C. J. MARTH.

GEARING FOR WASHING MACHINES.

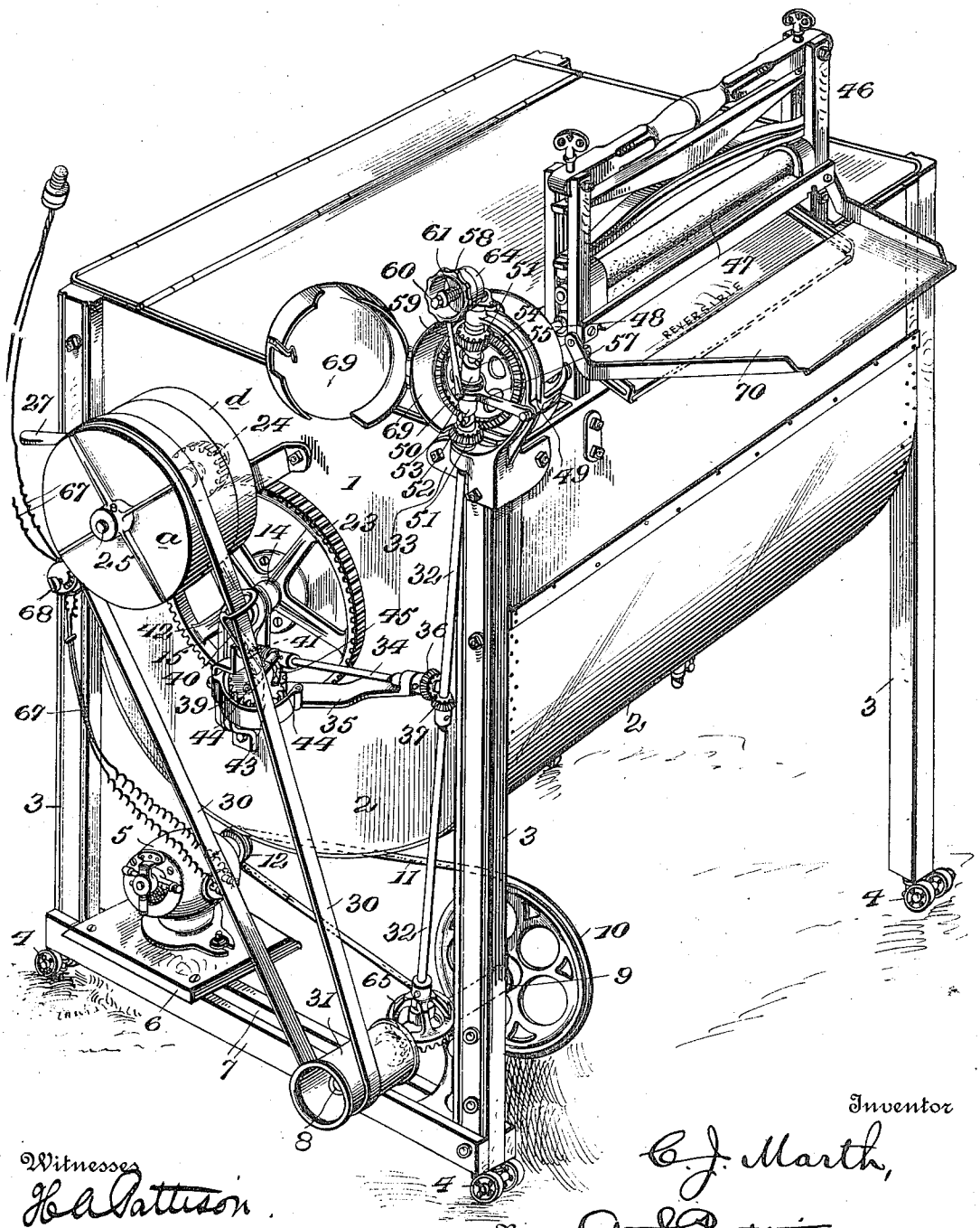
APPLICATION FILED DEC. 28, 1910.

1,006,860.

