T. FLETCHER.

SPEED REGULATING MEANS.

APPLICATION FILED MAY 16, 1917.

1,271,881.

Patented July 9, 1918.

2 SHEETS—SHEET 1.

Fig. 1.

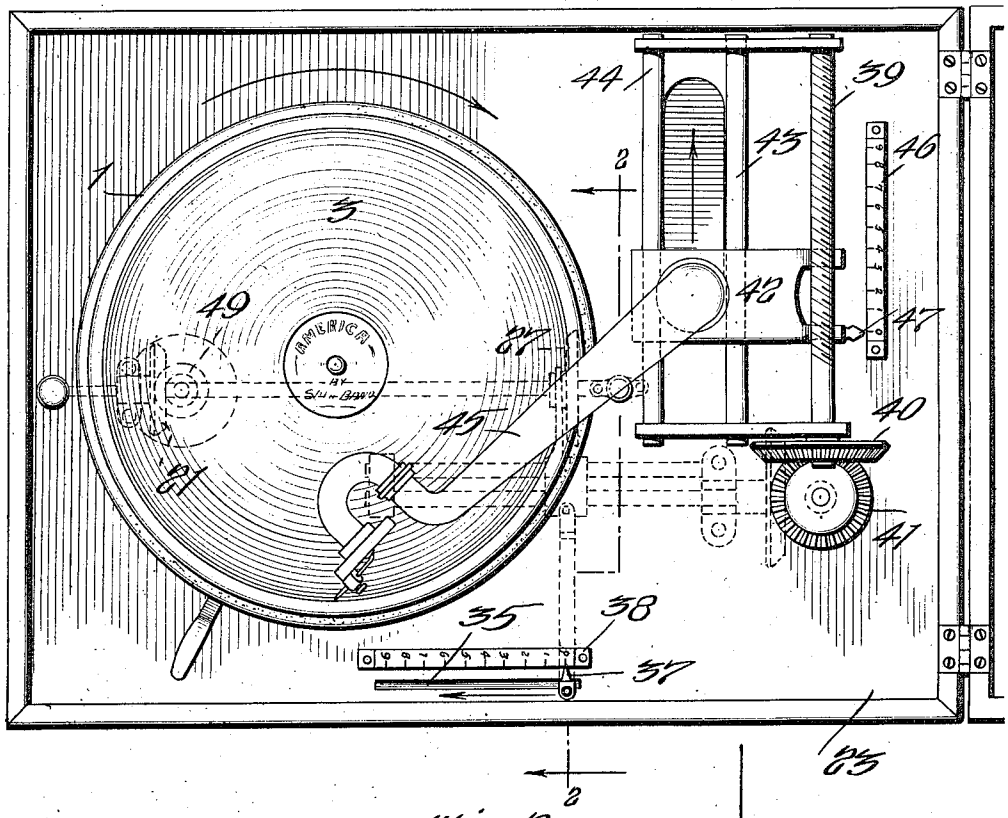
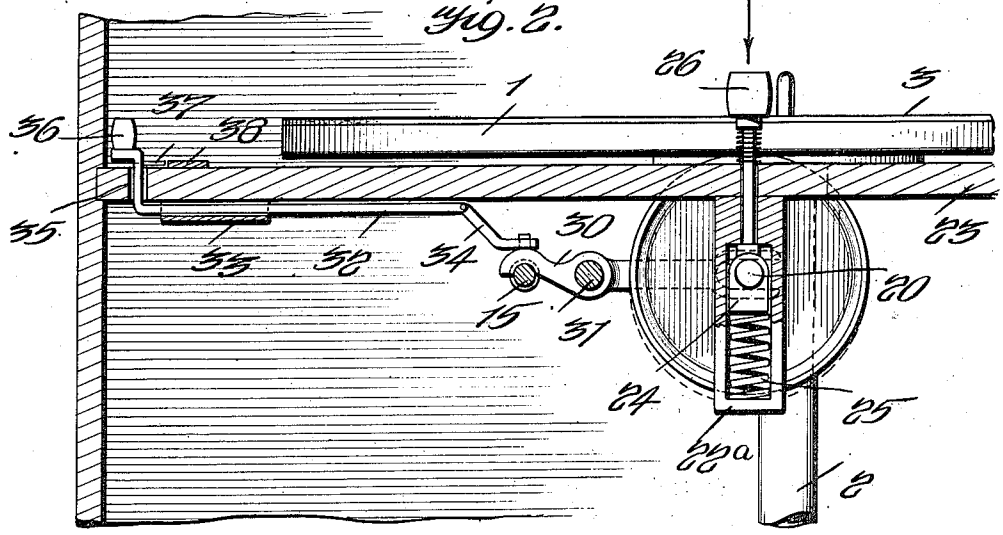


Fig. 2.



