Nov. 3, 1925. 1,559,692

S. B. GORBUTT

INTERGEARED SKY LINE LOGGING ENGINE

Filed March 5, 1924 3 Sheets-Sheet 1

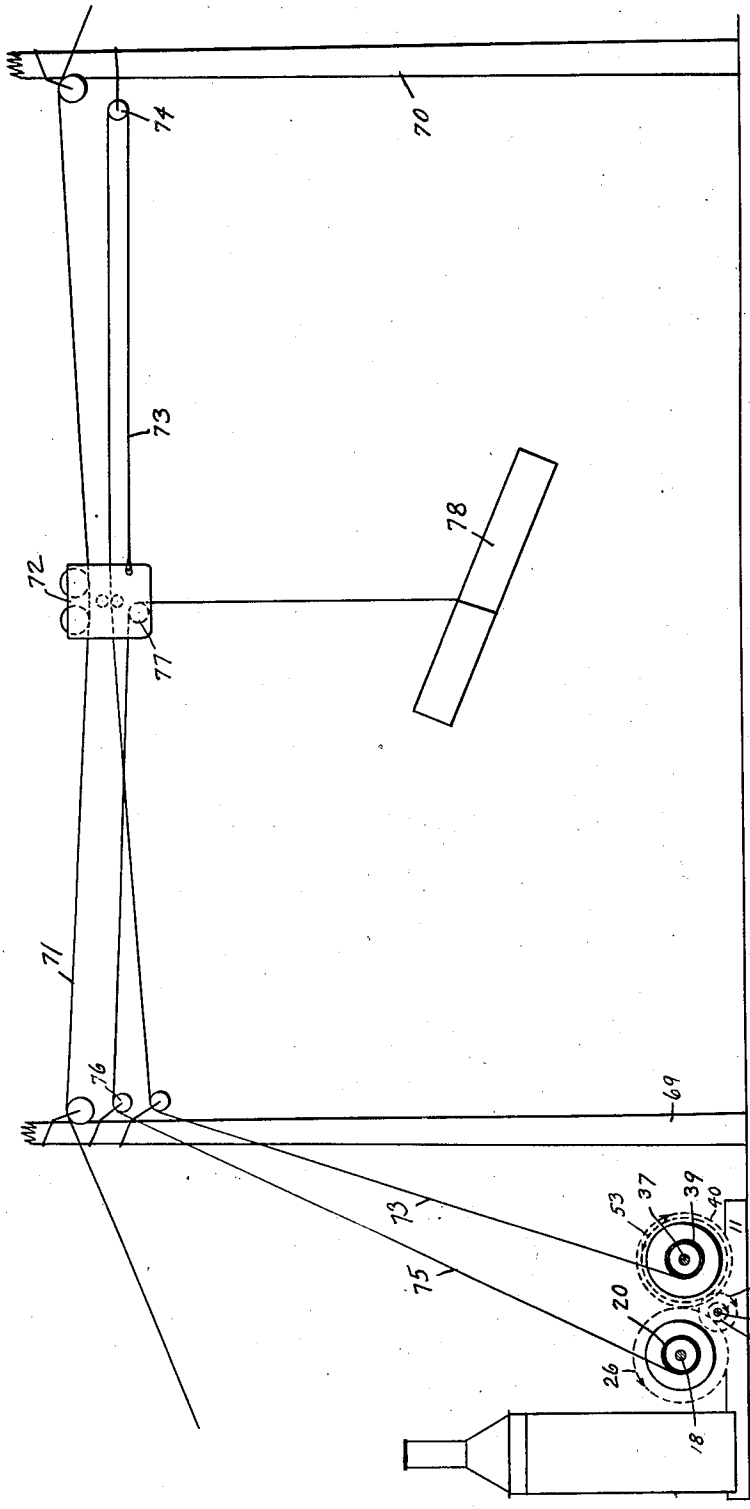


FIG. 1.