Patented Oct. 24, 1911.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses

H. A. Pattison.

C. P. Wright, Jr.

Inventor

C. J. Marth,

By A. S. Pattison,

Attorney

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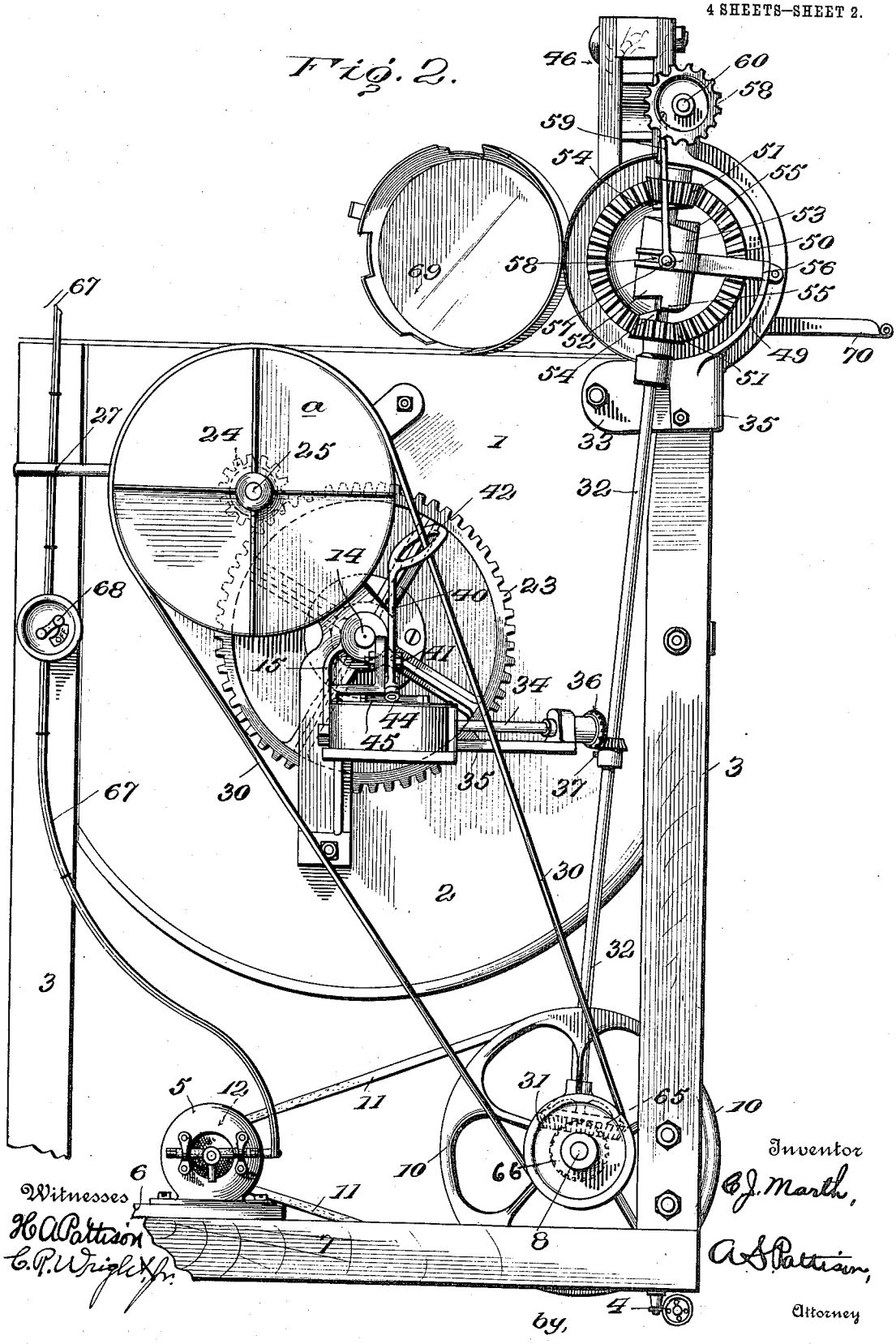
4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

Fig. 3.

