

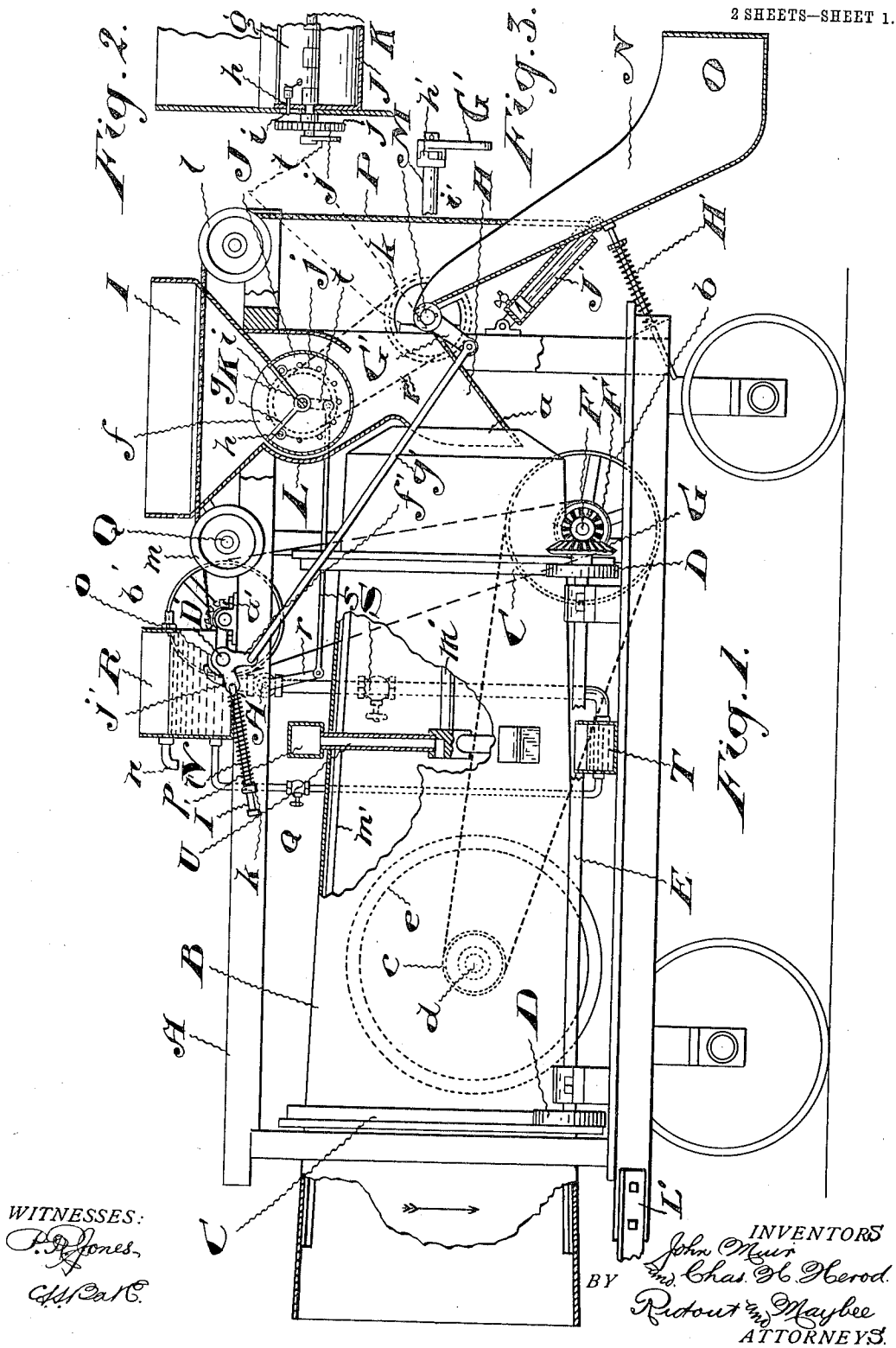
No. 851,686.

PATENTED APR. 30, 1907.