INVENTOR
S. B. GORBUTT
BY E. B. Birkenbeuel.
ATTORNEY

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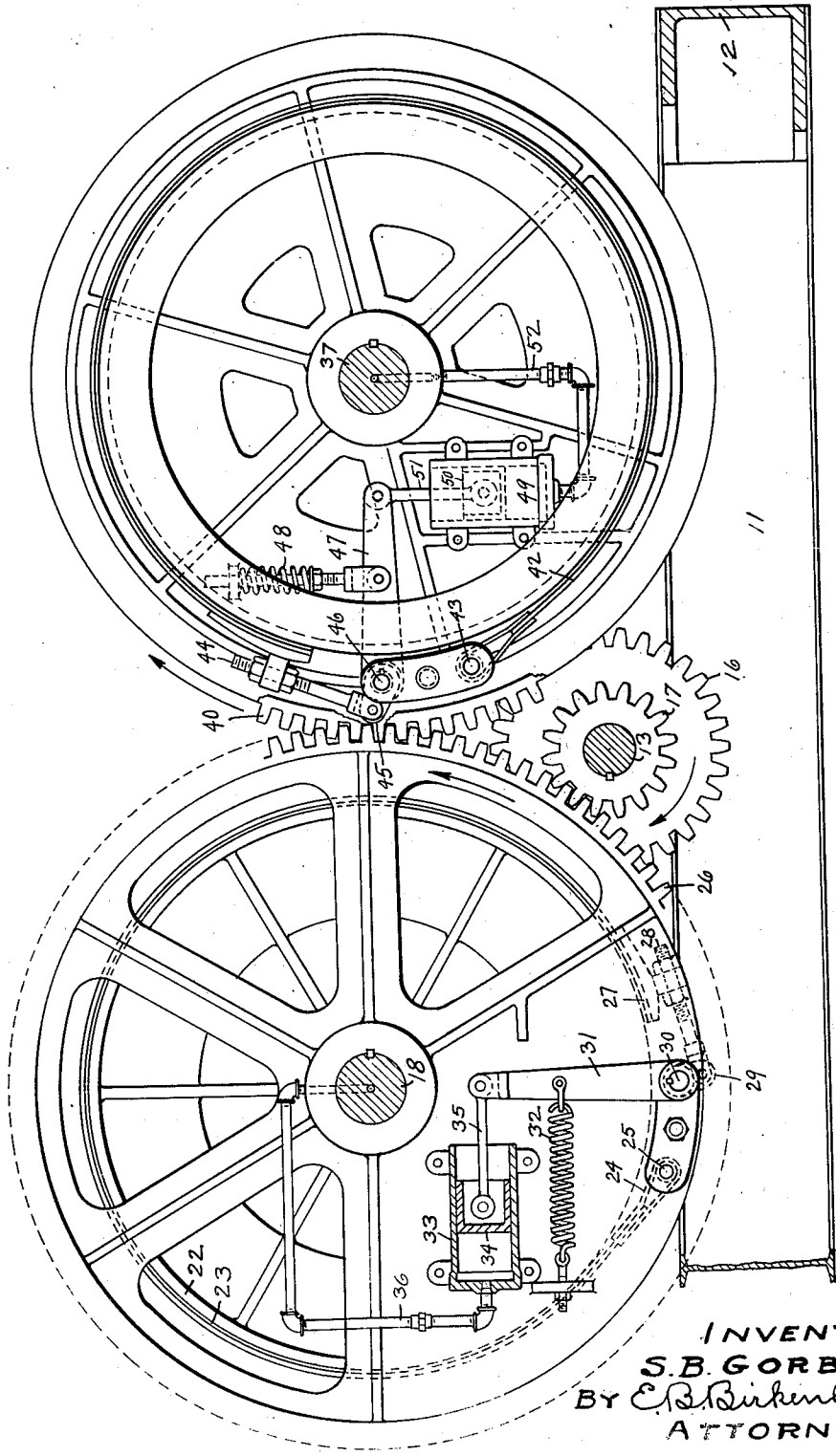


FIG. 2.