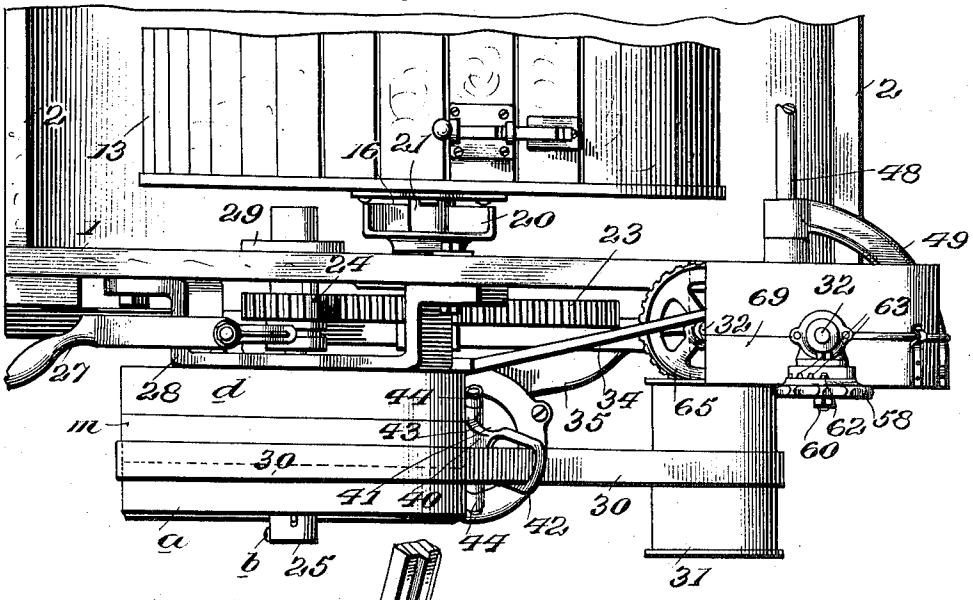


Fig. 4.

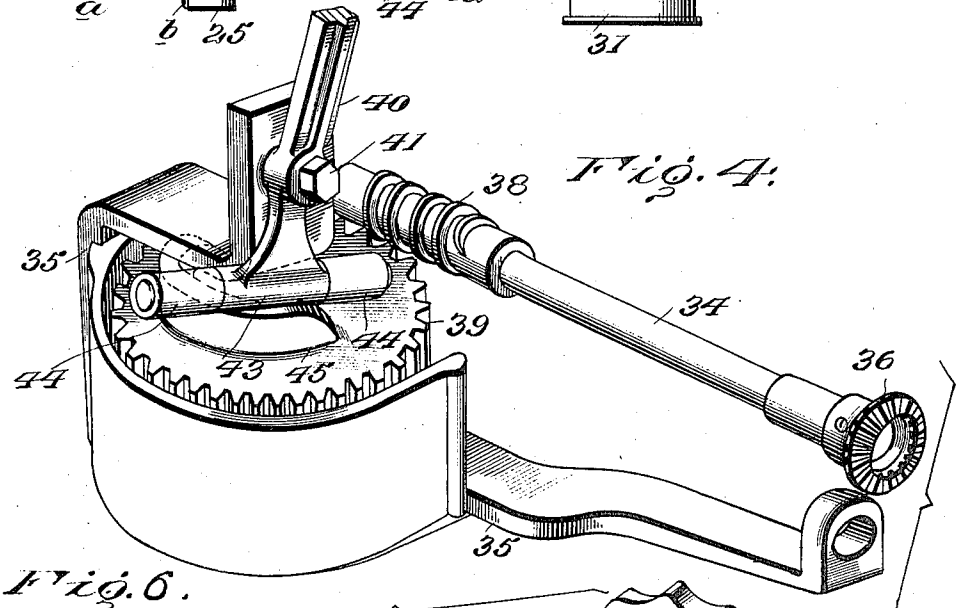
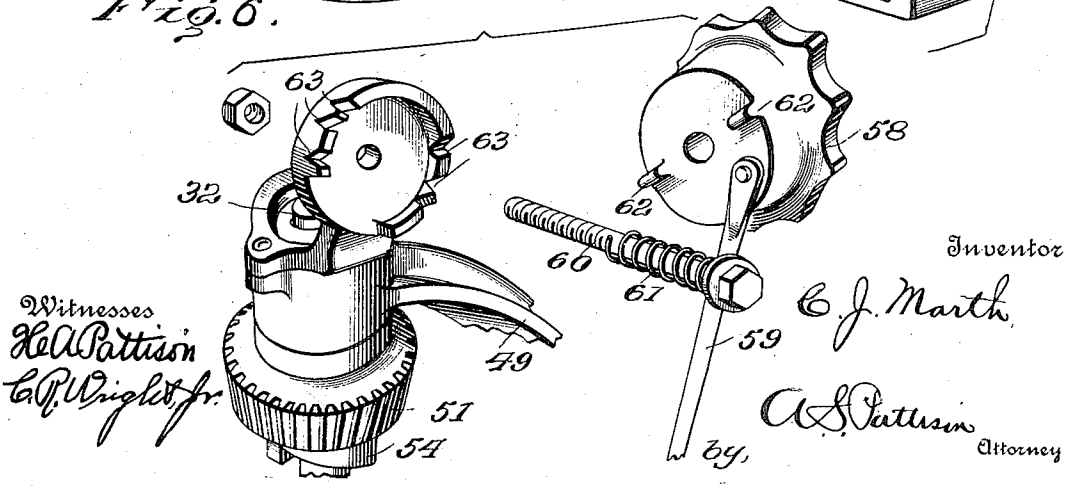


Fig. 6.



