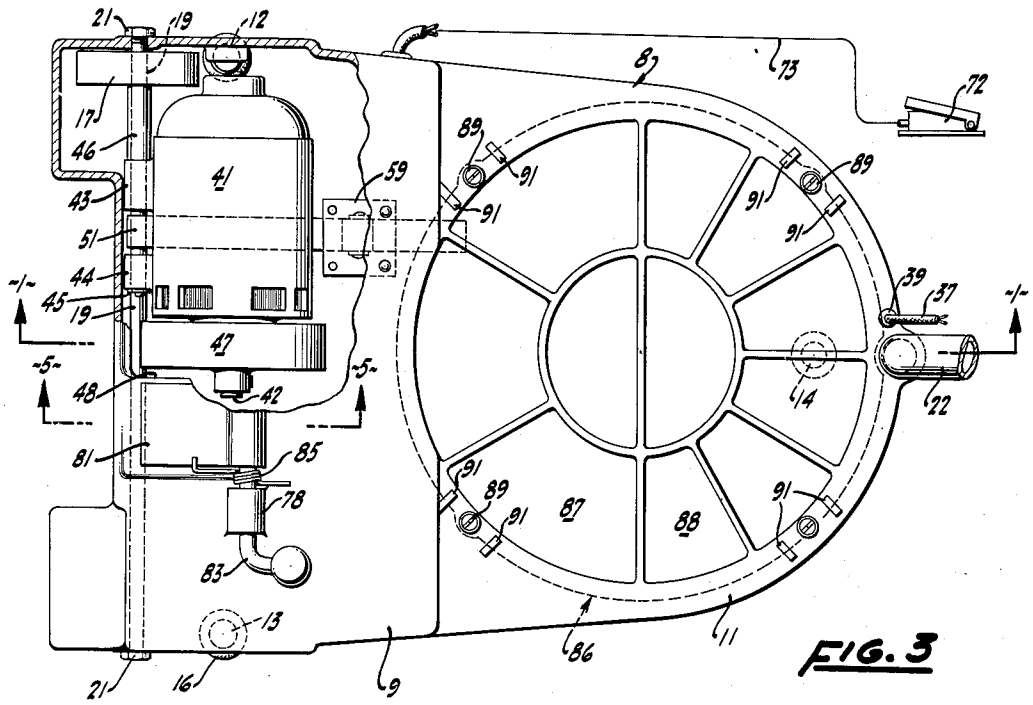


FIG. 3

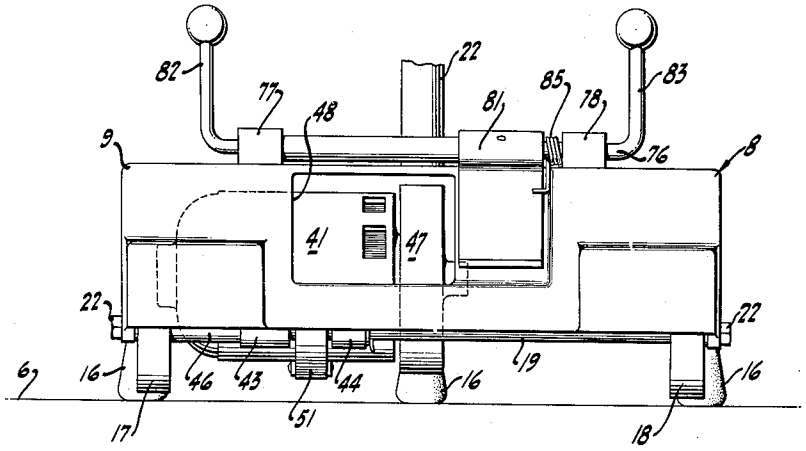


FIG. 4

INVENTOR.
GEORGE T. HEMMETER

BY Warren Lothrop

ATTORNEY

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WHEEL SPINNING MACHINE

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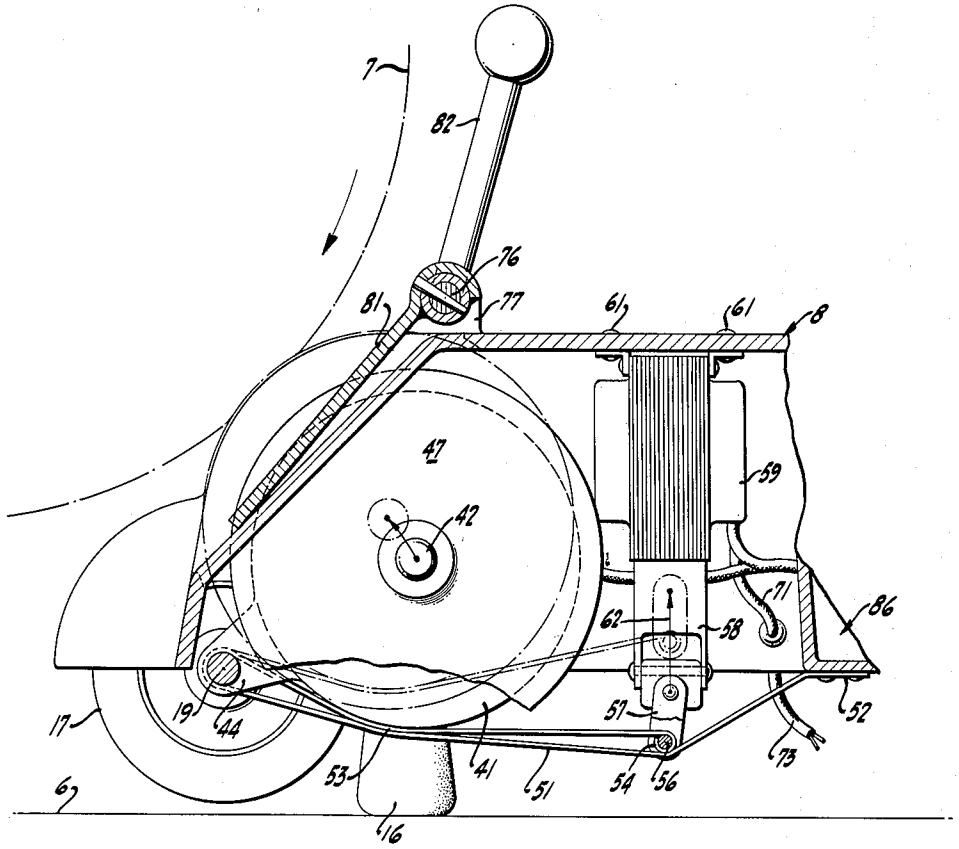


FIG. 5

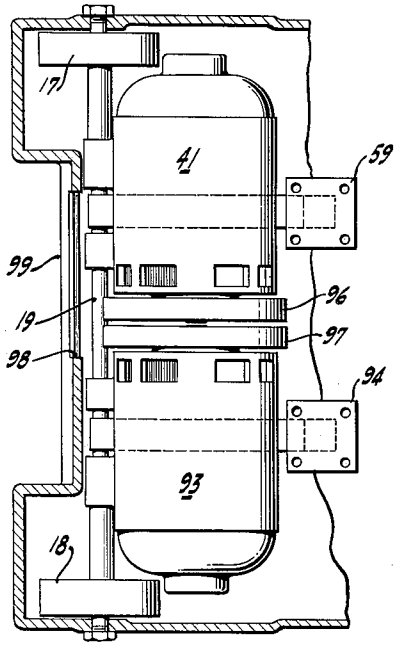


FIG. 6

INVENTOR.
GEORGE T. HEMMETER
BY Marcus Lothrop
ATTORNEY

United States Patent Office

2,728,236

Patented Dec. 27, 1955

2,728,236

WHEEL SPINNING MACHINE

George T. Hemmeter, Los Altos, Calif.

Application October 24, 1952, Serial No. 316,675

5 Claims. (Cl. 74—16)

My invention relates to mechanisms primarily for use in bringing rotary bodies up to a rotational speed suitable for testing the balance or unbalance of such bodies and is especially concerned with a device engageable with an automobile tire, for example, to bring the tire and its attendant rotary mechanism up to balancing speed. The present structure is intended for use in connection with the Wheel Balancer disclosed in my co-pending application filed August 28, 1952 with Serial No. 306,991. In that application there is shown a device of a circular disc configuration adapted to be temporarily secured to a jacked up vehicle wheel to indicate the position and amount of counterbalancing weight to be applied to the wheel to balance it within very close limits. The balancing operation requires that the wheel be rotated or spun at a relatively high speed. It is helpful to have a device for serving as a storage mechanism for the balancer itself when not in use and for carrying conveniently a supply of the necessary balancing weights.