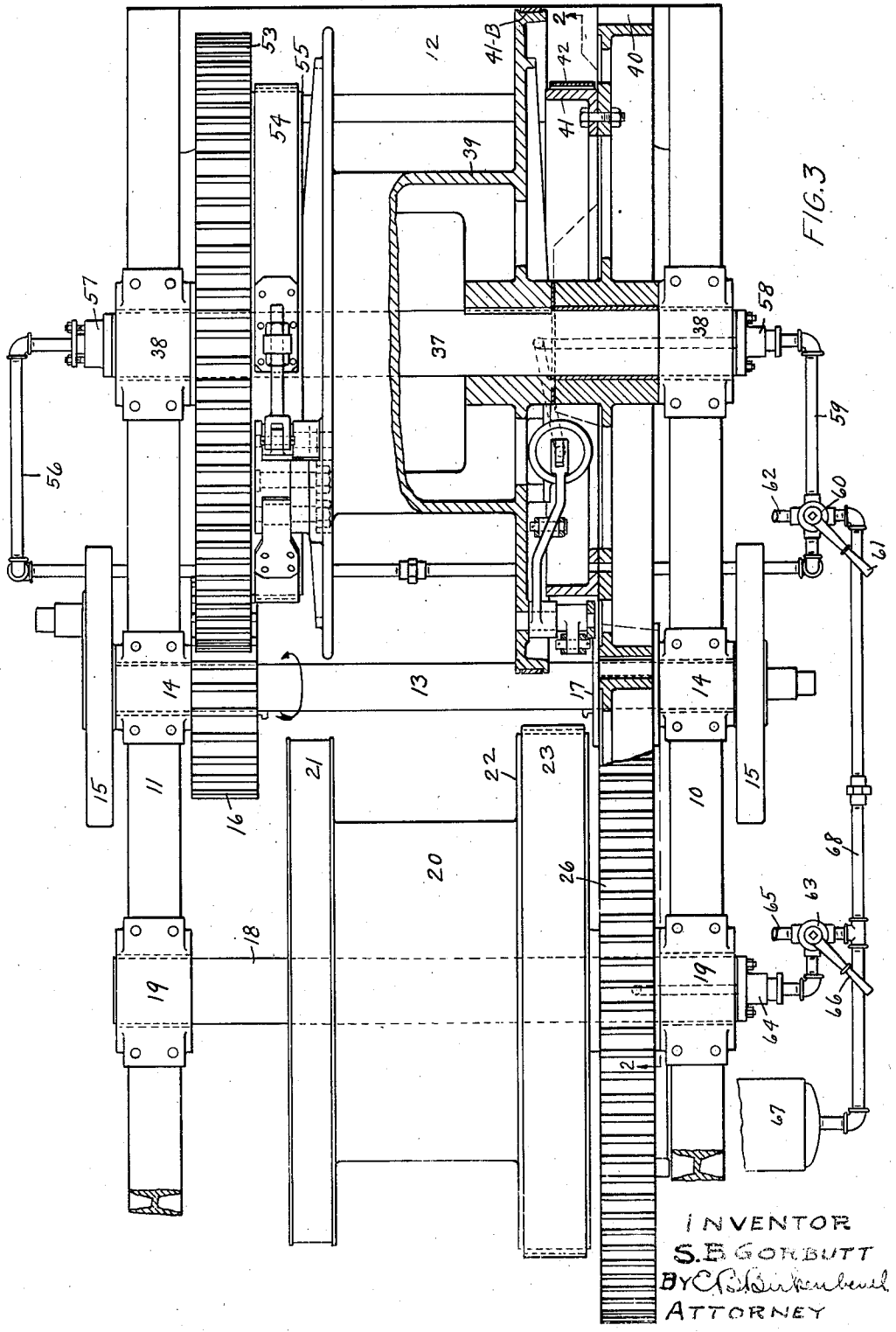
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UNITED STATES PATENT OFFICE.

SIDNEY B. GORBUTT, OF PORTLAND, OREGON, ASSIGNOR TO WILLIAMETTE IRON AND STEEL WORKS, OF PORTLAND, OREGON.

