July 7, 1925. 1,544,829

J. D. GIBBS

APPARATUS FOR DRILLING OIL WELLS

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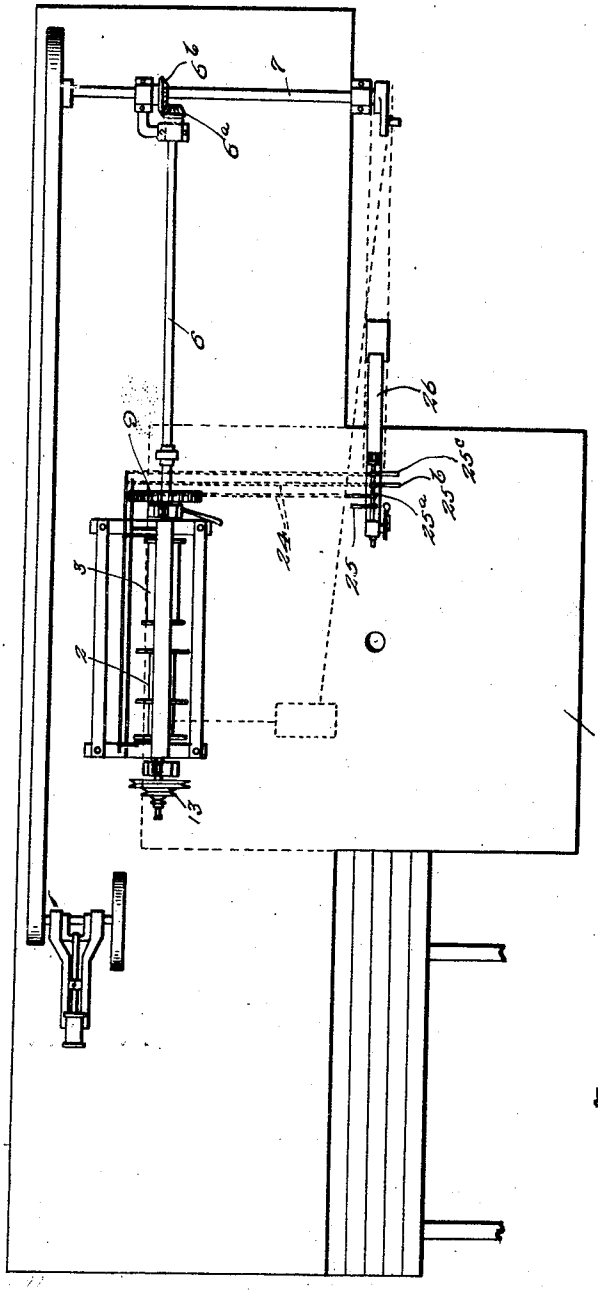


Fig. 1.

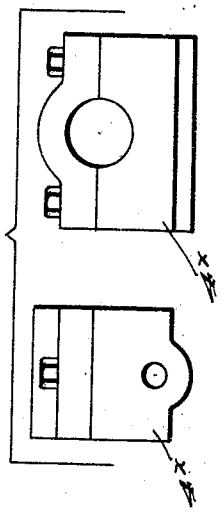


Fig. 10.

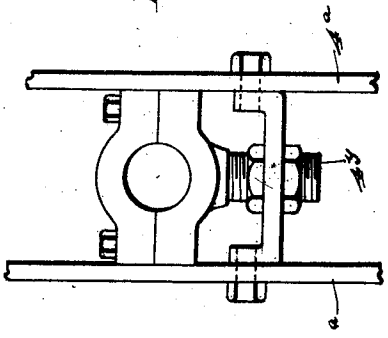


Fig. 9.

