No. 669,172. Patented Mar. 5, 1901.

M. T. & J. E. KANE.

WINDLASS.

(Application filed Oct. 27, 1900.)

(No Model.)

Fig. 2.

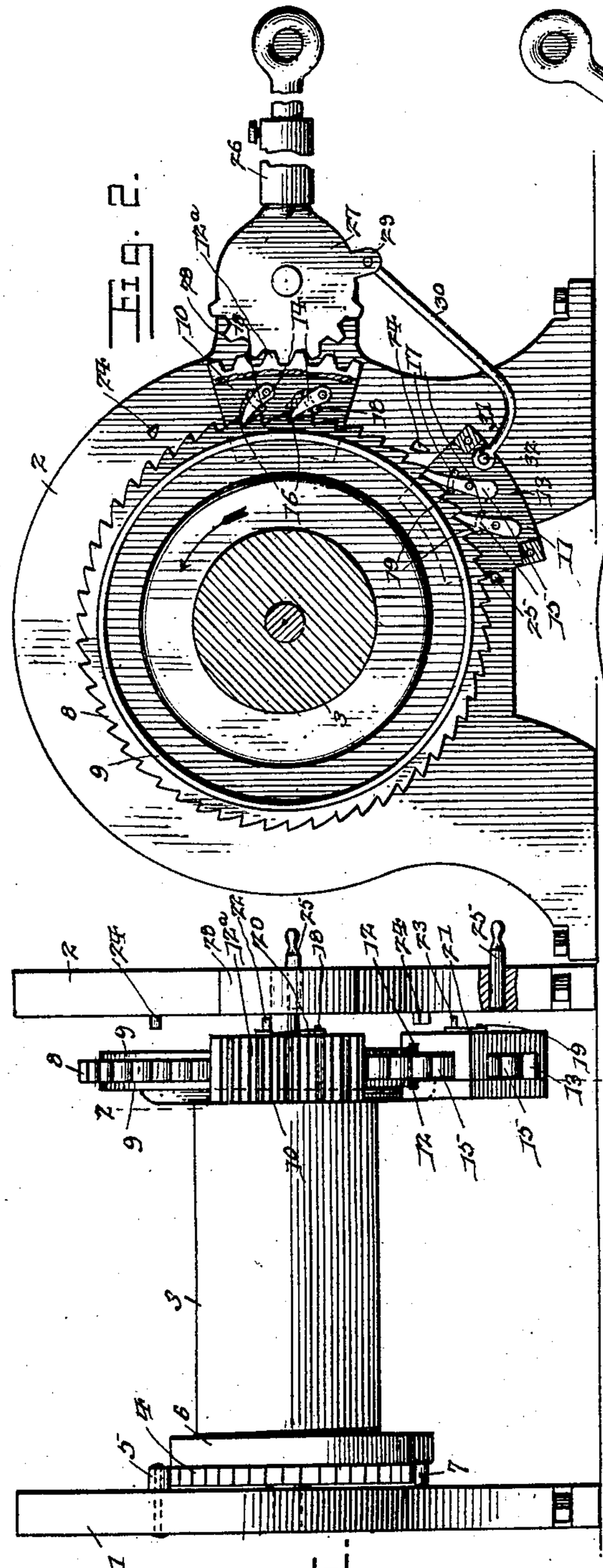

Fig. 3.