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4 SHEETS—SHEET 4.

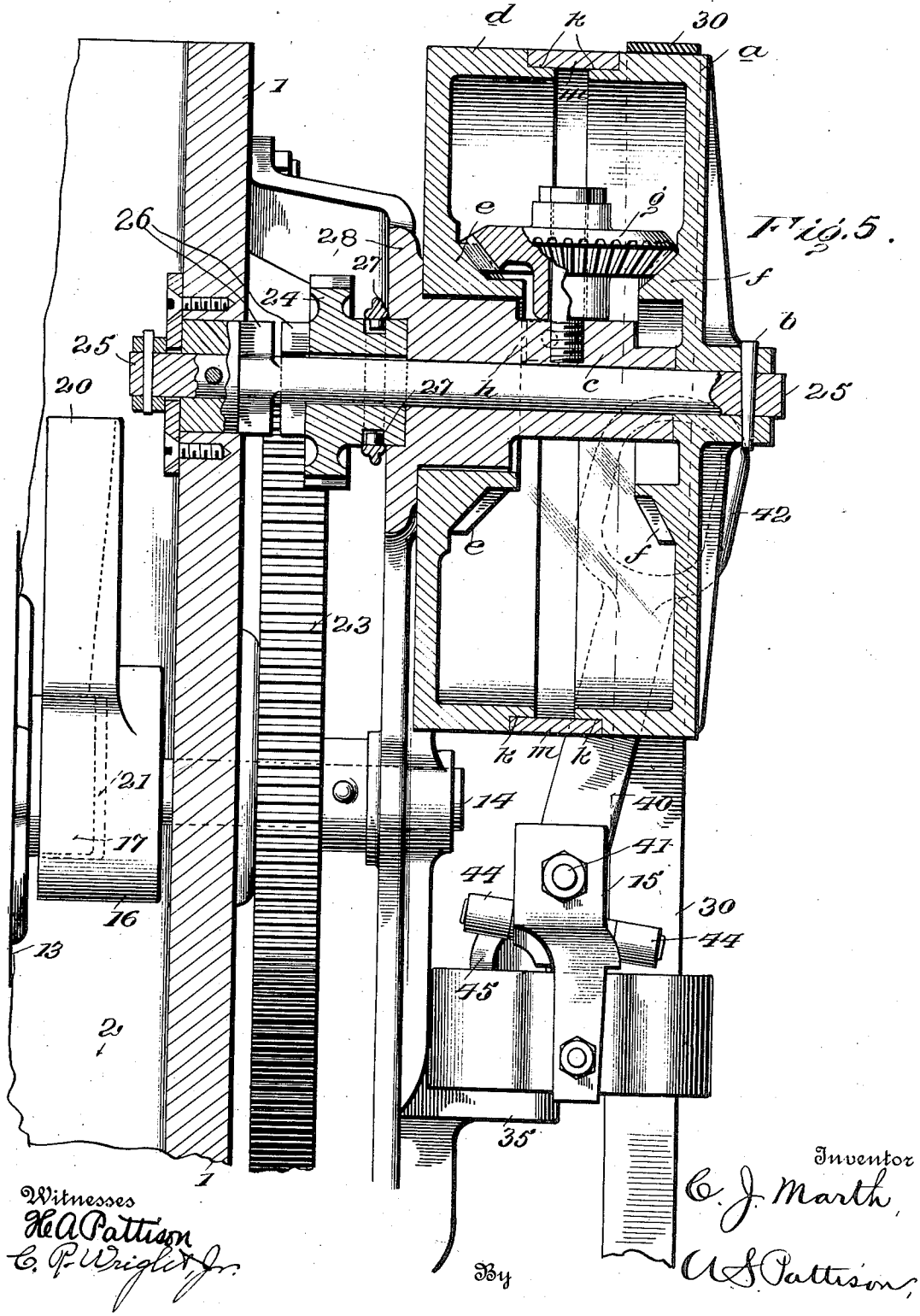

Fig. 5.

