

MULTIPLEX PHONOGRAPH.

The phonograph, wonderful as it is, has been rendered more useful and more enjoyable to everybody, and at the same time more profitable to exhibitors, by an exceedingly simple improvement recently completed and patented by Mr. George W. Moore, of Atlanta, Ga.

This improved attachment increases the capacity of the machine fivefold, the construction being such that five cylinders are held in position for instant use. The improvement does not in any way affect the working parts of the machine.

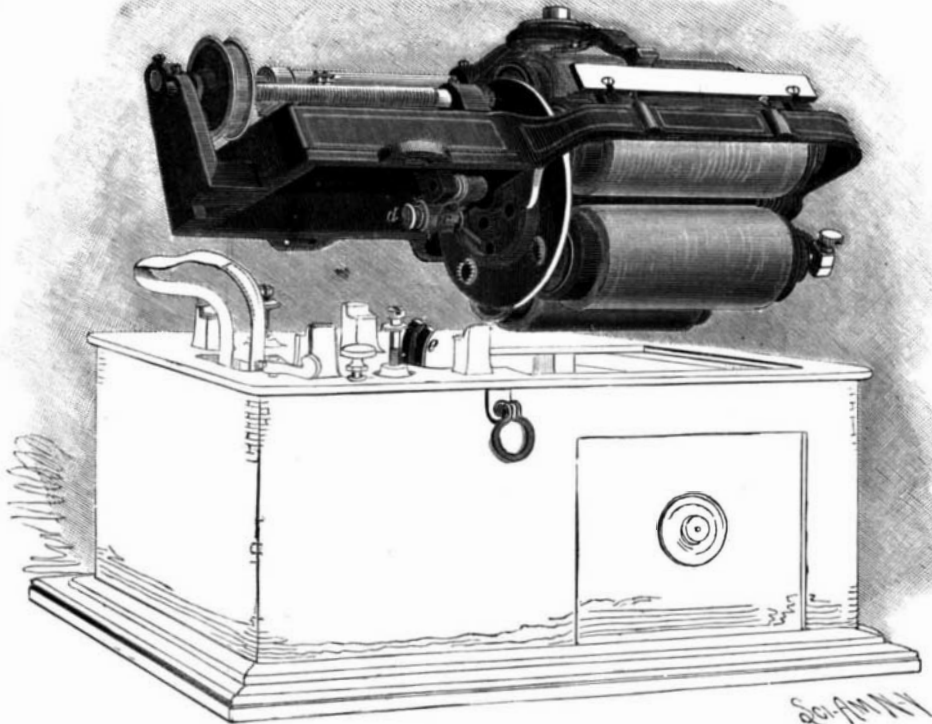
The attachment has a frame holding a screw-threaded mandrel, which is driven by a belt connection with the spring motor contained in the case which forms the base of the machine. In the space usually occupied by the record cylinder is placed a reel in which are loosely journaled five mandrels, each having at the end adjoining the screw a half clutch and a conical cavity. The clutch fits its counterpart on the end of the screw, and the conical cavity receives the conical end of the screw. This construction insures the centering of the mandrels and at the same time lifts the clutch end of the mandrel in the reel, so that it has no bearing at that point. The reel is capable of sliding longitudinally to permit of shifting the cylinders, and it is pushed forward by a spring having sufficient strength to hold the clutch in engagement while the machine is working.

In the end of the reel are five equidistant cavities, a, for receiving the pawl, b, as shown in the detail view. This pawl consists of a short stud held in a ball joint in the swinging arm, c, with the free end of the pawl pressed against the end of the reel by a spring. The arm, c, swings on a pivot concentric with the reel, and is provided with a spring for carrying it back against a stop at the point where the pawl enters one of the cavities, a, in the end of the reel. A stud, d, projects from the free end of the arm, c, in line with the axis of the pawl, b. This stud serves the double purpose of holding the ball end of the pawl in its cavity and of receiving the fork, e, by which the arm is swung when it is desired to shift the cylinders. The fork, e, is attached to a rod, f, which projects through the front of the phonograph base. After having moved the reel carrying the record cylinders one-fifth of a revolution, the arm, c, being carried back by its spring, the pawl, b, drops into one of the cavities, a, and when it is desired to shift the record cylinders, a forward movement of the rod, f, causes the arm, c, to swing, thereby swinging the pawl, causing it to shift from an oblique position, bringing it parallel with the axis of the arm, c, thereby increasing the distance between the reel and the arm, disengaging the clutch connecting the mandrel with the screw, and then moving forward the reel one-fifth of a revolution until the pawl, b, strikes the stop, g. When the arm, c, is returned to its original position, the spring on the reel carrying the record cylinders moves the reel forward, bringing the clutch of the next record cylinder in order in line with the screw. The continued movement of the arm withdraws the pawl from the cavity in the reel and carries the pawl back ready to be engaged with the next cavity in the reel.