WITNESS

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2 SHEETS—SHEET 2.

Fig. 3.

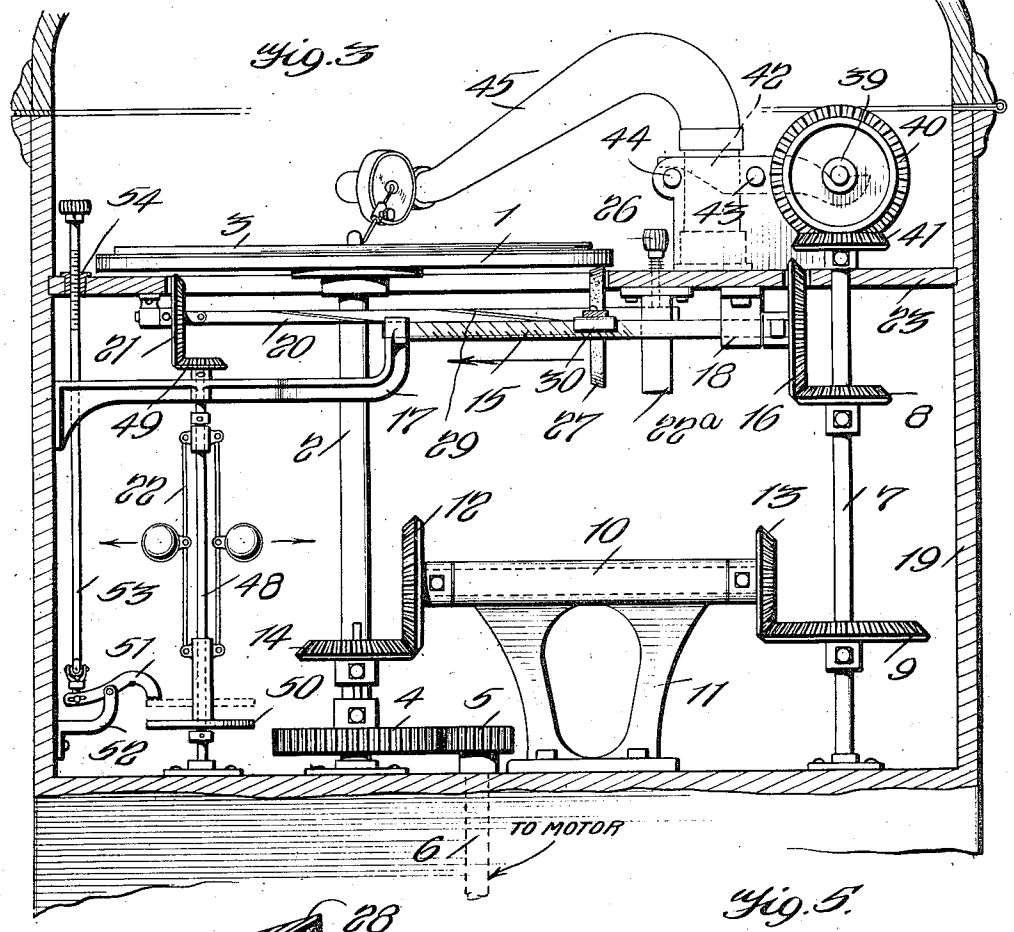


Fig. 4.