Witnesses
H. A. Pattison
C. P. Wright, Jr.

Inventor
C. J. Marth,
By
A. S. Pattison,
Attorney

UNITED STATES PATENT OFFICE.

CHARLES J. MARTH, OF ST. LOUIS, MISSOURI, ASSIGNOR TO WAYNE MANUFACTURING COMPANY, OF ST. LOUIS, MISSOURI.

GEARING FOR WASHING-MACHINES.

1,006,860. Specification of Letters Patent. Patented Oct. 24, 1911.

Application filed December 28, 1910. Serial No. 599,776.

To all whom it may concern:

Be it known that I, CHARLES J. MARTH, a citizen of the United States, residing at St. Louis, State of Missouri, have invented certain new and useful Improvements in Gearing for Washing-Machines, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to improvements in gearing for washing machines, and is of the cylinder type which is automatically rotary reversible.

One object of my present invention is to provide an improved mechanism whereby the reversing of the direction of rotation of the cylinder is effected smoothly and without any jerking or knocking of any of the parts.

Another object of my invention is to provide a gear drive between the power driven shaft and the wringer rolls, whereby a positive drive is effected, thus preventing any slipping of the drive by reason of the passing of a bunch or knot of clothes between the rolls.

Another object of the present invention is the provision of improved means for reversing the direction of rotation of the wringer rolls at the will of the operator, which enables the clothes to be wrung from the washing receptacle or cylinder into a bluing or rinsing tub, and by the reversing of the direction of rotation of the wringer, to wring the clothes from the bluing or rinsing tub without the necessity of moving the tub.

Other objects of the invention pertain to certain improved details of construction, which will be hereinafter fully described.

In the accompanying drawings—Figure 1 is a perspective view of my improved machine. Fig. 2 is an elevation of that end of the machine which contains the operating mechanism. Fig. 3 is a top plan view of that end of the machine which contains the operating mechanism, the cover of the tub, or the receptacle removed to show the rotary reversible cylinder therein. Fig. 4 is a detached enlarged perspective view of the gear and its cam, together with the improved operating parts for shifting the cylinder driving belt and for driving the wringer rolls. Fig. 5 is a sectional view through the reversing drums. Fig. 6 is a detached perspective view of the mechanism for shifting the wringer clutch sleeve, the parts shown in separated relation.

In carrying out the present invention in the form herein shown, a suitable washing receptacle or tub 1 is provided, and this tub has a curved or semicircular bottom 2. The tub is supported by suitable legs 3 attached at each corner thereof and preferably the legs carry casters 4, enabling the machine to be conveniently moved.

The power here shown for actuating the washing and wringing mechanisms is an electric motor 5, or any other power producing mechanism or machine which is supported by a platform 6, and the platform is attached to the beams 7, which connect the lower ends of two of the supporting legs 3. The motor 5 is located at one end of the beams 7 and a driving shaft 8 is supported in a suitable horizontally elongated bearing 9, the bearing being at the opposite end of the beams 7. The inner end of this shaft 8, carries a pulley 10 around which a belt 11 (preferably of the round type), and this belt also passes around a pulley 12, upon the inner end of the electric motor shaft.

Located within the tub 1 is a clothes receiving cylinder 13. This cylinder is easily removable in the manner hereinafter described. A short shaft 14 has its outer end journaled in a casting 15, its inner end passing through the wall of the tub 1 and carries a socket 16. This socket is adapted to receive an elongated projection 17, which is concentrically secured to one end of the cylinder 13. This socket 16 has its end provided with an upwardly flared portion 20 and a recess 21, which corresponds in shape to the shape of the stud 17 and is adapted to receive the stud.

Attached to the outer end of the shaft 14, is a gear wheel 23. This gear wheel meshes with a pinion 24, which is loosely mounted on the inner end of a belt drum shaft 25. The pinion and the inner end of the shaft are respectively provided with shoulders 26, which are adapted to interlock for the purpose of either locking the pinion to the shaft, or unlocking it from the shaft. The locking and unlocking position of the pinion with the shaft is controlled by a suitable lever 27. The shaft 25 is suitably journaled in a

bracket 28 attached to the outer side of the tub 1, and in a bearing 29 located in the wall of the tub.