J. MUIR & C. H. HEROD.
CONCRETE MIXER.

APPLICATION FILED MAY 22, 1905.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

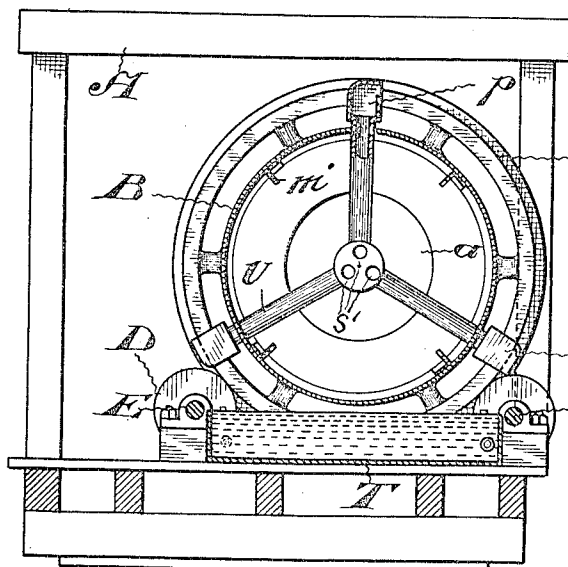


Fig. 4.

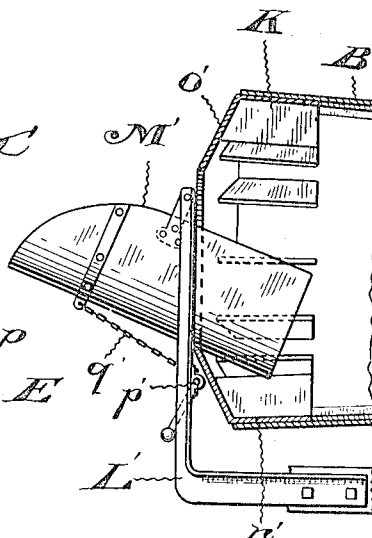


Fig. 6.

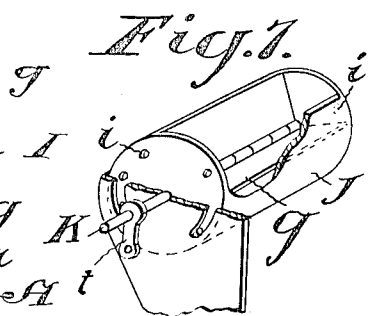
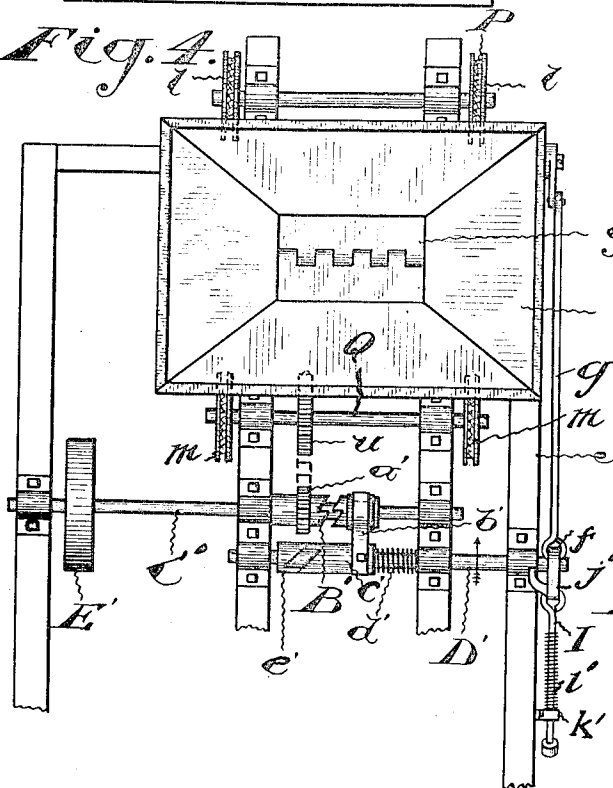


Fig. 5.

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CONCRETE-MIXER.