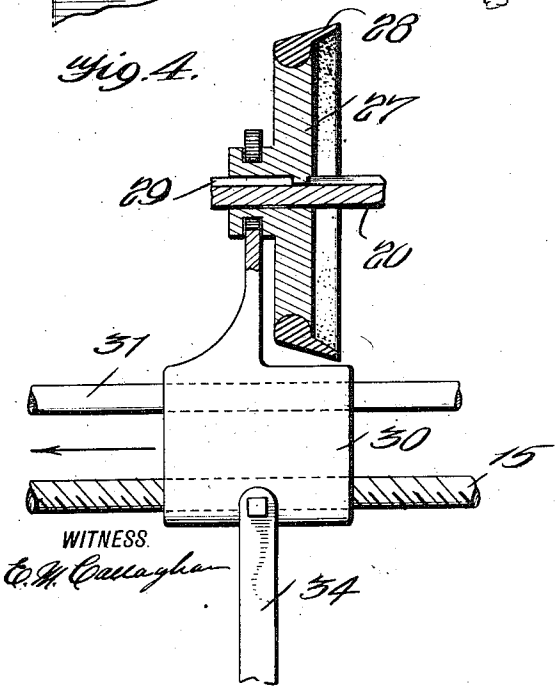
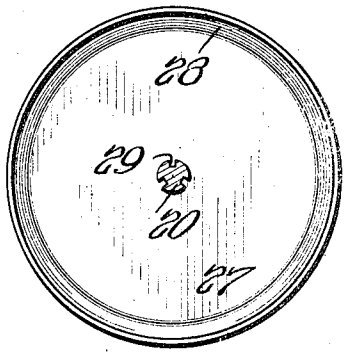


Fig. 5.



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SPEED-REGULATING MEANS.

1,271,881. Specification of Letters Patent. Patented July 9, 1918.

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To all whom it may concern:

Be it known that I, THEODORE FLETCHER, a British subject, and a resident of San Antonio, in the county of Bexar and State of Texas, have invented an Improvement in Speed-Regulating Means, of which the following is a specification.

In sound recording and reproducing machines utilizing disks for the records such disks—so far as informed—are revolved at a uniform speed; consequently no more sound is recorded on the outside spiral than on the innermost one, although the length is much greater.

As a result of this practice, it is not possible to record the whole of the surface of a large disk, because of the difference in the speed of the travel of the disk under the stylus or needle. If the speed were correct for the outside spirals of the disk, then it would be too slow for the inside ones, and if fast enough for the inner ones then it would be too fast for the outside spirals; consequently the present practice is to record only a comparatively small area of a disk, so that the relative speed of travel between the outside and the inside spirals shall be within certain bounds so that both can be played.

In the ideal instrument, the speed of travel of the disk should be the same throughout, that is the speed of that portion of the disk traveling under the stylus should be the same no matter at what part of the disk the stylus is located, and that speed should be the speed at which the best results can be obtained. If the speed is too fast, there is unnecessary friction between the stylus and disk, and as a result loud scratching sounds are produced. If the speed is too slow volume of sound is sacrificed and the results are otherwise unsatisfactory.

The present invention aims to overcome these objectionable features by providing a means for gradually increasing the speed of the disk as the center is approached or retarding the speed if the record is made from the center outward. In consequence of this method there need be no reasonable limit to the size of the disk and practically the entire surface may be utilized for receiving a record, with the exception of a small central area.

The drawings illustrate an embodiment of the invention, and—

Figure 1 is a top plan view of a sound recording and reproducing machine illustrating the application of the invention, the cover of the case being thrown open.

Fig. 2 is a sectional detail on the line 2—2 of Fig. 1, looking in the direction of the arrows.

Fig. 3 is an elevation showing more clearly the speed regulating means, the upper portion of the case being in section.

Fig. 4 is a top plan view of the friction wheel which is in contact with the rotary table showing the parts associated therewith, the friction wheel and its supporting shaft being in section.

Fig. 5 is a side view of the friction wheel, with its supporting shaft, the latter being in section.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

The numeral 1 designates the rotary table generally employed in sound recording and reproducing machines for receiving the disks containing the record. This table is carried by the usual shaft or spindle 2, which is driven from a suitable source of power inclosed in the casing of the machine. The disk 3 is of ordinary form generally employed for receiving the record, such disk being supported upon the table 1 and caused to rotate therewith by frictional contact in the manner well understood. In the present instance, the shaft 2 is provided with a gear wheel 4 which is in mesh with a pinion 5 secured to a shaft 6, the latter receiving power from the motor, not shown, in a manner well understood.

