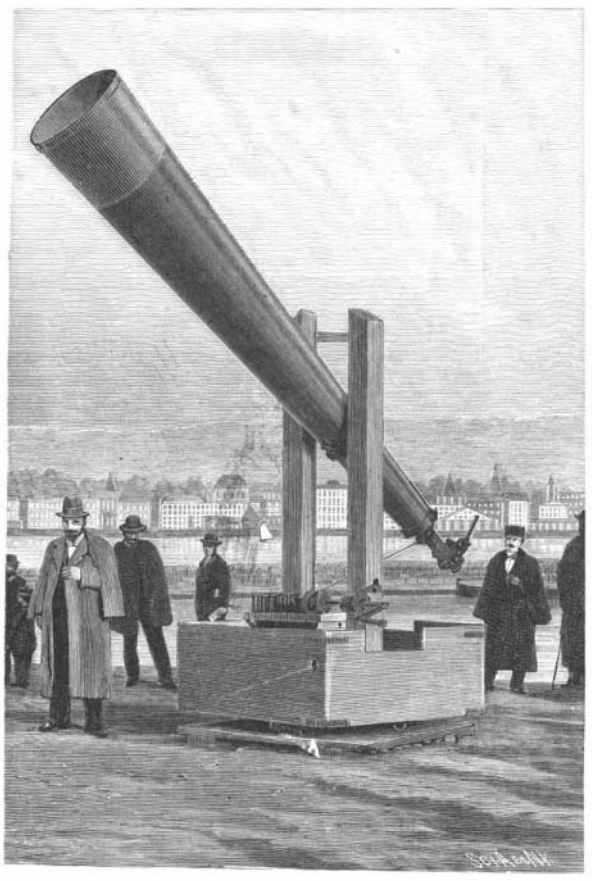
A NEW WEATHER CANNON.

Ever since "weather shooting," as it is called in Germany and Switzerland, met with such pronounced success in Styria, upper Italy, Hungary, and France, meteorologists have been engaged in a very wordy battle as to the merits of the scheme. That something has been accomplished cannot be denied. Indeed, so successful have been the efforts in preventing hailstorms in upper Italy that since the experiments of 1898 some twenty thousand stations have been established. At the Agricultural Congress held in Padua last November by far the greater number of the members were in favor of the building of "weather-shooting" stations. The congress was very decidedly impressed by an account of one of last summer's hailstorms in the vicinity of Vicenza. So violent was this particular storm, the story runs, that for miles the land was completely devastated. But in this ravaged section, one spot was spared, because there it is asserted a number of stations had been located which had warded off the danger.

The shooting apparatus hitherto used has been very primitive in construction. For a cannon, a mortar with a funnel-like barrel was often used. In some places the funnel is fixed vertically in masonry. This method of mounting the cannon is not only crude, but also dangerous, for often enough serious accidents have occurred. In order to avoid these dangers as well as to improve the apparatus in general a Hungarian editor named Kanitz has devised a simple form of cannon which is essentially a breech-loading mortar



THE KANITZ WEATHER GUN

some thirty feet in length. The mortar is journaled in a rotatable carriage, so that it can be raised and lowered and swung from side to side. The charge is a metallic cartridge of blasting powder. After the discharge a loud, shrill whistling is heard, lasting for about fourteen or fifteen seconds. French and Italian wine-growers insist that by means of the gun clouds are torn asunder, so that rain instead of hail falls.

The grape growers of five departments of the French Alps have formed an alliance for buying cannon and powder for next summer. The Italian government has such faith in weather-shooting that it supplies wine-growers with powder at the rate of three cents a pound.

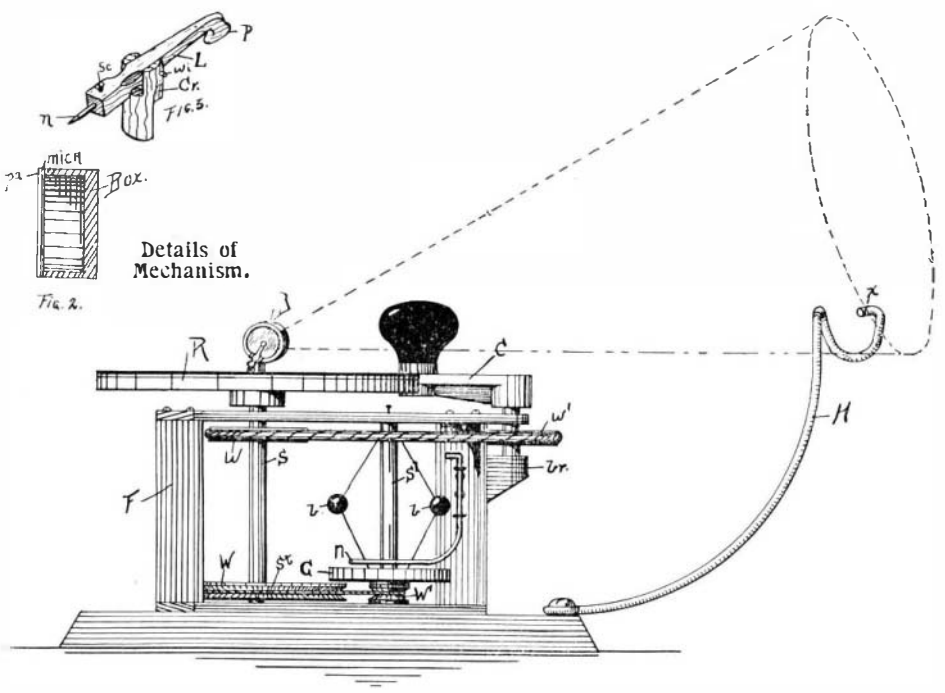
HOW TO MAKE A GRAMOPHONE.