No. 851,686.

Specification of Letters Patent.

Patented April 30, 1907.

Application filed May 22, 1905. Serial No. 261,584.

To all whom it may concern:

Be it known that we, JOHN MUIR and CHARLES H. HEROD, of the city of Brantford, in the county of Brant, Province of Ontario, Canada, have invented certain new and useful Improvements in Concrete-Mixers.

The object of our invention is to devise a concrete mixer which will automatically measure and mix the gravel, cement and water for the concrete in predetermined proportions so as to deliver a thoroughly mixed concrete of constant predetermined composition independent of the skill or care of the operator, and it consists essentially of a mixer provided with means for feeding cement and gravel in charges of predetermined size into the inlet end of the mixer and with means for subsequently and gradually adding a measured quantity of water substantially as hereinafter more specifically described and then definitely claimed.

Figure 1 is a side elevation partly in section of our improved mixer. Fig. 2 is a partial cross section of the cement feeding means. Fig. 3 is a plan view of the operating arm of the gravel introducing means. Fig. 4 is a cross section of the machine showing the water elevating means. Fig. 5 is a plan view of the discharge end of the mixer showing the elevating discharge. Fig. 6 is an elevation showing the mechanism for controlling the operation of the cement and gravel introducing means. Fig. 7 is a perspective view of the cement feeding means.

In the drawings like letters of reference indicate corresponding parts in the different figures.

A is the frame of the machine suitably shaped to support the different parts. It is preferably mounted on wheels, as indicated, for convenience in transportation. The actual mixing is carried on in the cylinder B, which is preferably tapered from its inlet *a* toward the discharge. The cylinder is provided with flanged wheels C which rest upon the friction wheels D secured to the longitudinal shafts E journaled on the frame of the machine. These shafts are driven from the transverse shaft F by means of beveled gearing G. This shaft F has a pulley *b* secured thereto driven in a suitable manner. It is illustrated as being driven from a small pulley *c* fast on the shaft *d*. This shaft may be the crank shaft of a gasoline engine of which *e*

is the fly wheel, but there is no novelty in this arrangement of the drive and the shaft E could be driven in any other manner or the drive applied directly to the pulley *b*. By means of the construction described the cylinder may be given a rotary motion in the direction indicated by arrow in Fig. 1. At the inlet end of the cylinder an inlet chute H is provided preferably entering within the inlet of the cylinder as shown. Above this inlet chute is located a cement hopper I. The bottom of the hopper is closed by the rotary chamber J preferably cylindrical. In one side of this chamber an opening *f* is formed which normally is in communication with the lower end of the hopper. Means are provided for varying or adjusting the capacity of this chamber J. We show the chamber secured to a shaft K suitably journaled, and on this shaft are hinged the radial partitions *g*. These are provided with any suitable means for angularly adjusting them to increase or diminish the size of the sector shaped chamber which is in communication with the opening *f*.

In Figs. 1 and 2 are shown spring actuated bolts *h* passing through the ends of the chamber and adapted to engage in any of the series of holes *i* formed in the sides of the chamber. L is a casing which surrounds the cylinder and preferably extends down to the inlet chute H to prevent the scattering of the cement when the machine is in operation. It is evident from the construction described that by rotating the chamber J charges of cement may be drawn from the hopper and discharged on to the inlet chute H, and that the quantity of cement so deposited may be varied by angularly adjusting the radial partitions *g*.

On the end of the shaft K is secured a sprocket wheel *j* connected by a sprocket chain *r'* with the sprocket wheel *k* fast on the shaft M suitably journaled adjacent to and preferably slightly above the outer end of the inlet chute H. To this shaft M is rigidly secured the outer end of the gravel chute N connected with the gravel receptacle O. Connected to the gravel receptacle are the cords or chains P running over the guide pulleys *l* journaled on the arm of the machine and secured to the pulleys *m* fast on the shaft Q journaled transversely at the upper part of the frame. It is evident that by rocking