A shaft 7 disposed parallel with the disk carrying shaft 2 is provided with bevel gear wheels 8 and 9. A longitudinal shaft 10 mounted in a bearing 11 is provided at opposite ends with bevel gear wheels 12 and 13. The bevel gear wheel 12 is in mesh with a bevel gear wheel 14 secured to the shaft 2, and the bevel gear wheel 13 is in mesh with the bevel gear wheel 9. As a result of this arrangement the shaft 7 is positively driven from the shaft 2. A screw shaft 15 is arranged horizontally at a point below the

table 1 and is provided at one end with a bevel gear wheel 16 which is in mesh with the bevel gear wheel 8. The screw shaft 15 is mounted in brackets 17 and 18 which are secured in any desired way to parts of the casing 19.

A shaft 20 is disposed parallel with the screw shaft 15 and is provided with a bevel gear wheel 21 which is designed to operate a governor 22 of any well known structural type. The shaft 20 is movable to admit of resetting the speed regulating means. For this purpose one end of the shaft 20 extends through a slot or opening formed in a bracket 22^a depending from a horizontal portion 23 of the casing. A bearing 24, receiving one end of the shaft 20, is movable vertically in the slot or opening of the bracket 22^a and is normally pressed upward by means of an expansible spring 25. A push rod 26, connected with the bearing 24, extends through the upper portion of the bracket 22^a and the partition or part 23 and extends above such partition a distance to be pressed upon when it is required to move the shaft 20 downward to admit of resetting the speed regulating means.

A speed controlling wheel 27 is mounted upon the shaft 20 and normally is in frictional contact with the under side of the table 1. The outer edge of the speed controlling wheel 27 is provided with a covering 28 of rubber or like material to insure frictional contact between the wheel and table, this being essential to the operativeness of the invention. The outer edge of the speed controlling wheel is beveled, as shown most clearly in Fig. 4, to facilitate the movement of the wheel toward the center of the table. The speed controlling wheel 27 is mounted upon the shaft 20 in a manner to impart a rotary movement thereto and in the preferred arrangement the shaft 20 is provided with one or more slight spiral ways 29 which coact with parts of the wheel 27, thereby tending to move such wheel on the shaft 20 toward the shaft 2 or axis of rotation of the table 1. This prevents any binding of the parts and obviates imposing any unnecessary work upon the driving mechanism.

A carrier 30 is mounted upon a rod 31 disposed intermediate of the shafts 15 and 20 parallel therewith. The carrier 30 is mounted upon the rod 31 to slide and tilt or pivot thereon. One end of the carrier 30 engages the speed controlling wheel 27 and is preferably forked to engage an annular groove formed in the hub of the wheel, as indicated most clearly in Fig. 4. The opposite end of the carrier 30 is formed upon its under side with screw thread sections to match the screw thread of the shaft 15. When the shaft 20 is depressed by pushing downward upon the rod 26 the carrier 30 is tilted upon the rod 31 thereby disengaging the threaded portion of the carrier from the shaft 15 so that the speed regulating mechanism may be set by moving the wheel 27 along the shaft 20 to the desired position. When pressure is removed from the upper end of the rod 26 the spring 25 presses the bearing 24 upward and returns the shaft 20 and carrier 30 to normal position, thereby maintaining the speed controlling wheel 27 in frictional contact with the table 1 and the threaded portion of the carrier 30 in contact with the screw thread shaft 15.

Means are provided for conveniently moving the carrier 30 on its supporting rod 31 when the wheel 27 is disengaged from the table 1 and the carrier 30 is disconnected from the shaft 15. As shown most clearly in Fig. 2, a bar 32 is slidable in a keeper 33 attached to the under side of the partition or part 23. A link 34 connects the inner end of the bar 32 with the carrier 30. The outer portion of the bar 32 is bent upwardly and extends through a slot 35 formed in the part 23, the upwardly bent end of the bar 32 being provided with a finger piece 36 to be grasped when it is required to move the bar 32 to reset the speed regulating means. A pointer 37, connected with the upwardly bent end of the bar 32, coöperates with a scale 38 disposed adjacent the slot 35 so as to indicate the position of the speed controlling wheel 27 with reference to the table 1.