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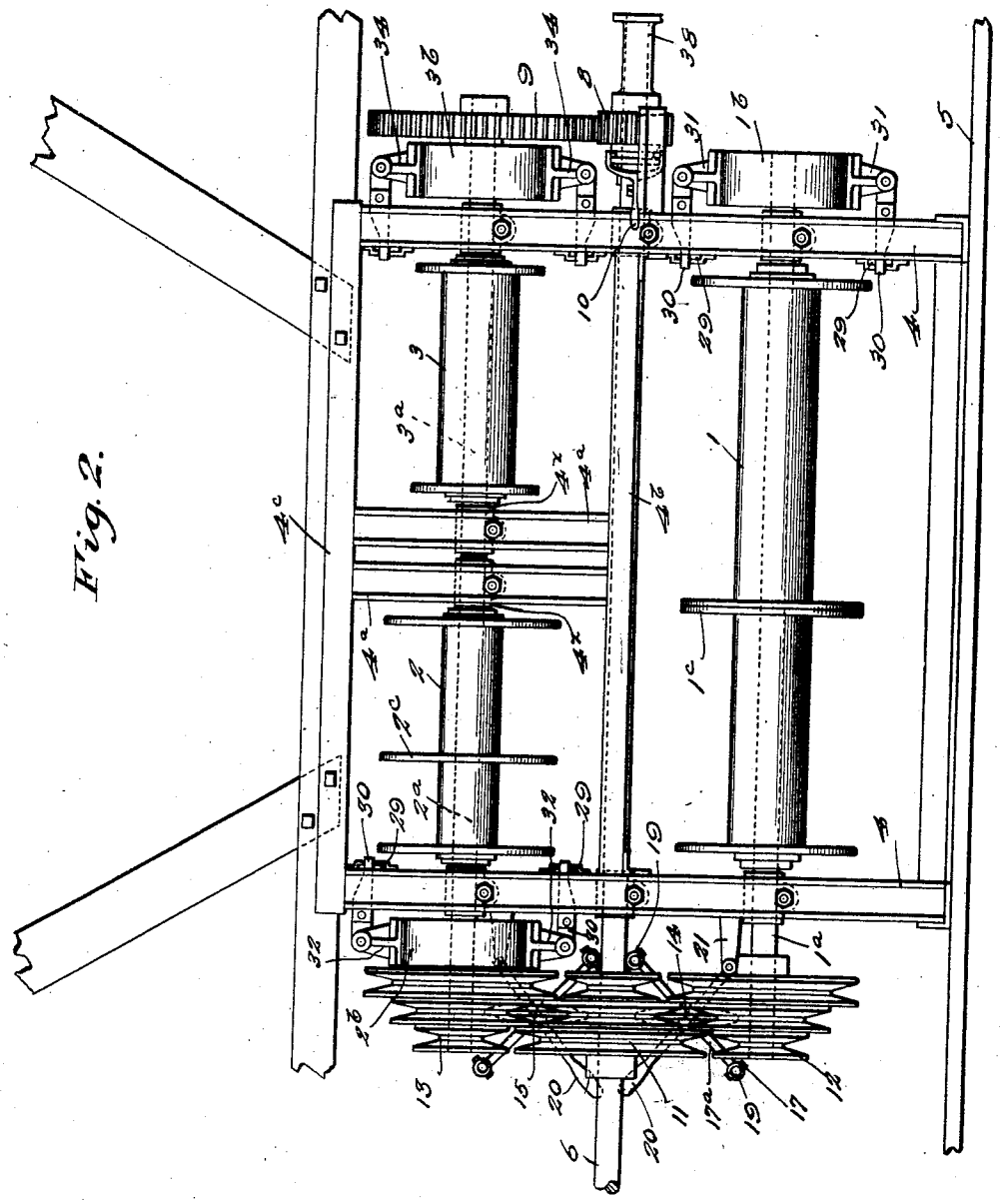
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Fig. 2.



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Fig. 4.