This simple and ingenious contrivance enables the user of the phonograph to shift from one record cylinder to another even while the phonograph is in operation, the reproducing apparatus being adjusted to admit of this movement. The engagement of the pawl with the stop after the movement of the reel prevents the throwing forward of the reel by its own momentum.

This attachment greatly increases the capacity of the phonograph and renders it more valuable for business purposes. It has been shown by months of constant use that a phonograph with this attachment will net the exhibitor much larger profits than the single machines. It is obvious that the number of cylinders need not be limited to five, as the principle involved can be as readily adapted to ten or twenty as five.

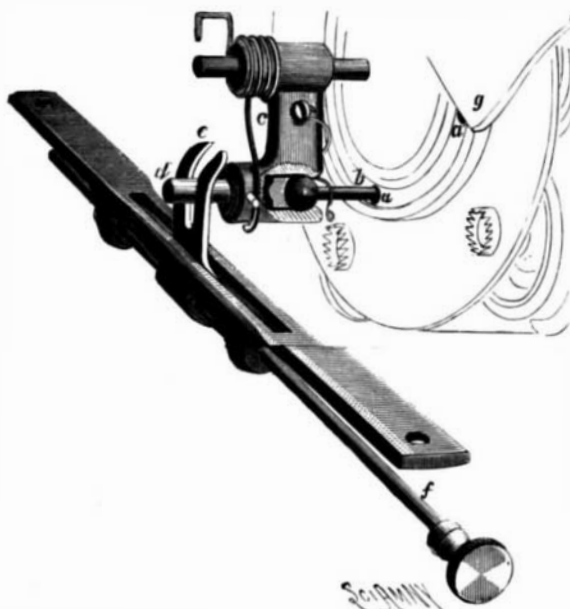
As a "nickel in the slot" machine, reproducing the songs and



PHONOGRAPH WITH FIVE CYLINDERS.

recitations of celebrated artists, and the latest and most popular airs of musical composition, the phonograph has achieved great fame and popularity. It has been exhibited all over the globe, winning praises everywhere.

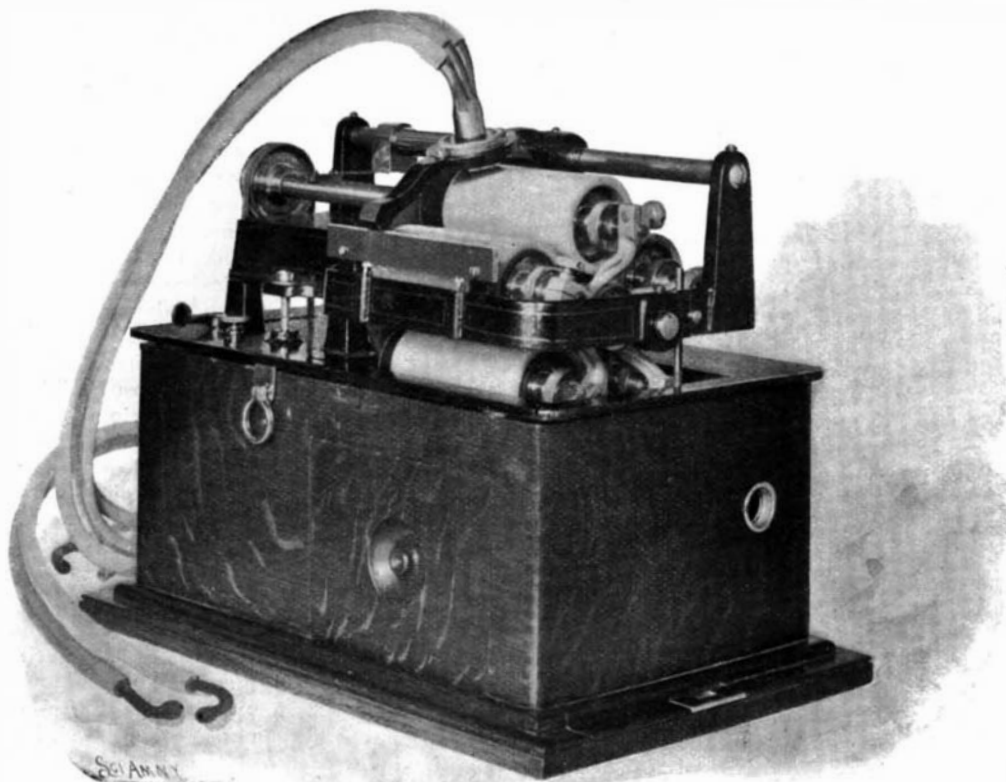
If the capacity of the machine had been larger, its