A drum *a* is attached to the outer end of the shaft 25 by means of a cross-pin *b* and a sleeve *c* is projected outwardly from the bracket 28 and upon the inner end of this sleeve a drum *d* loosely revolves. A gear *e* is attached to the inner side of the drum *d* and a gear *f* is attached to the inner side of the drum *a*. An idler pinion *g* is suitably journaled on the sleeve *c* and meshes with the gears *e* and *f*, and the inner drum *d* is located between the bracket 28 and a projection *h* on the sleeve *c* and is thereby held against endwise movement of the sleeve.

The inner edges of the drums *a* and *d* are provided with reduced or cut out portions *k*, which together constitute a groove in which a belt band *m* is loosely journaled, so that the drums may revolve independently of this band, and the band revolve independently of the drums.

A belt 30 passes around an elongated drum 31, which latter is rigidly attached to the outer end of the shaft 8, and this belt passes around and is adapted to be shifted from the drum *a* across the loose band to the drum *d* and vice versa. The object and operation of this construction will be explained presently.

The lower end of a vertically arranged shaft 32 is suitably journaled in the elongated bearing 9, and its upper end journaled in a bracket 33, which is secured to the upper corner of the tub 1. A horizontal shaft 34 is suitably journaled in a bracket 35 which is attached to the end wall of the tub 1, the outer end of the shaft having a beveled gear 36, which meshes with a beveled gear 37 attached to the shaft 32. Carried by the inner end of the shaft 34 is a worm 38 adapted to mesh with a worm gear 39. This worm gear 39 is suitably journaled in the bracket 35. A belt shifting lever 40 is intermediately pivoted at the point 41 on the bracket 35, and the upper end of the lever has a loop 42 passing around the belt 30. The lower end of this lever 40 is provided with a cross-head 43, upon opposite ends of which are journaled the rolls 44. A cam 45 is carried by the upper face of the worm gear 39, and this cam is adapted to alternately and successively engage the rolls 44 for tilting the shaft lever 40 first to one side and then the other for shifting the belt 30 from one of said drums to the other.

The operation of this part of my invention is as follows: The electric or other form of motive power being in operation, power is conveyed through the mechanism described to the shaft 32 and the belt 30. As shown in Fig. 1, the belt is in engagement with the pulley *a* and the shaft 25 is being directly driven by the drum in one direction. At the same time the shaft 34 is revolved which in turn rotates the worm-gear 39, and as this gear rotates, the cam 45 will engage the outer roller 44 and gradually shift the belt 30 toward the drum *d*. The belt 30, as shown, is narrower than the loose band sleeve *m*, so the belt is shifted on the loose sleeve and entirely out of contact with the outer drum *a* and before the belt engages the inner drum *d*. When the belt is in engagement with the drum *d* power is transmitted to the shaft 25 through the gear *e*, the idler pinion *g* and the gear *f* through the drum *a* to the shaft 25, which reverses the direction of rotation of the drum *a* and consequently of the shaft 25 and in turn the direction of rotation of the cylinder 13.

By means of this construction the cylinder 13 is rotated in opposite directions, exactly the same number of revolutions, which will prevent the clothes in the cylinder from bundling up and insuring proper cleansing of them. This is important in reversible cylinder machines in order to insure a thorough cleansing of the articles within the cylinder, for otherwise they will become bundled up and thus prevent thorough cleansing of them. This equal rotation in both directions is obtained and absolutely assured through the medium of the worm, worm-gear, cam and shifting lever which has already been described.

In machines of this type it is desirable to have the reversing of the cylinder accomplished in a smooth manner to prevent friction and knocking. By means of this construction the reversing of the cylinder is accomplished smoothly and perfectly without any knocking or friction between the parts.

My improvement further pertains to the gearing up of the drive shaft 8, with a power driven wringer 46. This wringer is attached to the upper edge of one side of the machine and the wringer rolls 47 extend in a line parallel with the axis of the cylinder 13. As here shown, the lower wringer roll is the driving one and its shaft 48 projects and is journaled in a housing 49 that extends upward from the bracket 33. A beveled gear 50 is attached to the end of the wringer-roll shaft 48, and this beveled gear is normally in mesh with beveled pinions 51, which are loose on the shaft 32 and located at opposite sides of the periphery of the gear 50. Located on the shaft 32 between the beveled pinions 51, is a clutch sleeve 52. This sleeve is longitudinally movable on the shaft 32, but is caused to rotate therewith by means of the well-known slot and pin construction 53. Each of the beveled pinions 51, are provided with clutch shoulders 54 and the opposite ends of the clutch sleeve 52 are provided with clutch shoulders 55. A link 56 has its outer end pivoted to the housing 49 and its inner end