It is therefore an object of my invention to provide a wheel spinning machine which will cooperate with my mentioned wheel balancer to provide a utilitarian article assisting in the balancing operation.

Another object of the invention is to provide a wheel spinning machine that can be operated by a user from the position he occupies during balancing of a wheel and without interfering with his free use of his hands in the balancing operation.

Another object of the invention is to provide a wheel spinning machine that can be powered and braked by remote control, especially foot control.

A further object of the invention is to provide a wheel spinning machine that can be folded compactly for storage.

Another object of my invention is to provide an improved wheel spinning machine.

A further object of my invention is to provide a wheel spinning machine effective to transfer substantial torque to the wheel being spun by means of friction and without dislodging the spinning machine from its temporary location.

Another object of my invention is to provide a wheel spinning machine having a means for controlling the speed of operation of the wheel.

A still further object of the invention is to provide a wheel spinning machine which is readily portable and easily operable for spinning wheels on the left hand side and on the right hand side of the vehicle.

Other objects of the invention together with the foregoing are attained in the embodiment of the invention described in the accompanying description and illustrated in the accompanying drawings, in which

Figure 1 is a cross-section on a vertical median plane through one embodiment of the wheel spinning machine of my invention, parts being broken away to reduce the size of the figure and the plane of section being indicated by the line 1—1 of Figure 3.

Figure 2 is an enlarged detail of the handle and frame junction.

Figure 3 is a plan of the wheel spinning machine of my invention, portions being broken away to reduce the size of the figure and part of the frame being broken away to show the motor mounting.

Figure 4 is an end elevation of the device, a part of the operating handle being broken away.

Figure 5 is an enlarged cross-section similar to Figure 1, the plane of section being on the line 5—5 of Figure 3.

Figure 6 is a partial plan similar to Figure 3 but showing a modified form of the spinning machine.

The wheel spinning machine is ordinarily utilized in a garage or similar environment having a floor 6 or ground on which a vehicle stands with a vehicle wheel 7 supported on a jack at some distance above the floor so that the wheel is freely rotatable and out of contact with the floor. The wheel spinning machine itself is primarily a portable device for use in connection with the wheel 7, which represents a wheel on either side of the vehicle and either forwardly or rearwardly thereof.

The spinning machine includes a main frame 8, preferably a suitable contoured casting of metal having a forward portion 9 of box-like configuration and a rearward portion 11 which is substantially a semi-circular ring. The frame 8 is provided with a support including a pair of forward feet 12 and 13 and a rearward foot 14, all of the feet preferably being covered with friction jackets 16 for good adhesion to the floor 6. The forward feet 12 and 13 are disposed on opposite sides of the frame so that they lie to either side of the wheel 7 and directly below an overhanging part of the wheel.

When the frame is resting on the supports 12, 13 and 14 it is level and stable with respect to the floor 6 but to render the framework portable I provide a pair of ground engaging wheels 17 and 18 within the forward portion 9 and at elevation slightly above the forward feet 12 and 13. Preferably the wheels are rubber tired and are journalled on a through axle 19 mounted in the sides of the frames and secured by removable nuts 21. The disposition of the wheels is such that when the framework 8 is tipped upwardly from the rear, the supports 12, 13 and 14 are raised from the floor and a substantial portion of the spinner weight is transferred to the two forward wheels 17 and 18 for ready portability, and remaining part of the weight being borne by a guiding handle 22.

This handle is conveniently a tube reduced at its lower end to pass through a boss 23 included in the frame 8. A snap ring 24 at the lower end of the tube holds the handle in position at one end and a shoulder 26 at the other side of the boss locates the handle on the upper face of the frame 8. The lower part of the handle is contacted by a detent ball 28 pressed into position by a spring 29 located in a cap 31 screwed into the boss 23. A pair of depressions 32 in the handle are formed by a diametrical bore 33 and tend to centralize the handle 22 either in its rearward operating position as shown in full lines in Figure 1, or in a forward inoperative or storage position, as shown by broken lines in Figure 1. The handle 22 at its upper end is provided with a grip portion 33 and intermediate its ends is supplied with hooks 34 and 36 on which conducting cable 37 is reeled when not in use. The cable is provided with the customary connection 38 and is brought alongside the handle 22 and is introduced through an insulator 39 into the semi-circular ring portion 11 of the frame.