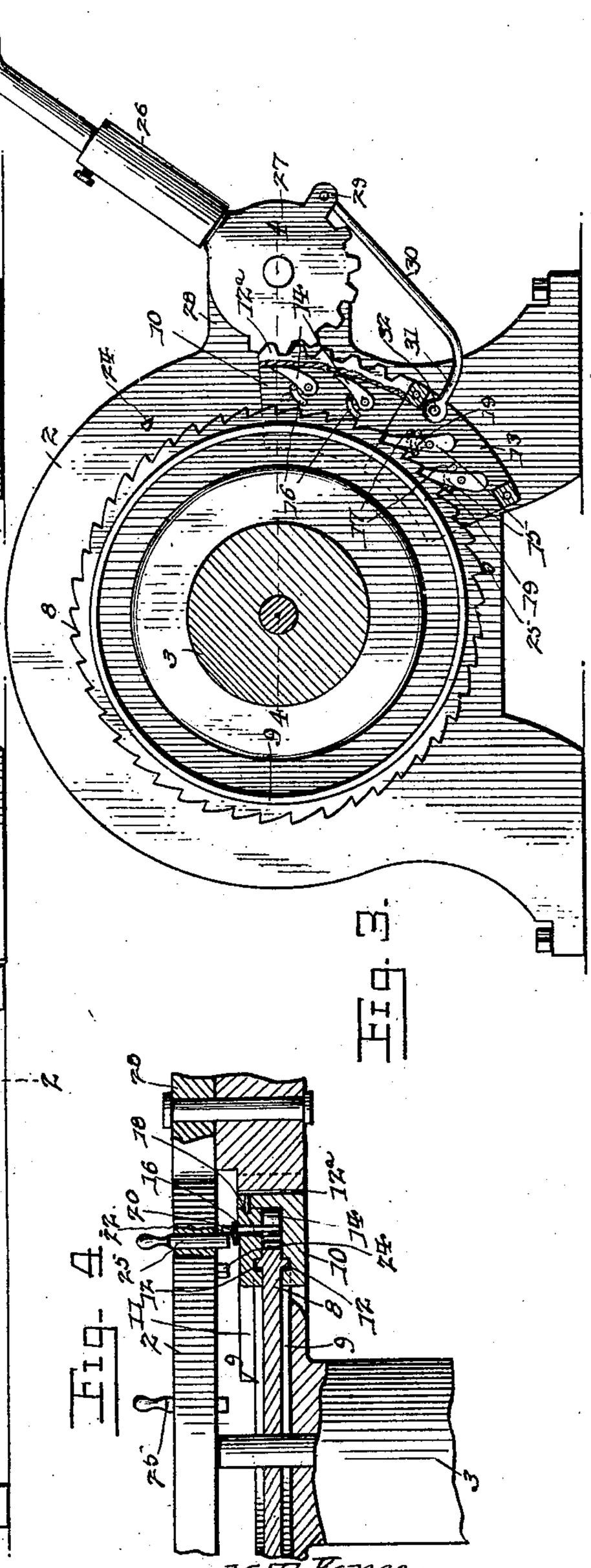

Fig. 1.

Fig. 4.

Witnesses
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UNITED STATES PATENT OFFICE.

MICHAEL THOMAS KANE AND JAMES EDWARD KANE, OF ST. JOHN, CANADA.

WINDLASS.

SPECIFICATION forming part of Letters Patent No. 669,172, dated March 5, 1901.

Application filed October 27, 1900. Serial No. 34,627. (No model.)

To all whom it may concern:

Be it known that we, MICHAEL THOMAS KANE and JAMES EDWARD KANE, subjects of the Queen of Great Britain, residing at Lancaster Heights, St. John, in the Province of New Brunswick and Dominion of Canada, have invented a new and useful Windlass, of which the following is a specification.

This invention relates to mechanical movements, and has for one object to provide improved means for operating windlasses, capstans, and the like, in which great power is required. It is furthermore designed to arrange for the convenient manipulation of the device by hand, both to wind up upon the drum and to ease the latter in a backward direction, so as to prevent a quick unwinding of the drum.

A final object resides in the continuous operation of the windlass by a lever, so that the opposite movements of the lever impart motion to the drum, whereby the lever has no lost motion.

With these and other objects in view the present invention consists in the combination and arrangement of parts, as will be hereinafter more fully described, shown in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that changes in the form, proportion, size, and minor details may be made within the scope of the claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings, Figure 1 is a front elevation of a windlass constructed in accordance with the present invention, the operating-lever being removed. Fig. 2 is a transverse sectional view taken on the line 2 2 of Fig. 1. Fig. 3 is a similar view illustrating the manner of easing the windlass-drum in a reverse direction. Fig. 4 is a detail sectional view taken on the line 4 4 of Fig. 3.