shaft Q that the gravel receptacle will be raised to dump its contents onto the inlet chute H and at the same time the chamber J will be rotated to simultaneously dump a proportionate quantity of cement. The method of operating this shaft will be described after we have set out the means of properly measuring the proper quantity of water. For this purpose we employ a tank R provided with an overflow *n* at such a height that only the requisite quantity of water can be held in the tank. The inlet pipe *o* may lead from any suitable water supply. If a gasoline engine be employed it will, of course, be convenient to connect it with the pumping and cooling system of the engine. This also serves the purpose of heating the water which is desirable in frosty weather. From the bottom of the tank an outlet pipe S leads to the trough T located below the cylinder. This trough is located at the point in the length of the cylinder at which it is desired to introduce the water. This is preferably about one-third of the length of the cylinder from the inlet as it is desirable to partly mix the material dry before adding the water. The admission of water to the trough from the tank is controlled by a stop cock A', with a controlling arm *r*. This controlling arm is pivotally connected with a pitman *s*, the other end of which is pivoted on a crank arm *t* secured to the shaft K. Thus, the water in the tank is allowed to flow down to the trough at the same time that the gravel and cement are dumped into the cylinder. The pipe S is provided with a globe valve. This globe valve is intended for the purpose of varying the quantity of water allowed to flow through the pipe, as sometimes a somewhat slacker mixture is required than at other times, and it is occasionally necessary to use more or less water, according to the condition of the mixture employed. From this description it will be seen that the water is measured owing to the fact that the water is only allowed to flow through the pipe S at such times as the gravel and cement are being dumped into the cylinder. The flow of the pipe being uniform, and the speed of the apparatus being constant, the same quantity of water is delivered to the trough every time a measured batch of cement and gravel is introduced into the apparatus. At the same time, the amount of water introduced with each batch is easily regulable at any time by means of the globe valve, as already described. Within the cylinder above the trough is located a spider having hollow arms U, each provided with an opening *s'* at or near the center of the cylinder. On the ends of the arms outside the cylinder are secured buckets *p* communicating with the interior of the hollow arms. These buckets are adapted to dip into the trough T and to pick up a small quantity of

water therefrom. As the cylinder rotates the buckets are raised and their contents poured through the hollow arms and into the cylinder near the center whence it drops onto the concrete material within the cylinder. Of course, it is not absolutely necessary that the outlets be at the center provided they are sufficiently far away from the inside surface of the cylinder to avoid all possibility of their becoming clogged with the cement. While a trip capable of manual control only might be used, we show means for giving both automatic and manual control, as shown in Figs. 1 and 5.

The shaft Q it will be seen is provided with a sprocket wheel *u* adapted to be driven by a sprocket chain from the sprocket wheel *a'* fast on the loose member of a ratchet clutch B' on the shaft C'. The sliding member of this clutch is grooved in the ordinary manner and with the groove is engaged the shifter *b'* carried by one member *c'* of the ratchet clutch on the shaft D'. This member *c'* is freely slidable and rotatable relative to the shaft D', and is normally pressed toward the left hand in the Fig. 5 by means of the coil spring *d'*. The other member *e'* of the clutch on the shaft D' is secured to the shaft. From this construction it follows that by rocking the shaft in the direction indicated by arrow in Fig. 5 that the members of the clutch B' will be allowed to engage and the sprocket wheel *a'* given a driving connection with the shaft C'. On the said shaft C' is secured a pulley E'. This pulley is driven by a suitable belt from the pulley F' fast on the shaft F, which is being continuously driven when the machine is in operation. Thus the shaft Q will be rotated as long as the members of the clutch B' are engaged. When the shaft D' is rotated in the opposite direction to that indicated by arrow the clutch members *c' d'* will be forced apart as shown in Fig. 5 and the ratchet clutch B' disengaged so that the shaft Q and its connected parts are no longer driven. The shaft D' may be operated by hand, but to avoid accidents it is preferably automatically operated as shown particularly in Figs. 1 and 5. The arm *f'* is secured to the end of the shaft D' and normally projects downwardly. To this arm is pivoted the connecting rod *g'*, the other end of this rod being pivotally connected with the end of the arm G' loose on the shaft M. Stops *h'* are provided on this arm G' adapted to play on each side of a lug formed on a collar *i'* secured to the shaft M, see Fig. 3. When the parts are in the position shown in Fig. 1 the lug is engaged by one of the stops and the weight of the gravel receptacle with its contents presses on the arm and tends therefore to rock the shaft D'. The receptacle is however normally supported by the spring cushion H' so that no motion is imparted to the parts until a sufficient weight has been put in