To serve as a means for rotating the wheel 7 I provide within the box-like portion 9 of the frame 8 an electric motor 41 having the customary motor shaft 42 journalled therein and having a pair of ears 43 and 44 formed on its housing for hinge engagement with the axle 19. The engagement of the ears 43 and 44 with the axle is for

free rotation of the motor as a body about the axle as a pivot and in a path or direction having a component generally upward toward the tire 7. Suitable stops 45 and 46 are disposed on the axle so that endwise motion of the motor in both directions is precluded.

Mounted on the shaft 42 of the motor is a friction drum 47 or driving pulley of a diameter such that it can be contained within the envelope of the box-like portion 9 of the frame 8, but which is also movable to an opening 48 in the frame 8 toward the wheel 7 and into closely pressed engagement or driving relationship with the wheel. The friction drum 47 is preferably of small mass so that it assumes driving speed rapidly. It normally is located substantially on or near the center line of the frame.

Additionally to support the motor 41 and the friction drum 47 in position and for movement in the mentioned path, there is provided a supporting leaf spring 51 at one end fastened by suitable securing means 52 to the bottom portion of the frame 8. The spring 51 is looped around the axle 19 and is extended from the axle so that a portion 53 lies beneath and is in contact with the frame of the motor 41 to serve as a cradle and a yielding support therefor. The spring terminates in a loop 54 around a pin 56 in the lower end of a universal link mechanism 57 effective to connect the end of the spring to the armature 58 of an electromagnet 59 or solenoid.

The position of the solenoid 59 in the frame 8 is established by fastenings 61 in the box-like portion 9 of the frame and in such a location that when the solenoid is energized and its armature 58 is lifted, as shown by the arrow 62 in Figure 5, it lifts the cradle portion 53 of the spring to move the motor 41 in an upward, arcuate path about the axle shaft 19 and into yielding contact with the wheel 7. The reaction due to lifting the motor into tire contact is taken in a downward direction and for the most part on the two forward feet 12 and 13. The nature of the force exerted by the spring, and by the energized solenoid 59 assisting the spring, is yielding so that irregularities in the circumference of the wheel 7 or vibratory movement due to unbalance are yieldingly met by slight motion of the motor and friction drum. Nevertheless a tight enough frictional engagement is had between the drum and the tire so that substantial driving torque is transmitted. One of the reasons for the upward direction of engagement is that the reaction on the supporting mechanism is largely downwardly or has a component which is generally downward in the immediate vicinity of the forward supports 12 and 13 so that they are thrust with more than usual force against the floor 6 to avoid slipping of the frame.

Preferably the solenoid 59 and the motor 41 are energized simultaneously by means of appropriate conductors 71 which extend from the conductor 37 and pass through a switch 72 (Figure 3) of any convenient type for manual or pedal operation and disposed at the end of the flexible cord 73. The switch 72 can thus be remotely located with respect to the frame 8 and can be situated on the floor on the left side or right side of the unit for ready operation. When the switch 72 is closed, the solenoid 59 and the motor 41 are simultaneously energized so that the motor, as it speeds up, is displaced so that the friction drum 47 contacts with the wheel to be balanced and rotates the wheel at balancing speed, as indicated by the broken lines in Figure 5.

When the switch 72 is opened, the solenoid 59 and the motor 41 are de-energized and the motor coasts. The driving pulley or friction drum breaks contact with the wheel and drops from its projected position adjacent the wheel being balanced and falls to inactive position, as shown by the full lines in Figure 5, with the weight of the motor resting largely on the lower strap 51. The free spinning vehicular wheel is then available for balancing without hindrance from external driving forces. The motor may be re-energized at any time irrespective of whether the driving wheel is in motion.

After completion of the balancing operation, the wheel may be brought to a quick stop by means of a brake provided for that purpose. Spanning the box-like portion 9 of the frame is a brake shaft 76 mounted in upstanding lugs 77 and 78 forming part of the frame. Between its ends the brake shaft carries a blade 81 to lie alongside the projected portion of the friction drum 47. The blade is moved between active and inactive positions by either one of a pair of crank handles 82 and 83 disposed adjacent the sides of the frame for left hand or right hand operation.