INTERGEARED SKYLINE LOGGING ENGINE.

Application filed March 5, 1924. Serial No. 697,039.

To all whom it may concern:

Be it hereby known that I, SIDNEY B. GORBUTT, a citizen of the United States, and a resident of Portland, in the county of Multnomah and State of Oregon, have invented a new and useful Intergeared Skyline Logging Engine, of which the following is a specification.

This invention relates more especially to the logging industry and particularly to that portion of same in which logs are picked up bodily and carried on cableways and the log itself is held in suspension by holding back on the carriage through the medium of an out-haul line. My invention pertains particularly to the engine employed for operating such systems, by what is commonly known as an interlocking drum, or preferably an intergeared engine in which the skidding or hauling drum is interlocked or geared to the out-haul drum when the log is being transported at the desired height.

In this type of engine the out-haul drum is capable of being driven in either direction, usually at a greater speed when taking the carriage out to the woods, in order that it can play out line as fast as it is being hauled in by the skidding drum, or the reverse.

The interlocked feature is of itself not new, as is also the case with the reversible out-haul drum.

An object of my invention is to provide an extremely smooth working engine in which changes in the direction of carriage travel and the elevation of the log being transported can be effected with a minimum strain on engine, lines, spars, etc.

A second object is to simplify the construction of the device both in the machine shop and foundry.

A third object is to reduce the weight of the device without sacrificing strength and durability in parts usually subjected to the greatest strains.

A fourth object is to expedite repairs and replacement of the friction elements during operation, when time is an important element to be conserved, and to also make it a much less difficult task to renew or adjust other parts subject to wear.

A fifth object is the elimination of the V block frictions and their side thrusts, with their attendant power losses and wear, which, between adjustments, render their smooth operation almost an impossibility.

A sixth object is the reduction in weight and the removal of overhang on the drum shafts which is present when operating V block frictions.

A seventh object is the elimination of sliding gears.

An eighth object is the construction of the device in a manner that no drum bushing is required in the haulback drum, and that the gear bushings on its drum shaft can easily be replaced when desired.

In order to secure these results I have employed friction bands between the crank shaft and the two out-haul drum drives, and also between the crank shaft and the skidding drum.

I accomplish these results in the manner set forth in the following specification and illustrated in the accompanying drawings, in which:

Figure 1 is a diagrammatic view showing the nature of the logging operation and its relation to the device. Figure 2 is a vertical section of that portion of the logging engine which comprises my invention, and is taken along the lines 2—2 in Figure 3. Figure 3 is a plan of Figure 2.

Similar numbers of reference refer to the same parts throughout the several views.

Referring in detail to the drawings, in its preferred form the device includes the usual side beams 10 and 11 and the end beam 12. A crank shaft 13 is mounted on the beams 10 and 11 in the bearings 14. Rotation, as indicated, is supplied to the crank shaft 13 through the crank disks 15 from the usual engine (not shown). On the crank shaft 13 are keyed the large haulback pinion 16 and the small skidding pinion 17.

Skidding drum.

A skidding drum shaft 18 is mounted on the beams 10 and 11 in the bearings 19. A skidding drum 20 is loosely mounted on the shaft 18 and is provided with a friction flange 21 for a brake band (not shown) as is the usual practice. The skidding drum 20 is also provided with a driving flange 22 for a friction band 23 whose end 24 is attached to the bolt 25 on the gear 26, and whose end 27 is attached to the adjustable bolt 28 which is joined to the lever 29 on

the rocking shaft 30 which journals in the gear 26.

The lever 31 which rocks the shaft 30 is urged by the spring 32 to expand the band 23. The air operated cylinder 33 is mounted on the gear 26 and its piston 34 is joined by the connecting rod 35 to the lever 31. Admission of air to the cylinder 33 causes the lever 31 to move in opposition to the spring 32 and frictionally engage the drum 20 and the gear 26. Air is admitted from the shaft 18 to the cylinder 33 through the pipe 36. The gear 26 is preferably tight on the shaft 18 and meshes with the pinion 17 on the crank shaft 13.