Like characters of reference are employed to designate corresponding parts in all of the figures of the drawings.

Referring to the drawings, 1 and 2 designate the opposite frame-standards of the present device, which support the journals of the drum 3. The latter is provided at one end with a ratchet-wheel or toothed flange 4, and a ratchet-pawl 5 is mounted upon the inner side of the adjacent standard 1, so as to cooperate with the ratchet-disk and prevent backward movement of the drum. At the inner side of the ratchet-disk there is provided a brake-band 6 to frictionally embrace a suitable brake-flange upon the drum, said band being connected to the adjacent frame-standard by means of a suitable fastening 7. At the opposite end of the drum there is provided an outwardly-directed marginal flange or ratchet-disk 8, which is provided at opposite sides with the corresponding outwardly-directed marginal flanges or concentric ribs 9. Slidably embracing the toothed periphery of the disk or flange 8 are the opposite clutches 10 and 11, each of which is segmental in shape and bifurcated at its inner side, so as to straddle the peripheral edge of the disk, and also provided in its inner walls with the opposite arcuate grooves 12 (best shown in Fig. 4) for the reception of the flanges or ribs 9 of the disk, whereby the clutches are held against outward displacement from the disk. It will of course be understood that each clutch is formed in opposite sections, so that they may be applied from opposite sides of the disk and afterward bolted together or otherwise connected.

The segmental bodies of the clutches are substantially equal in size, the clutch 10 being located above the other clutch and also provided with gear-teeth 12^a upon the outer convex edge thereof, while the clutch 11 has its outer edge provided with a longitudinal slot 13. Pairs of ratchet-dogs 14 and 15 are mounted within the bifurcations of the respective clutches, and pairs of arcuate slots 16 and 17 are formed in the sides which are next to the adjacent frame-standard. Dog-lifting pins 18 and 19 work in the respective arcuate slots which are struck from the pivots of the respective dogs as centers. As best indicated in Fig. 1 of the drawings, the outer ends of these pins project outwardly through the slots and are connected by the respective links 20 and 21, so that the members of each pair of pins may work simultaneously to lift or throw the respective dogs out of engage-

ment with the teeth of the ratchet-disk 8. The upper pin of each pair projects outwardly beyond the connecting-link, so as to form the respective studs or projections 22 and 23 for engagement with trips provided upon the inner side of the adjacent frame-standard, so that the ratchet-dogs may be automatically tripped and thrown out of engagement with the ratchet-disk. For each clutch there is provided a pair of oppositely-arranged cam-trip shoulders 24 and 25, of which the upper shoulder 24 is fixed and the lower is adjustable, so as to be thrown into and out of the path of the adjacent pin projection 22 or 23—as, for instance, by being slidable laterally through an opening in the frame-standard, as best shown in Figs. 1 and 4 of the drawings. The upper trip-shoulders are located at the upper limits of the movements of the respective clutches and are designed to be engaged by the respective projecting dog-lifting pins, so as to throw the dogs into engagement with the ratchet-disk, while the lower trip-shoulders are reversely curved, so as to trip the pins outwardly, and thereby throw the dogs out of engagement with the ratchet-disk at the lower limits of the clutches.

For operating the clutches there is provided a telescopic lever 26, having a segmental toothed head 27, fulcrumed upon an ear or projection 28 of the frame-standard 2 and offset upon the inner side thereof, so as to engage the toothed outer edge of the segmental clutch 10. The lower edge of the segmental head 27 is provided with a pendent ear or projection 29, to which is pivotally connected the upper end of a link or connecting-rod 30, having its lower end provided with a lateral arm 31, which extends into the lower clutch 11 through the slot thereof, wherein it is pivotally connected, as at 32.