The brake blade 81, when applied, also has a reaction component which is downwardly so that extra force is imposed upon the forward supports 12 and 13. While some extra load is imposed upon the rearward support 14, it is important that the forward ones are located substantially beneath the wheel 7 so that they are firmly urged to guard against slipping action against the floor 6, both in driving and in braking. The brake blade is held in the off position by a torsion coil spring 85. The brake operating handles are conveniently located for operation by the user without his leaving his position required to operate the balancing mechanism.

As a matter of convenience in the balancing operation, the ring portion 11 of the frame is designed to receive a receptacle 86 divided into a number of compartments 87 and 88 to store balancing weights of different configurations and mass. The tray or structure 86 is preferably a separate item which is fastened to the main frame 8 by screws 89 and is referred to generally as part of the frame. Also, the frame 11 is formed with a number of upstanding centering lugs 91 to serve as guides for the storage support of a wheel balancer of the sort referred to in my co-pending application and indicated by the dotted line 92 in Figure 1. Thus, the balancing mechanism serves as a cover for the tray 86 when it is not in use and therefore is conveniently located and stored.

It is sometimes necessary to provide more power than is normally available in the motor 41 in spinning of heavy tires such as truck tires or wheels having abnormal drag. In that instance I do not generally modify the structure to any great extent except preferably, as shown in Figure 6, provide duplicate motors 41 and 93 disposed coaxially on similar mountings and with similar solenoids 59 and 94. These are energized by a single switch 72 and are provided with a pair of friction drums 96 and 97 disposed side by side as closely as possible and simultaneously projectable through the opening 98 in the frame 99. A disconnect switch is placed in the circuit of one motor and solenoid to permit operation with either one or two driving motors in operation subject to the choice of the operator. Otherwise the structure is the same as previously described but the two friction wheels each being driven by a motor, transmit a substantially increased torque.

I claim:

1. A wheel spinning machine comprising a frame, means for supporting said frame on the floor adjacent a wheel to be spun, an electric driving motor having a shaft, means for mounting said driving motor on said frame for lifting movement toward and lowering movement away from said wheel, a friction drum mounted on said shaft, an electric solenoid having an armature, means for mounting said solenoid on said frame for lifting and lowering movement of said armature, means for connecting said solenoid when energized to lift said armature and said motor and said friction drum toward and into pressure contact with said wheel whereby reaction forces are transmitted through said supporting means to said floor, and a switch for simultaneously energizing said motor and said solenoid.

2. A wheel spinning machine comprising a frame, means for supporting said frame adjacent a wheel to be spun, said frame having an opening therein adjacent to said wheel, a friction drum, means on said frame for

mounting said friction drum for lifting movement from a first position inside said frame into a second position with said drum engaging said wheel through said opening, a solenoid effective when energized yieldingly to lift said mounting means toward said second position, an electric motor for driving said drum, and means for simultaneously energizing said motor and said solenoid.

3. A wheel spinning machine comprising a frame, means for supporting said frame upon the ground adjacent a wheel to be spun, said frame having an opening therein adjacent said wheel, an electric motor having a shaft, a hinge mount for said motor on said frame, a friction drum on said motor shaft, a solenoid effective when energized to move said hinge mount with an upward component from a first position with said friction drum inside said frame into a second position with said friction drum engaging and pressing upwardly upon said wheel through said opening, and a switch independent of the position of said hinge mount for simultaneously energizing said motor and said solenoid.

4. A wheel spinning machine comprising a frame, means for supporting said frame adjacent a wheel to be spun, at least part of said support means being at either side of and beneath said wheel, a friction drum, means for mounting said friction drum on said frame for movement with an upward component toward said support means, electromagnetic means for so moving said friction drum to press yieldingly against said wheel with the reaction of said pressure against said support means, electric means for driving said friction drum, and means independent of the position of said drum for simultaneously energizing said electromagnetic means and said electric means.

5. A wheel spinning machine comprising a frame having an opening in the upper portion thereof, feet on said frame for supporting said frame upon the floor, means forming a cradle beneath said opening, means for pivotally supporting one end of said cradle upon said frame, a solenoid including an armature, means for supporting said solenoid upon said frame for movement of said armature in a vertical direction, means for supporting the other end of said cradle upon said armature, an electric motor supported on said cradle and having a shaft, a friction drum on said shaft and movable to project through said opening, and a switch operable independently of the position of said motor and drum for simultaneously energizing said motor and said solenoid.

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