Haulback drum.

A haulback drum shaft 37 is mounted on the beams 10 and 11 in the bearings 38. On the shaft 37 is keyed a haulback drum 39. Between the drum 39 and the beam 10 is loosely mounted a holdback gear 40 which meshes with the gear 26 at all times and has secured thereto a friction flange 41. A brake 41^B is also supplied on drum 39. Around the flange 41 is placed a friction band 42, one end of which is secured to the bolt 43 on the drum 39 and the other end of said band is attached to the adjustable bolt 44 which is joined to the lever 45 on the rocking shaft 46, which journals in the side of the drum 39. The lever 47 which rocks the shaft 46 is urged by the spring 48 to expand the band 42.

The air-operated cylinder 49 is mounted on the drum 39 and has its piston 50 joined by the connecting rod 51 to the lever 47. Admission of air to the cylinder 49 causes the lever 47 to move in opposition to the spring 48 and frictionally engage the drum 39 and gear 40. Air is admitted from the shaft 37 to the cylinder 49 through the pipe 52.

A mechanism similar to the cylinder 49 and its attached parts is mounted on the opposite end of the haulback drum 39 and frictionally engages the drum 39 and the loose gear 53 which meshes with the pinion 16 by means of the band 54 on the flange 55. In this case, air is admitted to the shaft end by way of the pipe 56 and the swivel coupling 57. A similar coupling 58 admits air to the cylinder 49 by way of the pipe 59. A four-way valve 60 supplies air to either of the pipes 56 or 59 under the control of the lever 61 and exhausts it from the other cylinder through the pipe 62.

It will be understood that the bands 42 and 54 are closely adjusted but that there is a small space between these adjustments during which time the drum 39 is free to rotate, but the smaller this space is, within practical limits, the smoother the operation of the device.

A three-way valve 63 admits air to the shaft 18 from the swivel coupling 64 and releases it from the exhaust pipe 65 under the control of the handle 66. Air from the source of supply 67 is carried to the valves 60 and 63 by the pipe 68.

For a more complete description of the details, such as band actuating parts, swivel couplings, etc., reference is made to my copending application 681,692, filed Dec. 20, 1923.

In Figure 1 of the present application I have illustrated, in a somewhat diagrammatic form, a layout of my device as applied to skyline logging in which are shown a head-tree 69 and a tail-tree 70 between which is suspended a standing line 71 which supports the carriage 72. A haulback line 73 is attached to the carriage 72 and passes through a tail-block 74 on the tail-tree 70 and through a head-block on the head-tree 69 down to the haulback drum 39.

A skidding line 75 is wound on the skidding drum 20 and passes over the block 76 on the head-tree 69, then over a sheave 77 on the carriage 72, and then down to the log 78 to which it is made fast in the usual manner. In this view only essentials have been shown or described, in order to more clearly point out the advantages which result when dispensing with the V block frictions for intergeared engines and employing friction bands which are operable from between the shaft bearings instead of by the ponderous overhanging end thrusting devices.

Operation.

When bringing in a log 78 from the woods, air is applied to the band actuating cylinders of the drum 20 and the brake 41^B on the haulback drum 39 is applied to an extent which will cause the haulback line 73 to resist the pull of the skidding line 75 sufficiently to cause the log 78 to rise to the desired elevation. The brake 41^B is then released and the holdback gear 40 is brought into engagement with the drum 39, which causes the haulback line 73 to play out at practically the same speed that the skidding line is hauled in—or in other words—causes the log 78 to be held at a fixed elevation, which may be varied at will from time to time during the travel of the carriage 72.

It is evident that since the adjustment of the bands 42 and 54 is circumferential and very accessible, these bands may be held in nice adjustment with only a very small space in which the drum 39 can rotate freely. The effect of this construction is to greatly reduce the shocks resulting from shifting the gearing.

While a friction band might be considered the equivalent of a V block type of friction in many cases, it has been found in this instance that the great economy ef-

fected in time, labor, and weight, and the greater smoothness in operation has proved it superior to the V block and made it of extreme importance to the logging industry.