the receptacle to overcome the resistance of the spring cushion. The shaft D' is held in its normal position by the rod I' pivotally engaged with the arm j' rigidly secured to the shaft D'. This rod passes through the guide k' and is provided with a coil spring l' pressing against a pin or other stop on the rod and against the guide k'. It will be seen that the point of the connection of the rod I' with the arm j' is out of line with the guide k' and the shaft so that the pressure of the spring tends to retain the shaft in the position shown, overcoming the tension of the spring l'. As gravel is placed in the receptacle the tension on the spring cushion is gradually overcome and by means of the connections already described the shaft D' is rotated until the point of connection of the rod I' is shifted to the other side of the line of centers when the tension of the coil spring l' rotates the shaft in the direction indicated by arrow in Fig. 6 and allows the clutches to engage as already described. Thus the gravel receptacle is elevated, the cement dumped, and the water allowed to flow from the tank. The sudden movement of the shaft D' was permitted without affecting the shaft M owing to the peculiar stop and lug connection of the arm G' with the shaft already described. The movement of the arm however in following the movement of the shaft D' caused the other stop to engage the lug of the collar i' on the shaft. Consequently as the gravel receptacle raised the arm was drawn upon to restore the parts to their original position, which original position is finally assumed as the gravel receptacle reaches its extreme upward position and its contents have been dumped. Then owing to the releasing of the clutch B' the shaft Q is allowed to run free and the receptacle is free to drop to its normal position. To ease its fall we provide one or more air-dash pots J', part of which being pivoted on the frame of the machine and the other on the receptacle. As these air cushions are of ordinary construction, further description will be unnecessary.

Returning to the construction of the cylinder it will be seen that the part in which the material is mixed dry is provided with four ribs or flanges m' while only two of these are continued through the wet mixing part of the cylinder. We find this arrangement preferable. It will be noted on reference to the Figs. 1 and 5 that the ribs do not run quite up to the discharge end of the cylinder. This permits of the insertion of a cap comprising a collar n' and an annular flange o' having a central opening therein. Secured to the cap are a series of lifting plates K'. L' is a bracket secured suitably to the frame of the machine and carried up in front of the cap. On this bracket is hung a tilting bucket or chute M'. On the bracket is journaled a shaft p' provided with a suitable crank han-

dle. On the shaft is wound a chain q' connected with the outer end of the bucket. The contents of the cylinder are elevated by the plates K' and dropped into the bucket which may be subsequently tipped to discharge its contents by rotating the shaft p'. We do not claim this construction as particularly new but only as applied detachable to the end of the cylinder. For wheelbarrows the end of the cylinder is left open, but for certain purposes the elevating and dumping arrangement just described is convenient.

From the above description it will be seen that we have devised a machine which will automatically measure and mix the gravel, cement and water for the concrete in predetermined proportions. It will of course be understood that by the term gravel we mean any of the well-known substances used as a body for concrete. This may be either ordinary natural gravel, sand and crushed stone or other well-known equivalents. Owing to this automatic measuring and mixing a concrete is produced of unvarying composition completely independent of the skill or the care of the operator, who is merely required to load gravel into the gravel receptacle and to see that the hopper is kept filled with cement. It will be seen too that the cement and gravel are simultaneously dumped in batches into the extreme end of the mixing chamber, insuring that from the moment the mixer is entered they are together as one body requiring only to be thoroughly agitated in their passage through the cylinder. This is a much superior arrangement to ordinary mixers in which the cement and gravel are either deposited in the cylinder at different times or at different parts of the cylinder. It will be seen too that the output of the machine is varied without varying the speed of the drive, as the material is fed to the machine as rapidly as the gravel receptacle can be filled by the operator. If only one man is available, the machine will operate perfectly while at any time by increasing the number of men shoveling the gravel the capacity of the machine may be increased to the limit of the quantity which the cylinder is capable of handling. Such automatic response of the machine to the demands made upon it has not hitherto been obtained.