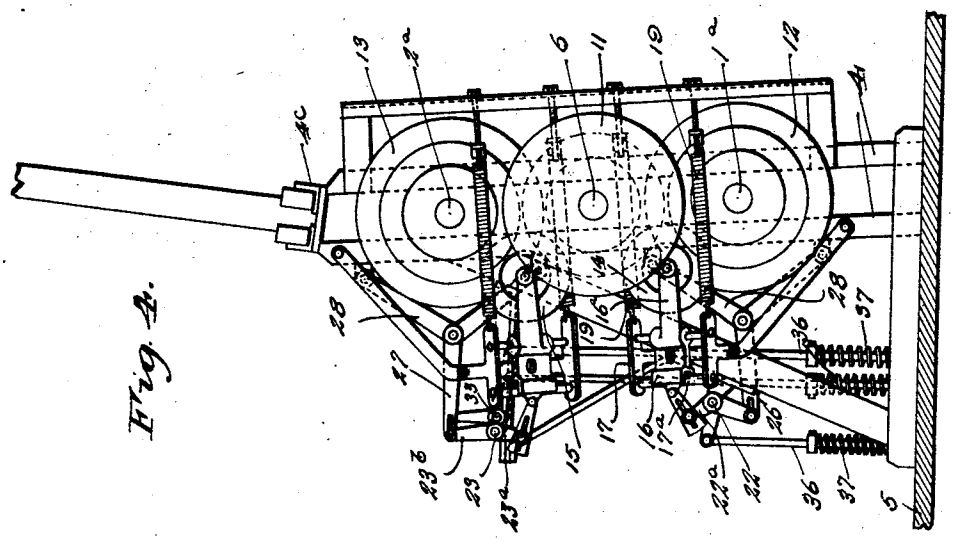
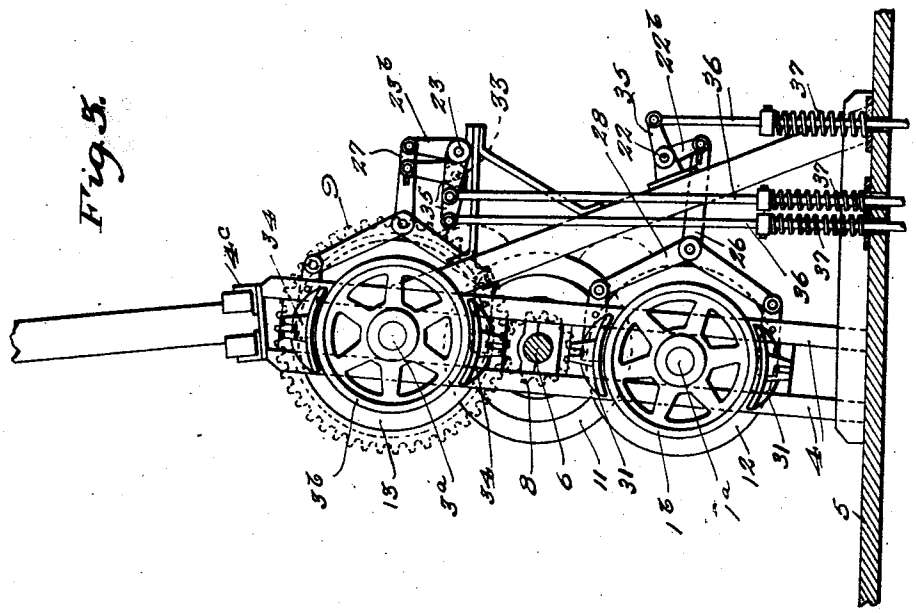


Fig. 5.



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APPARATUS FOR DRILLING OIL WELLS

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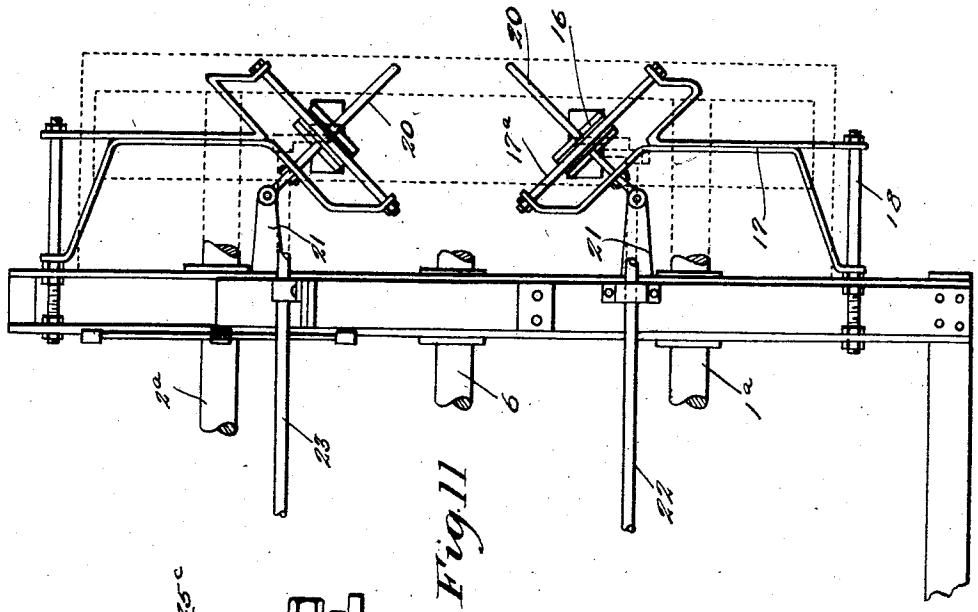