In Miller et al, 680,934, is illustrated an interlocked mechanism in which V blocks are employed to frictionally engage the two drums with the two meshing gears, and a clutch is placed on the power shaft to drive the haulback gear E.

It will be observed that the V block actuating mechanism is outside of the shaft bearings, and it is a matter of common knowledge that when this mechanism is designed to take care of the enormous loads handled by modern logging engines, that these mechanisms grow so rapidly in size and weight as to be an actual encumbrance to the machine.

When driving through a clutch on the power shaft the size of the clutch is limited by the effort to make the pinions as small and the drums as large as possible for speed purposes. Also when a clutch is positioned on the power shaft it is placed between the crank disks, which are ordinarily tight on the shaft. This means that to replace the friction element on the power shaft, either of the drum shafts and parts mounted thereon, must first be removed and then the power shaft itself must be lifted out of its bearings, and one of the crank disks removed.

In my device the friction band fastenings are removed and the band itself, which is of the hinged type, is removed and relined and then replaced, or a spare band is put on in its stead, without disturbing any of the other parts.

By making the elements 39 and 26, which carry the air cylinders tight on their respective shafts, the delivery of air from the shaft ends to the cylinder is expedited.

As previously stated, I am aware that interlocked gears have been employed for logging purposes; I therefore do not claim my device broadly but have directed my claims to a mechanism in which band frictions are employed to transmit motion to the desired parts, instead of the usual V block frictions, and it is my invention to cover only such forms and modifications as fall fairly within the appended claims.

I claim:

1. In an intergeared logging engine, the combination of spaced frame members; a drive shaft mounted across said frames; unequal pinions secured on said drive shaft; a skidding drum shaft journaling across said frames; a skidding drum loose on said skidding drum shaft; a skidding gear tight on said skidding drum shaft and meshing with the smaller pinion; a band friction between said skidding drum and its gear; an air-actuated friction applying means for said band; a haulback drum shaft mounted across said frame; a haulback drum secured on said haulback drum shaft; a haulback gear loose on said haulback drum shaft and meshing with the larger pinion; a band friction between said haulback gear and drum; a holdback gear loose on said haulback shaft; a band friction between said holdback gear and haulback drum; and means for actuating said bands on said haulback drum consisting of a cylinder mounted between each gear and its drum, having a piston and levers arranged to actuate said bands, with valve means for admitting air to either the cylinder on the holdback or haulback gear side of said haulback drum and to exhaust air from the opposite cylinder.

2. In an intergeared logging engine, the combination of a frame; a haulback drum shaft mounted across said frame; a haulback drum secured on said shaft; an air cylinder mounted at each end of said drum; concentric haulback and holdback gears loosely mounted at each end of said drum outside of said air cylinders; a friction flange formed on the inner side of each gear; friction bands around said flanges operable from said air cylinders; valve means for admitting air through the ends of said haulback drum shaft through said drum to its respective cylinder in a manner that either of said frictions may be applied at one time, or both may be released, under the control of said valve; a skidding drum mounted on said frame; a gear at one end of said skidding drum meshing with said holdback gear; a power shaft; and unequal pinions mounted on said power shaft meshing with said haulback and skidding gears.

3. In an intergeared logging engine, the combination of a power shaft; a pair of unequal pinions secured on said power shaft; a skidding drum shaft; a skidding drum loose on said skidding drum shaft; a tight skidding drive gear on said skidding drum shaft meshing with the small pinion on the power shaft; a band friction adapted to engage said skidding drum; a haulback drum shaft on the opposite side of said power shaft; a haulback drum secured on said haulback shaft; a haulback gear loosely mounted at one end of said haulback drum and meshing with the large pinion; a holdback gear loosely mounted at the opposite end of said haulback drum and meshing with the skidding drive gear; air-operated band friction means between said haulback drum and its adjacent gears; valve means for controlling said band operating means; a brake for said haulback drum; and a brake for said skidding drum.

SIDNEY B. GORBUTT.