BY WILL. B. STOUT.

A gramophone which will produce very good results with the ordinary gramophone records may be made, with very little work, by any one who can use a jackknife. It costs nothing, except for the record, and will certainly repay any boy or man who will spend a few hours making it.

As shown in the drawings, it consists principally of two parts; one for rotating the disk or record, and the reproducing part. The disk or record is supported on the circular piece, *R*, cut from half or three-eighths-inch pine, and mounted on the shaft, *s*, which, in turn, revolves in the wooden frame, *F*, which is of half-inch pine, an inch and a half wide. On the shaft, *s*, are also two pulley wheels, *w* and *W*, the former two inches in diameter, and the latter three and a half, both grooved to receive a round belt. These, too, may be cut from half-inch pine. The smaller wheel, *w*, is mounted just below the upper crosspiece of the frame, the larger one, *W*, just above the lower crosspiece, as shown.

The governor, which is mounted next to the record axle, but far enough away in the frame to clear the wheel, *W*, consists of a shaft, s^1, with the three-quarter-inch pulley, W^1, cut on it, on which is mounted a wheel, *G*, rimmed with a strip of lead from an old lead pipe. This wheel fits loosely on the axle, s^1, so that it can slide freely up and down on it. The lead rim should be at least an eighth of an inch thick and half an inch wide, or the width of the wheel, *G*. Running through two awl holes a quarter of an inch from the axle, s^1, in the wheel, *G*, is a string or small wire, as shown, which runs at the top through an awl hole driven crosswise through the axle, s^1. On this string, which is fastened from slipping through the awl holes in the wheel, *G*, by knots, are two split shot or fish-line sinkers. When the shaft, s^1, is revolved, the balls, *b*, fly out, and, when sufficient speed has been reached, lift the weighted wheel, *G*, till it presses on the wire stop, *n*. This stop is a loop of wire, fastened to the side of the frame so as to be adjustable up and down to regulate the speed. At the opposite end of the frame to the disk, or record axle, *s*, is mounted a second two-inch pulley wheel, w^1, between an extension of the upper crosspiece and a small wooden bracket, *br*. It is connected with the pulley, *w*, by a belt, and is turned by means of a crank, *C*. The pulley, *W*, is also connected with the governor pulley, W^1, by a waxed string pulley belt, *St*. By this means, when the crank, *C*, is turned, the wheel, *w*, is turned through the medium of the belt connecting the pulleys, *w* and w^1. Thus the pulley, *W*, is turned, and, in turn, the pulley, W^1, and axle and governor, as shown, the governor regulating the speed. The upper part, or surface, of the wheel, *G*, should have glued upon it a piece of flannel, to prevent undue noise when the wire, *n*, rubs upon it, and to increase the friction. The disk, *B*, should run as true as possible, and the axle should project up through it a quarter of an inch, and be as large around as the size of the central hole in the record. A record is seven inches in diameter. The sound-reproducing part consists principally of the "sounding box" and its lever, and the horn. The box may be an old wooden pill box, or may be cut from inch pine. It should be circular, about an inch and a half in diameter, inside measurement, and an inch deep. If cut of inch pine the central hole will be cut clear through the piece and a quarter-inch backing, or bottom of the box glued on. A three-quarter-inch hole is drilled in one side of the box to receive the horn. To the front of the box is glued a thin diaphragm of isinglass, outside of which is glued a paper ring, or washer, as large as the rim of the box. The writer used one machine for a while which had a tight paper diaphragm; but the isinglass is better. The box is shown in section in Fig. 2. The lever (Fig. 3) is cut out of hard wood in the shape shown; the distance from the wire axle, *wi*, to the center of the part, *p*, being the radius of the box outside. The other end of the lever is a trifle shorter than the inner end, and holds at its end the needle, *n*, in a small awl hole. This needle is held