Fig. 11

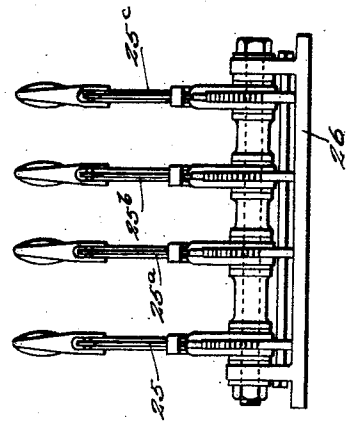


Fig. 6.

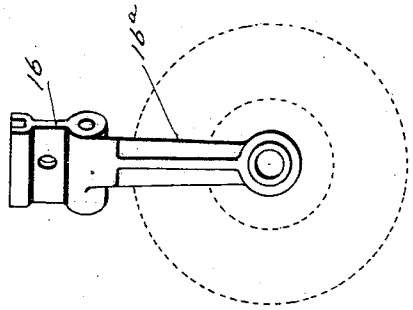


Fig. 8.

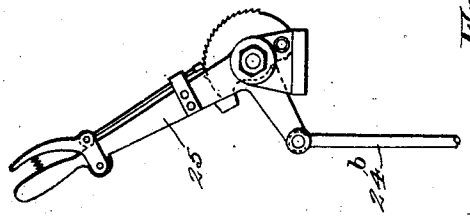


Fig. 5.

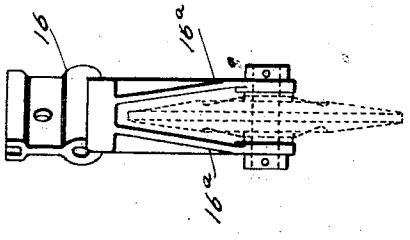


Fig. 7.

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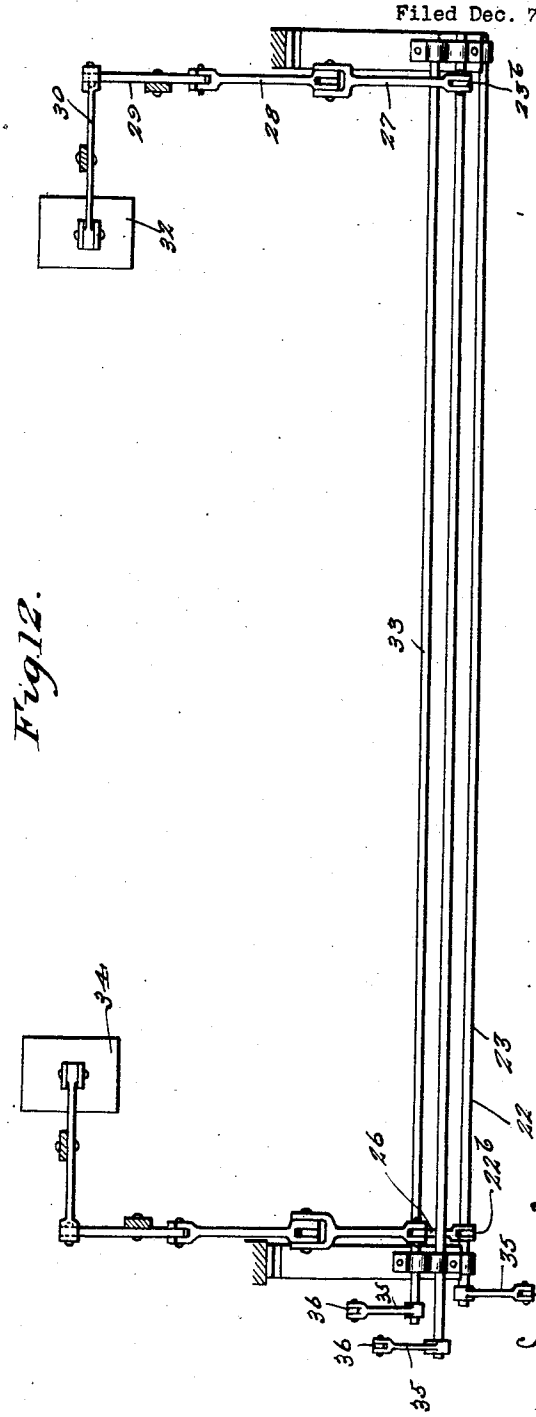