A screw shaft 39 is disposed above the partition or part 23 and at a right angle to the screw shaft 15, and it is provided at one end with a bevel gear wheel 40 which is in mesh with a bevel gear wheel 41 secured to the upper end of the shaft 7. The gear wheels 8 and 41 are of like diameter and provided with an equal number of teeth, and the gear wheels 16 and 40 are likewise of corresponding size and number of teeth, and as a result the screw shafts 15 and 39 are rotated at a like speed. A carrier 42 is mounted upon a rod 43 disposed parallel with the screw shaft 39. A second rod 44 is located a distance from the rod 43 and parallel therewith, and receives one end of the carrier 42 which rests thereon, as indicated most clearly in Fig. 3. The opposite end of the carrier 42 extends beneath the shaft 39 and is formed with screw thread sections to match the screw thread of the shaft 39. The sound tube or arm 45, adapted to receive the recorder or reproducer, is connected with and mounted upon the carrier 42 in a manner to move therewith, so as to cause the recorder or reproducer to travel across the disk 3 from the outer edge thereof toward the center, or vice versa, according to the arrangement. When the arm or sound tube is lifted the carrier 42 is tilted

upon the rod 43 in a manner to disengage its threaded portion from the screw thread of the shaft 39 so that the carrier may be moved along the rod 43 to bring the stylus of the recorder or reproducer to the desired point upon the disk. In order that the exact position of the stylus with reference to the disk may be ascertained, indicating means are provided, the same consisting of a scale 46 and a pointer 47, the latter being connected with the carrier 42, and the scale 46 being provided upon the part 23. The graduations of the scales 38 and 46 correspond, and since the screw threads of the shafts 15 and 39 are alike and such shafts are driven at a like speed, the carriers 30 and 42 are moved at a like speed, with the result that the speed controlling wheel 27 and the stylus of the recorder or reproducer occupy a like distance from the center of the disk, or approximately so.

The shaft 48 of the governor 22 is geared to the shaft 20 so as to be driven thereby. This result is effected by means of a bevel gear wheel 49 secured to the shaft 48 and in mesh with the bevel gear wheel 21. A disk 50 mounted on the shaft 48 is connected with the weighted arms of the governor and is moved on the shaft 48 by the governor. The disk 50 constitutes one member of a brake. The coöperating brake member is indicated at 51 and consists of a lever pivoted between its ends upon a bracket 52. A rod 53 is connected with one end of the brake member 51 and may be adjusted to set the brake mechanism so as to control the speed as may be required. The rod 53 has screw thread connection at 54 with the part 23 of the casing, and its upper end projects and is provided with a milled finger piece to be conveniently grasped when it is required to set the brake.

In the embodiment of the invention illustrated in the accompanying drawings the disk 3 is rotated by means of the table 1 from the motor, not shown, in the usual way. The speed controlling wheel 27 being in frictional contact with the table 1 is rotated thereby and imparts a corresponding movement to the shaft 20 which latter in turn drives the governor 22 which in turn acts to control the speed of the table and disk. It is assumed that the disk contains a record which is formed by a sound groove extending from the outer portion of the disk toward the center thereof, hence the parts are adjusted so that the speed controlling wheel 27 moves from the outer portion of the table toward the center thereof, and the part 45 receives a corresponding movement, the purpose being to have the wheel 27 and the stylus occupy a position at a like distance from the center of the disk so that the speed of that portion of the disk in contact with the stylus is uniform throughout, both when making a record or when reproducing the record. Obviously the speed of the disk varies according to the relative position of the wheel 27, but that portion of the disk in line with the wheel 27 is driven at a uniform speed, hence the same sounds occurring upon different portions of the disk are always the same and of equal length.

It is to be understood that instead of driving the table 1 from the shaft 2 at a constantly increasing speed which is regulated by the governor mechanism, the operating motor may be caused to run at a constant rate which may be controlled by the governor, and the speed controlling wheel 27 may be driven directly from the shaft 48 or 20 and in this arrangement the table 1 would receive motion direct from the wheel 27. In this arrangement the transverse motion of the wheel 27 and reproducer carrier 42 would be through the shaft 2, the same as hereinbefore described. In this arrangement the table 1 would be accelerated without increase of speed of either the governor or the motor.