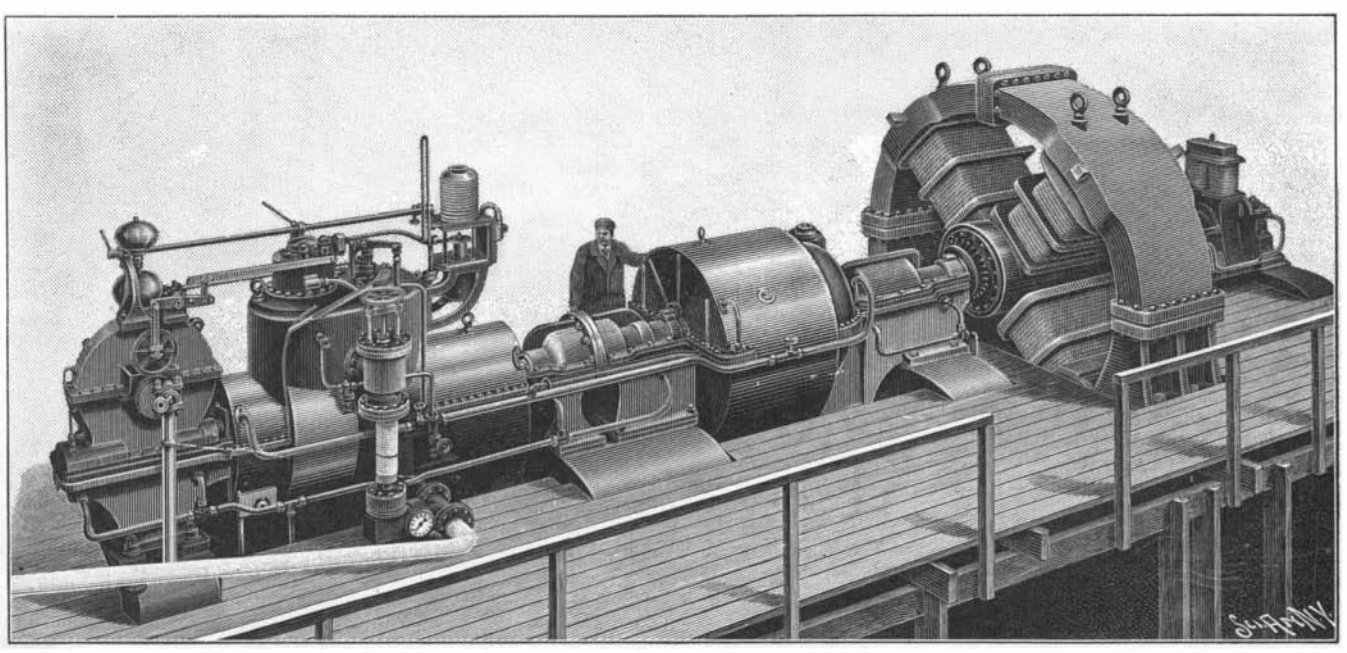
A HOME-MADE GRAMOPHONE.

in place by a small screw, *Sc*, so that its projection from the wood may be adjusted till the clearest effect is produced. The lever is mounted in a crotch, *Cr*, cut also from hard wood, the axle, *wi*, being a wire. The crotch part is glued on to the side of the box at an angle of about 120 deg., with the hole already cut to receive the horn, the part, *p*, of the lever being fastened to the center of the mica or isinglass diaphragm with glue or sealing wax. The horn, which may be made of stiff bristol board or tin, is now thrust into the hole in the side of the box or, better, fastened to the outside, so as not to obstruct the hole. If of pasteboard it may be glued in place by slitting the end and gluing on the flaps thus made. If of tin it may be soldered to a tin ring or band surrounding the box, or the flaps may be fastened on with brads.

The disk-turning mechanism is now fastened cornerwise on a wooden baseboard and a wire holder, *H*, fastened with a screw to one corner. This should reach up a little higher than the level of the record, but this may be adjusted by bending the wire. Also the distance from the needle to the guard may be adjusted in the same way till the right weight rests on the needle. A short "hook," as at *x*, may project in through a hole in the horn or funnel to keep it from turning. When all is ready put on your record, with the needle resting in its groove at the outside edge, and turn the crank. You will find by experiment how best to adjust the different adjustable parts to get the best results, but you will be surprised at the results you obtain with the crudest made machine. While not up to a machine-made product, yet it is not far behind, and for the satisfaction to the maker for the time spent in its manufacture, it "can't be beat."

PARSONS 1,000-K W. TURBINE AND ALTERNATOR.

We illustrate a 1,000-kilowatt turbine and alternator, one of two built by C. A. Parsons & Co., of Newcastle,



PARSONS 1,000-K. W. STEAM TURBINE AND ALTERNATOR AT ELBERFELD, GERMANY.

Steam consumption on test equivalent to 11.9 pounds per indicated horse power per hour.