Fig 12.

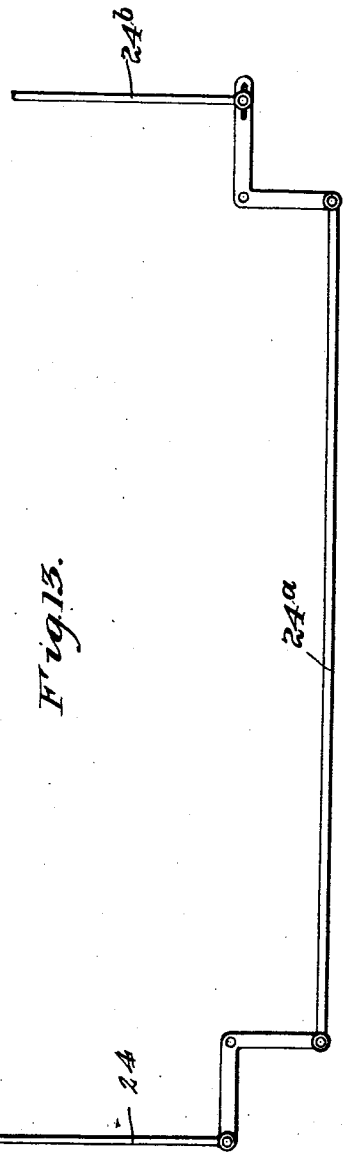


Fig 13.

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UNITED STATES PATENT OFFICE.

JAMES D. GIBBS, OF LOUISVILLE, KENTUCKY.

APPARATUS FOR DRILLING OIL WELLS.

Application filed December 7, 1921. Serial No. 520,640.

To all whom it may concern:

Be it known that I, JAMES D. GIBBS, a citizen of the United States, and a resident of Louisville, in the county of Jefferson and State of Kentucky, have invented certain new and useful Improvements in Apparatus for Drilling Oil Wells, of which the following is a specification.

My present invention relates to improvements in apparatus for use in the drilling of oil wells and concerns particularly the arrangement of and mechanism for controlling the winding drums or reels used for the drill, sand and casing lines respectively.

Heretofore the several mechanical parts have been distributed around the derrick as practically independent units and so separated as to require the services of a plurality of men, and it is well known in this art that the lost time and lost motion and constant attention necessary to keep the rig in proper running shape and the number of operations required have been material factors in the high cost of oil well drilling.

These it is the object of the present invention to avoid by assembling the drill, sand, and casing line drums or reels in a single unitary structure and to provide improved driving and control mechanism which latter is arranged so that it can be operated by the operator who controls the engine.

To this end the invention comprises the novel features of construction and arrangement and combination of parts hereinafter described and particularly defined by the appended claims.

An embodiment of my invention is illustrated in the accompanying drawings in which:

Figure 1 is a diagrammatic view of derrick and engine platforms provided with my equipment.

Fig. 2 is a front elevation of the drum assembly.

Fig. 3 is a view of the right hand end (Fig. 2) with the gears shown only in dotted lines for clearness of illustration.

Fig. 4 is a similar view of the opposite end.

Figs. 5 to 13 inclusive are views of details.