The advantages described can be obtained without the use of the automatic trip hereinbefore described, as the capacity of the gravel receptacle being a fixed quantity the measuring will be as exactly performed if the machine be arranged to depend on a manually operated trip to start the elevating and dumping mechanism in motion. Indeed as shown, the machine may be manually tripped by applying pressure to the gravel receptacle or by tripping the arms G', f' or the rod g', and the parts will as before be automatically returned to their normal position. But,

of course, for a manually operated trip only, we would prefer to simplify the construction.

What we claim as our invention is:—

1. A concrete mixer in combination with
5 overhead means for introducing a measured quantity of cement in a batch into the mixer; an elevating receptacle for gravel; means for causing the gravel receptacle to elevate and dump its contents into the mixer; and means
10 connected with the cement and gravel introducing means for causing the intermittent and simultaneous operation of the said cement and gravel introducing means, substantially as described.
- 15 2. A concrete mixer in combination with overhead means for introducing a measured quantity of cement in a batch into the mixer; an elevating receptacle for gravel; means for causing the gravel receptacle to elevate and
20 dump its contents into the mixer; means connected with the cement and gravel introducing means for causing the intermittent and simultaneous operation of the said cement and gravel introducing means; and means for
25 elevating and discharging into the mixer a measured quantity of water, substantially as described.
3. A concrete mixer in combination with overhead means for introducing a measured
30 quantity of cement in a batch into the mixer; an elevating receptacle for gravel; means for causing the gravel receptacle to elevate and dump its contents into the mixer; means connected with the cement and gravel introducing
35 means for causing the intermittent and simultaneous operation of the said cement and gravel introducing means; and means for elevating and discharging into the mixer a measured quantity of water in small regularly
40 repeated portions, substantially as described.
4. A cylindrical continuous rotary concrete mixer having an inlet opening at one end and a discharge opening at the other in
45 combination with a chute leading into the inlet; means for dumping a measured quantity of cement into the chute; means for dumping a measured quantity of gravel onto the chute; and mechanism connected with and forming
50 part of the apparatus for causing the inter-

mittent and simultaneous operation of the cement and gravel dumping means, substantially as described

5. A continuously running concrete mixer in combination with means for intermit- 55 tently and simultaneously introducing into the mixer separately measured quantities of cement and gravel; means for subsequently adding water; a pipe adapted to supply the water; a valve in the pipe; mechanism con- 60 nected with and forming part of the apparatus operating with the gravel and cement introducing means to operate the valve to permit of water flowing only when gravel and cement are being introduced into the mixer, 65 substantially as described.

6. A continuously running concrete mixer in combination with means for intermit- tently and simultaneously introducing into the mixer in batches separately measured 70 quantities of cement and gravel; means for subsequently adding water; a pipe adapted to supply the water; a valve in the pipe; mechanism connected with and forming part of the apparatus operating with the gravel 75 and cement introducing means to operate the valve to permit of water flowing only when gravel and cement are being introduced into the mixer; and means for varying the flow of the pipe, substantially as described. 80

7. A cylindrical rotary concrete mixer having an inlet opening at one end and a discharge opening at the other in combination with a chute leading into the inlet; means for dumping a measured quantity of cement into 85 the chute; a gravel receptacle; a normally upwardly inclined gravel chute connected therewith; hinged above the inlet chute; mechanism connected with and forming part of the apparatus for swinging up the recepta- 90 cle to dump its contents onto the inlet chute; and means for causing the simultaneous operation of the cement and gravel dumping means, substantially as described.

Toronto, May 13th, 1905:

JOHN MUIR.

CHARLES H. HEROD.

Signed in the presence of—

JOHN G. RIDOUT,

P. R. JONES.