THE SHIFTING MECHANISM.

usefulness would have been greater, and the profit arising from its exhibition would have been proportionately large.

To this idea is due the multiplex attachment. Having five cylinders where the old phonograph had only one, the multiplex necessarily increases the resources and commercial value of the machine in proportion to



THE MULTIPLE PHONOGRAPH.

the number of additional cylinders, while occupying the space of only one machine.

This useful improvement in phonographs is controlled by the Multiplex Phonograph Company, 1395 Broadway, New York.

Victorian Wars.

The Army and Navy Gazette calls attention to a remarkable feature of the Queen's reign, the enormous number of wars, "little and big," that have marked its progress. Scarcely a twelvemonth of this period has passed, indeed, without finding England at war in some part of the world. Here is a list of the principal campaigns and expeditions: Afghan war, 1838-40; first China war, 1841; Sikh war, 1845-46; Kaffir war, 1846; second war with China, second Afghan war, 1849; second Sikh war, 1848-49; Burmese war, 1850; second Kaffir war, 1851-52; second Burmese war, 1852-53; Crimea, 1854; third war with China, 1856-58; Indian mutiny, 1857; Maori war, 1860-61; more wars with China, 1860 and 1862; second Maori war, 1863-66; Ashanti war, 1864; war in Bhootan, 1864; Abyssinian war, 1867-68; war with the Bazotees, 1868; third Maori war, 1868-69; war with Loo-shais, 1871; second Ashanti war, 1873-74; third Kaffir war, 1877; Zulu war, 1878-79; third Afghan war, 1878-80; war in Basutoiland, 1879-81; Transvaal war, 1879-81; Egyptian war, 1882; Soudan, 1884-85-89; third Burma war, 1885-92; Zanzibar, 1890; India, 1890; Matabele wars, 1894 and 1896; Chitral campaign, 1895; third Ashanti campaign, 1896; second Soudan campaign, 1896. The same paper gives an account of hardships during the present Soudan campaign.

The Second Brigade was ordered to march from Suarda to Sadin Fanti, twenty-one miles distant across the desert, instead of following the river. The heat was intense; the men were in heavy marching order, water was short. There were twenty-nine cases of sunstroke, of which two were instantly fatal. Numbers fell out and soldiers were in the most exhausted condition.

The First Brigade fared still worse. They were ordered to march across the desert, each man carrying his rifle, his kit, two days' rations and a hundred rounds. The storm that was threatening when they left came upon them before they reached the first watering place. Nearly three hundred men fell out, of whom nine died, and before they arrived at Sadin Fanti one thousand seven hundred men had fallen out, and of one battalion of seven hundred men only sixty marched into their quarters.

Rain Experiments.

L. Errera describes in *Terre et Ciel*, says Engineering, a very simple manner of producing a rain, not of water, but of alcohol, and the winds which accompany its formation. That he is by no means the first in the field does not make his experiment less interesting. A glass cylinder about 8 inches high and 4 inches in diameter is half filled with alcohol of 92 per cent. The cylinder is covered with an ordinary china saucer and slowly heated in a water bath, so that the whole becomes warm without the alcohol beginning to boil. The vessel is then taken out of the bath and placed on a table. Vapors soon begin to condense on the saucer, clouds form, and tiny regular drops fall down in vertical lines into the alcohol. The drops have an average diameter of 40 or 50 millionths of a millimeter, but they vary in size. The rain continues for half an hour. The upper part soon clears, and the condensation takes place some distance below the saucer; thus we have the ocean, the clouds above, and the serene sky higher up still. If, after heating the vessel, the hot saucer is suddenly replaced by a cold one, storms can be observed. As one side of the cylinder will not rarely be a little colder than the other, ascending currents can often be noticed on the one side, descending on the other. If the warm part is cooled, the currents change direction. The arrangement lends itself to other experiments.

TRIESTE recently had a rainfall of 6 1/8 inches in 12 hours.