Referring by reference characters to these drawings, the numeral 1 designates the drill line reel, 2 the sand line reel, and 3 the casing line reel, the functions of which are well understood by those skilled in the art. The reel 1 is fast on a shaft 1^a journaled in suitable bearings in the lower portions of the vertical end frame members 4 supported by the flooring 5.

The reels 2 and 3 are respectively carried by shafts 2^a and 3^a having their outer ends journaled in bearings in the upper portions of frame members 4 and their inner ends journaled in bearings 4^x in the vertical frame members 4^a extending between and carried by the cross members 4^b and 4^c.

The bearings are preferably swivel bearings and the bearing at one end of each shaft is supported by an adjusting screw 4^y as shown in detail in Fig. 9 so that said end can be raised or lowered to cause the line or cable to properly wind on the reel.

The shaft of reel 1 carries at its right hand end (Fig. 2) a brake drum 1^b and the outer ends of the shafts 2^a and 3^a are provided with similar brake drums 2^b and 3^b with which brake shoes cooperate in the manner hereinafter described.

The reels 1 and 2 are preferably provided with the customary movable partitions 1^c and 2^c to accommodate the active and surplus portions of the lines or cables as the operation proceeds.

Power is imparted to the several drums by a main drive shaft 6 which is driven by means of bevel gears 6^a, 6^b from shaft 7 (Fig. 1) which carries the crank which operates the walking beam (not shown). Shaft 6 carries a gear or spur wheel 8 (Figs. 2 and 3) which meshes with a gear 9 fast on casing reel shaft 3^a and means are provided by which said gear connection may be made active or inactive at will. Such means may, as shown, consist in having the gear 8 splined on shaft 6 and providing a gear shift lever 10 having a fork engaging an annular groove in the hub of the gear whereby the latter may be thrown into and out of mesh with the gear 9 at will. It will be understood that normally the clutch is in gear engaging position and the casing line reel 3 is controlled wholly by the engine, to wit, by the engine throttle and reverse.

I provide means whereby the reels 1 and 2 may be driven from shaft 6 at will at varying speeds, and such means preferably comprises a multi-grooved cone wheel 11 fast on shaft 6 which is in alignment with but spaced from two reversely arranged multi-grooved cone wheels 12 and 13 fast respec-

tively on the shafts 1^a and 2^a, and with which respectively cooperate two idle or clutch pulleys 14 and 15 (Fig. 4) which are capable of being pressed into frictional engagement with the grooves to cause shaft 6 to drive either of the reel shafts 1^a and 2^a, or to be withdrawn therefrom when the rotation of the reel shafts is to be stopped.

As the two idle or clutch discs or wheels are supported and operated in a similar manner a specific description of one will suffice for both.

Wheel 14 for example, is journaled between bracket arms 16^a (Figs. 7 and 8) of a member 16 slidably mounted on guide rods or bars 17^a (Figs. 4 and 11) of a frame 17 which is pivotally supported from a rod or member 18 carried by the main frame. The free portion of frame 17 or that part carrying the guides is normally drawn towards the vertical plane passing through shaft 6 by a spring 19, so that wheel or clutch disc 14 for example, will have its wedge shaped periphery forced into the aligning grooves of wheels 11 and 12, so that wheel 12 and hence reel 1, will be driven from shaft 6. As the periphery of the wheel is of narrow wedge shape in cross-section and the grooves of corresponding shape no very heavy spring action is necessary to secure the necessary driving friction owing to the wedging action. Preferably the apex of the wedge is arranged so as not to touch the bottom of the coacting groove.

Means are provided for moving the idle wheel or disc in the opposite direction to stop the drive, and when disc 14 has been moved clear of the multi-grooved pulleys its carrier member may be slid along the guides 17^a to bring it into alignment with other grooves, it being understood that the guides are parallel with the adjacent portions of the peripheries of the respective multi-grooved pulleys or wheels.

The middle grooves are for normal speed and the side grooves for higher and lower speeds. In practice the friction wheels are preferably enclosed in a suitable cover or casing to protect them from water as indicated in dotted lines, in Fig. 11.

To effect the shift of the carrier member I provide a hand lever 20 (Figs. 2 and 11) fulcrumed on a bracket 21 carried by the main frame and slidably engaging an opening in the carrier member.