In adapting a machine provided with the invention for playing standard records the speed controlling wheel 27 may be moved to a point near the center of the table 1 to give the disk the required speed and then the shaft 15 disconnected from the shaft 7, or the gear wheel 12 may be disconnected from the gear wheel 14, This change may be readily made and is easily understood by one versed in the art.

It will be understood from the foregoing that the speed of the disk under the stylus of the recorder or reproducer is uniform, thereby resulting in the production of a uniformity of sound and also enabling a greater scope of record to be provided upon a given area of disk, and the machine is capable of playing disks of much greater size than is possible under present conditions, and moreover by having the motion of the speed controlling wheel and the stylus across the disk at like speeds it is possible to place the phonograms much closer upon the disk than is possible by records of the present day.

I claim:

1. In speed regulating means for sound recording and reproducing machines, a rotary disk receiving table, a speed controlling wheel in frictional contact with the table, a shaft supporting the speed controlling wheel and having spiral engagement therewith, a governor mechanism adapted to be operated by the said shaft, and means for moving the speed controlling wheel across the table.

2. In speed regulating means for sound recording and reproducing machines, a disk supporting table adapted to have a rotary

movement imparted thereto, a speed controlling wheel in frictional contact with said table and having its outer edge beveled to facilitate movement of said wheel across the table in the operation of the machine and a governor-controlled support for the speed controlling wheel.

3. In speed regulating means for sound recording and reproducing machines, a rotary disk supporting table, a speed controlling wheel in frictional contact with the table, a movable shaft supporting the speed controlling wheel, a governor mechanism adapted to be actuated by means of said shaft, a screw shaft, a carrier engaging the speed controlling wheel and the screw thread shaft, and means for moving the carrier to disconnect it from the screw thread shaft and to clear the speed controlling wheel from the table to admit of resetting the speed regulating means.

4. In speed regulating means for sound recording and reproducing machines, a rotary disk supporting table, a speed controlling wheel in frictional contact with the table, a shaft supporting the speed controlling wheel and adapted to have a limited movement, a governor mechanism adapted to be actuated from said shaft, a screw shaft, a rod paralleling and disposed between the two shafts, a carrier mounted upon the rod to slide and tilt thereon and having engagement at one end with the screw shaft and at its opposite end with the speed controlling wheel, and means for imparting a pivotal and sliding movement to the carrier to admit of resetting the speed regulating means.

5. In speed regulating means for sound recording and reproducing machines, a rotary disk supporting table, a speed controlling wheel, a movable shaft therefor, yieldable means normally holding the speed controlling wheel in frictional contact with the table, a governor mechanism adapted to be actuated by means of the said shaft, a carrier mounted to tilt and slide and having engagement with the said controlling wheel, a screw shaft having engagement with the said carrier for moving the speed controlling wheel across the table, and means for moving the shaft supporting the speed controlling wheel to admit of resetting the speed regulating means.

6. In a machine for recording or reproducing sound, a rotary disk supporting table and an arm for receiving the recorder or reproducer, a speed controlling wheel in frictional engagement with the table, a governor-controlled support for the speed controlling wheel, a screw shaft for moving the speed controlling wheel across the table, a second screw shaft for moving the arm to carry the stylus across the disk, and means for operating the two screw shafts at like speeds whereby the speed controlling wheel and the stylus occupy a like distance from the axis of rotation of the table to cause that part of the disk in contact with the stylus to travel at a uniform speed.

7. In a machine of the character specified, and in combination with the disk receiving table, a speed controlling wheel in frictional contact with the table, a shaft supporting such wheel and driven thereby, a governor mechanism adapted to be operated by said shaft, a screw shaft for moving the speed controlling wheel across the table, and gearing connecting the screw shaft and the shaft for transmitting movement to the said table.

8. In a machine for recording or reproducing sound, a disk supporting table and an arm for receiving the recorder or reproducer, a speed controlling wheel in frictional contact with the table, a supporting shaft therefor, a governor mechanism adapted to be actuated by means of the said shaft, a screw shaft for moving the speed controlling wheel across the table, a resetting mechanism for the speed controlling wheel embodying indicating means, a screw shaft for moving the said arm to carry the stylus across the disk, indicating means having connection with the said arm to admit of properly positioning the stylus, and connecting means between the table and the screw shafts for moving the same in unison.

THEODORE FLETCHER.