For an understanding of the operation of the device to wind a cable upon the drum reference is had to Fig. 2 of the drawings, in which it will be assumed that the lever is at the intermediate point of its downward movement upon the pivotal center of the segmental head 27 as a fulcrum. As the outer end of the lever is being depressed the action of the toothed head is to elevate the upper clutch upon the peripheral edge of the ratchet-disk, and as the dogs 14 are in engagement with the teeth of the disk the drum will be turned in the direction of the arrow. In the meantime the lower clutch will be traveling downwardly and rearwardly over the toothed periphery of the disk under the influence of the rod 30, the dogs 15 slipping over the teeth in the peripheral edge of the ratchet-disk. When the outer end of the lever is elevated, the lower clutch will also be drawn upwardly with its dogs in engagement with the ratchet-disk, whereby the drum is continued in its forward movement, while the upper clutch will slide downwardly or rearwardly over the toothed periphery of the disk. Thus the clutches are alternately brought into action and the drum is operated upon by the opposite movements of the lever, whereby a continuous turning of the drum is maintained and there is no lost motion in the lever.

The manner of easing the drum in a reverse direction to that of the winding operation will be understood by reference to Fig. 3, in which the operating-lever has been shown at its upper limit and ready to descend. As the lever descends the upper and lower clutches will be forced in opposite directions upwardly and downwardly, the dogs of the upper clutch being out of engagement and those of the lower clutch being in engagement with the ratchet-disk, whereby the upper clutch has no effect upon the drum, while the lower clutch is interlocked therewith and permits the drum to turn in a reverse direction under the influence of the strain upon the cable, the unwinding being governed or controlled by the manipulation of the lever. When the lower clutch reaches its lowest limit and the upper clutch reaches its upper limit, the projecting pins 23 and 22 will strike the respective trip-shoulders 25 and 24, whereby the dogs of the upper clutch are automatically thrown into engagement with the ratchet-disk, while the dogs of the lower clutch are automatically thrown out of engagement with the ratchet-disk, thereby throwing the strain of the drum upon the upper clutch, and as the lever is raised the upper clutch will descend and ease the drum rearwardly and the lower clutch will travel upwardly until it strikes the upper trip and again interlocks with the ratchet-disk as the upper clutch is disengaged therefrom.

It will now be understood that the upper cam-trips of each pair throw the respective dogs into engagement with the ratchet-disk, and therefore said trips may remain fixed, as they will not interfere with the forward turning of the drum. However, the lower trips throw the dogs out of engagement with the ratchet-disk, and therefore it is necessary that such trips be adjustable in order that they may be thrown out of the paths of the projecting ends of the dog-lifting pins when the drum is to be turned in a forward direction and moved into the paths of said pins when the drum is to be eased in a reverse direction. Also it is the upper pin of each pair that projects, in order that the lower pin may pass the respective lower trips without throwing the dogs, whereby the latter are not thrown until they reach their lowermost or rearmost limits.

A final important feature of the present device resides in the fact that the drum is locked against unwinding, so that the operator may let go of the operating-lever even though the pawl 5 may not be in engagement with the drum. This condition is brought about by the reason of the fact that the tendency of the drum to unwind would force the upper clutch

10 downwardly, and thereby force the lever upwardly; but this is offset by the tendency of the lower clutch 11 to travel in the same direction, and thereby draw the lever downwardly, which results in a locking of the drum against unwinding or a reverse turning when the lever is not being operated or held by the operator.

What is claimed is—

1. The combination with a drum, having a ratchet-disk, of opposite clutches slidably mounted upon the peripheral edge of the disk, one of the clutches having a toothed segmental part, an operating-lever having an intermediate fulcrum, and a toothed segmental head in engagement with the toothed part of the one clutch, and a link connection between the other clutch and the lever at the opposite side of the fulcrum thereof.