To withdraw the idle or clutch wheels to stop the drive I provide rock shafts 22 and 23 (Fig. 4) which carry arms 22^a and 23^a which are connected by slotted links (giving a lost motion connection) with the carrier frames. These rock shafts are connected by suitable lever arm and rod connections 24 24^a, 24^b (Figs. 1 and 13) arranged underneath the floor with control levers 25^a and 25^b having suitable hand control means cooperating with stationary notched quadrants (Figs. 5 and 6) whereby the control levers may be locked in any desired position, such control levers being located adjacent the engine reverse lever 25 and all being conveniently located on a horizontal beam 26 extending between and supported by the "head ache post" and Samson post.

When a clutch disc is thrown out to stop the drive it is essential that a brake should be applied to hold the corresponding reel stationary. To this end I provide the rock shafts 22 and 23 with arms 22^b and 23^b which are connected by rods 26 and 27 with pairs of toggle links 28, which links are in turn connected to levers 29 and 30 operating brake shoes 31 and 32 cooperating respectively with the brake drums 1^b and 2^b hereinbefore referred to.

A rock shaft 33 through similar connections operates the brake shoes 34 which cooperate with casing line brake drum 3^b, the operation of rock shaft 33 being controlled by hand lever 25^c.

Spring means are provided tending normally to apply the brakes which may take the form of arms 35 on the shafts to which are connected rods 36 which are under pressure of springs 37 as clearly shown in Fig. 3.

The main shaft may be provided with a winch as indicated at 38.

Having thus described my invention, what I claim is:

1. In combination a main frame, a pair of reel carrying shafts journaled therein, multigrooved cone wheels fast on said shafts having V-shaped grooves, a driving shaft journaled between said reel shafts and carrying a similar reversely placed cone wheel, swinging frames pivoted to the main frame and having guides parallel to the juxtaposed portions of said cone wheels, slides carried by said guides with means for operating them, idle wheels rotatably carried by said slides and having wedge shaped peripheries, means for adjusting the slides to align the idle wheels with different grooves, and means for swinging said frames.

2. In combination a main frame, a pair of reel carrying shafts journaled therein, multigrooved cone wheels fast on said shafts having V-shaped grooves, a driving shaft journaled between said reel shafts and carrying a similar reversely placed cone wheel, swinging frames pivoted to the main frame and having guides parallel to the juxtaposed portions of said cone wheels, slides carried by said guides with means for operating them, idle wheels rotatably carried by said slides and having wedge shaped peripheries, means for adjusting the slides to align the idle wheels with different grooves, and means for swinging said

frames, brake mechanism for said drums, and means for operating them in unison with said frames.

3. In combination a main frame, a pair of reel carrying shafts journaled therein, multigrooved cone wheels fast on said shafts having V-shaped grooves, a driving shaft journaled between said reel shafts and carrying a similar reversely placed cone wheel, swinging frames pivoted to the main frame and having guides parallel to the juxtaposed portions of said cone wheels, slides carried by said guides with means for operating them, idle wheels rotatably carried by said slides and having wedge shaped peripheries, means for adjusting the slides to align the idle wheels with different grooves, rock shafts having lost motion connections with said swinging frames, brake drums on said reel shafts, brake shoes cooperating with said drums, toggle joints for operating said brake shoes, and operating connections between said toggle joints and said rock shafts.

4. In combination a main frame, a pair of reel carrying shafts journaled therein, multigrooved cone wheels fast on said shafts having V-shaped grooves, a driving shaft journaled between said reel shafts and carrying a similar reversely placed cone wheel, swinging frames pivoted to the main frame and having guides parallel to the juxtaposed portion of said cone wheels, slides carried by said guides with means for operating them, idle wheels rotatably carried by said slides and having wedge shaped peripheries, means for adjusting the slides to align the idle wheels with different grooves, springs exerting pressure on said frames, rock shafts having lost motion operating connections to said frames, brake drums on said reel shafts, brake shoes cooperating with said drums, toggle joints for operating said brake shoes having operating connections to said rock shafts, and spring means tending to rotate said rock shafts.

In testimony whereof, I affix my signature.

JAMES D. GIBBS.

Witnesses:
C. W. EAKEN,
L. W. WELLER.