provided with the well-known yoke 57, which engages an annular groove 58 in the clutch sleeve 52. When the clutch sleeve 52 is moved to lock with the lower pinion 54, the wringer rolls are caused to rotate in one direction, and when it is moved to interlock with the upper pinion 54 the wringer rolls are caused to rotate in the opposite direction. The movement of the clutch sleeve 52 is effected by a hand-operated wheel 58, which is journaled on the extension of the upper end of the housing 49, and a link 59 has its lower end operatively connected with the yoke 57 and its upper end pivotally connected with the hand-wheel 58. This hand-wheel 58 is longitudinally movable on its shaft 60 and is normally held inward by a spring 61. The inner face of this hand-wheel is provided with a projection 62 adapted to interlock with the notches 63 on the extension 64 of the housing 49. By pulling outward on the hand-wheel 58, it can be rotated to carry the clutch sleeve to either of its extreme movements or neutral position and held in its adjusted position by the projection 62 and its registering notch 63. The lower end of the shaft 32 is provided with a beveled gear 65, which meshes with the pinion 66 on the shaft 8.

Power is transmitted to the motor 3 (when an electric motor is used) through a suitable cable 67, which may or may not have an intermediate switch 68, by means of which the current to the motor is turned on or cut off.

Suitable housings are provided for the gears 36, 37, 39, 65 and 66 (not shown) and a housing 69 is provided for the gear 50 and pinion 51 to prevent accidental interference with the gears or accidental injury to persons. A hinged shelf 70 is located at the outside of the wringer rolls 47 to convey the clothes therefrom to a bluing or rinsing tub (not shown) located to receive them.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A gearing for washing machines, comcomprising a belt drum shaft, a belt drum fast thereon, a belt drum concentric with and loose in respect to said shaft, a loose belt band between said drums, the drums having bevel gears on adjacent faces, an idler gear support between said drums, an idler gear journaled on said support and meshing with both of said belt drum gears, a driving shaft, a belt driven by the driving shaft passing around and adapted to move laterally across the drums and said belt band, and means for moving said belt laterally.

2. A gearing for washing machines, comprising a belt drum shaft, a belt drum fast upon said shaft, a belt drum concentric with and loose in respect to said shaft, a loose belt band between and journaled upon said drums, bevel gears on said drums, an idler gear between and meshing with said belt drum gears, a driving shaft, a belt driven by said driving shaft passing around and adapted to move laterally across said belt drums, and means for moving said belt laterally.

3. A gearing for washing machines, comprising a belt drum shaft, a belt drum fast to said shaft, a belt drum concentric with and loose in respect to said shaft, a belt band located between said drums, the drums having beveled gears, an idler beveled pinion between and meshing with said gears, a drive shaft, a laterally shifting belt adapted to be operatively connected with the drums and band, a belt shifter adapted to move the belt across the face of the drums and the band, the belt shifter operatively connected with the drive shaft.

4. In a gearing for washing machines, the combination of a belt drum shaft, a belt drum rigidly connected with the shaft, a drum concentric with and loose in respect to the shaft, a loose belt band between and separating the drums, a drive shaft, a shiftable belt adapted to operatively connect the drums and the drive shaft, an intermediately pivoted belt shifting lever having one end adapted to shift the belt and the opposite end provided with a cross-head, a gear below the cross-head and adapted to alternately engage the opposite ends of the cross-head, and operative connections between the gear and the drive shaft.

5. In a gearing for washing machines, the combination of a belt drum shaft, a belt drum rigidly connected with the shaft, a drum concentric with and loose in respect to the shaft, a loose belt band between the said drums, a drive shaft, a shiftable belt adapted to operatively connect the drive shaft with the drums and loose band, an intermediately pivoted belt-shifting lever having one end adapted to shift the belt, the opposite end of the lever provided with a cross-head, a gear having a cam on its face, adapted to alternately engage the opposite ends of the cross-head, a shaft having at one end a worm meshing with the said gear, the opposite end of the shaft operatively geared to the drive shaft for the purpose described.

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

CHARLES J. MARTH.

Witnesses:

ESTELLA C. NEUHAUS,

WM. H. NORDMAN.