2. The combination with a drum having a ratchet-disk, of opposite frame-standards supporting the drum, opposite ratchet-clutches slidably mounted upon the peripheral edge of the disk, one of the clutches having a toothed outer edge, a lever having a toothed segmental head pivotally mounted upon one of the frame-standards and in engagement with the toothed edge of the adjacent clutch, and a connecting-rod having its opposite ends pivotally connected to the segmental head and the other clutch, respectively.

3. The combination with a drum, of opposite clutches slidably mounted thereon, means for simultaneously moving the clutches in opposite directions, and means for automatically reversely tripping the clutches at their opposite limits.

4. The combination with a drum, of opposite clutches slidably mounted thereon, means for simultaneously moving the clutches in opposite directions, and means for automatically interlocking the clutches with the drum at their respective outer and inner limits and for automatically disengaging the clutches at their respective inner and outer limits.

5. The combination with a drum, of clutches slidably mounted thereon, means for moving the clutches simultaneously in opposite directions, and means for automatically engaging the clutches at their corresponding limits and for automatically disengaging said clutches at their opposite corresponding limits.

6. The combination with a drum, of opposite clutches slidably mounted upon the drum, means for simultaneously moving the clutches in opposite directions, and opposite automatic engaging and disengaging trips for each of the clutches.

7. The combination with opposite frame-standards, of a drum mounted therebetween, opposite clutches slidably mounted upon one end of the drum, means for moving the clutches simultaneously in opposite directions and mounted upon one of the frame-standards, and engaging and disengaging trips carried by one of the frame-standards and arranged in the paths of the respective clutches.

8. The combination with a drum, of opposite clutches slidably mounted upon the drum, means for moving the clutches simultaneously in opposite directions, and engaging and disengaging trips for each clutch, some of the trips being adjustable into and out of the paths of the clutches.

9. The combination with a drum, of opposite clutches slidably mounted thereon, means for moving the clutches simultaneously in opposite directions, and engaging and disengaging trips for each of the clutches, the disengaging trips being adjustable into and out of the paths of the clutches.

10. The combination with a drum, having a ratchet-disk, of opposite clutches slidably mounted upon the peripheral edge of the disk, each clutch having a ratchet-dog, and a dog-operating device projecting at one side of the clutch, means for simultaneously moving the clutches in opposite directions, and engaging and disengaging trips arranged in the paths of the respective projecting dog-operating devices.

11. The combination with a drum, having a ratchet-disk, of opposite clutches slidably mounted upon the peripheral edge of the disk, each clutch having a pair of ratchet-dogs, a pair of dog-operating pins working in arcuate slots in the sides of the clutch, a link connecting the pins, one of the latter having a trip projection extended outwardly through one of the slots, and opposite engaging and disengaging trips arranged in the paths of the respective projecting dog-operating pins.

12. The combination with opposite frame-standards, of a drum mounted therebetween, and having a ratchet-disk arranged adjacent to one of the standards, opposite segmental and bifurcated clutches slidably straddling the peripheral edge of the disk, one of the clutches having a toothed outer edge, and both clutches having ratchet-dogs for engagement with the ratchet-disk, and dog-operating pins projecting laterally toward the adjacent standard, opposite disengaging and engaging trips carried by the inner side of the adjacent standard and arranged in the paths of the respective pins, an operating-lever fulcrumed upon the adjacent standard, and having a toothed segmental head in mesh with the toothed edge of one of the clutches, and a connecting-rod having its opposite ends pivotally connected to the head and the other clutch, respectively.

13. The combination with a drum, opposite ratchet-clutches therefor, and means for simultaneously moving the clutches in opposite directions, of means for automatically tripping the clutches to permit of a reverse rotation of the drum.

14. The combination with a drum, opposite

operating-clutches therefor, which are simultaneously movable in opposite directions, and operating means therefor, of means for alternately and automatically tripping the clutches, whereby the drum may be reversely turned.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

MICHAEL THOMAS KANE.
JAMES EDWARD KANE.

Witnesses:
JAMES E. COWAN,
THOMAS P. REGAN.