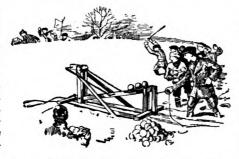
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Heavy Artillery for a Snowball Fight

A RMIES with the most improved engines of war usually win. So with snow battles. The "army" that first attacks with the snowball cannon described below and follows up with a massed attack of infantry, will force the "enemy" to surren-



The base A consists of two pieces 2 in. by 4 in. by 5 ft., planed smooth and one end of each tapered. One foot from the tapered ends bolt two vertical pieces, B (2 in. by 4 in. by 2 ft. 2 in.) to the inside of the bases,

BOARD AMMUNITION HOLDER TRIGGER

Construction of the snowball cannon

which should be laid parallel and level. With four bolts, bolt C (2 in. by 4 in. by 1 ft. 4 in.) horizontally between the tops of the two pieces. This brings the two pieces A about 6 in. apart. Then bolt cross pieces D and E (1 ft. 6 in. long) to each end so the pieces A will be exactly parallel. Two braces should be bolted to the sled from B down to A, as shown, to keep the upright B rigid and vertical.

The sling or catapult G is a piece of $\frac{7}{8}$ -in. oak or ash board 4 in. wide and 4 ft. 3 in. long. Pivot this freely between the two uprights B, using a carriage-bolt with pieces of rubber hose for washers.

long bolt is driven through the end of Cand another through G 2 ft. 3 in. from the pivot. Secure them in place with washers and locknuts and connect the ends of the bolts securely with a pair of strong spiral springs, as shown. These must be strong, of equal tension, and of a normal length to raise the lever G nearly upright.

The trigger J is made of a piece of stout oak or ash about 2 in. square and 15 in. long. Hinge one end to the cross piece E with a strap hinge at the upper end, screw an angle-iron as shown, and halfway between fasten a light spiral spring similar to a curtain spring. Tie the pull-cord to a screw-eye at the back of the trigger. Just in front of the trigger bolt the guide F to the front of E. This is a piece 2 in. by 4 in. by 15 in., with the top end slotted down 2 in. wide for about 6 in. to receive the end of G. Attach the free end of the trigger spring to the back of F so it pulls J forward. A metal plate should be fastened to the end of G to engage the angle-iron on J. The ammunition holder is a wide board about 15 in. long, with three tin can covers to hold the snowballs. A section of old automobile tire M acts as a buffer and a screw-eye in the center of D serves to hold the drag-rope.

In action, the rear end is raised or lowered to get the desired firing position, as determined by practice, and the cross pieces are weighed down with snow to

steady the cannon.

period of dipping till the acid has no further effect, after which the plates are ready for charging and may be assembled in the Wooden separators about 1/16 in. thick are placed between the plates.

Obtain regular separators if possible, for the cost will be trifling. If you make your own, use thin wood perforated with 1/16-in.

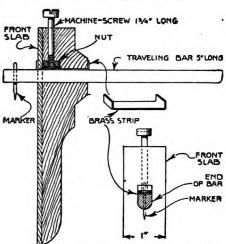
Use direct current for charging. For a 6-volt battery the charging voltage should be from 8 to 12 volts. Fill the cells with acid mixed to test 1100 with the hydrometer, and use nothing but distilled water. After being charged the first time, the positive plate will turn a reddish brown.

The battery will not work at full strength until after being charged and discharged a few times. You can use a charging current of 4 amp. to start and 2 amp. to finish. The acid should test 1300 when fully charged. If the battery is to be moved around, the tops must be sealed up and the plates fastened securely so that they will not move.—HARRY L. GRAY.

Make This Handy Gage for Your Workshop

HERE is a useful little gage that will remain set in any desired position and is easily made.

Select a clean, straight-grained piece of maple and cut it to the pattern shown. On



This makes a neat and durable gage

the finished flat surface center 11/4 in. from the end and bore a \(^3\ext{k-in.}\) hole through the block. Trim the top of the hole square with a chisel.

Through the end of the block drill a 3/16-in. hole down to meet the cross hole, and where it meets it, chisel out a recess to hold the nut of the machine bolt that passes through it. Glue the front slab on, perforate it at the cross hole, and then bend a piece of brass, as shown, to slip through the cross hole and hold the nut in place.

Shape the traveling bar to fit the hole snugly and drill a fine hole ¼ in. from the end for the marker, which is a piece of steel umbrella rib filed to a point. By tightening the screw the bar will stay firmly in any position.

When stained and polished, this is a handsome little gage.—L. H. KIRBY.

DENTS can be removed from the fenders or body of an automobile by using a pillow of sand. Fill a canvas sack with sand, fasten a board to one side, and place the soft side against the cavity. Then ham mer the ridges with a wooden mallet or s soft hammer.

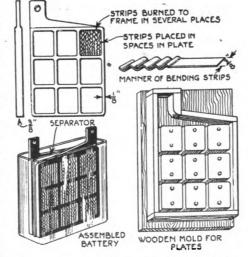
Building a Serviceable Storage Battery

ELECTRICAL experimenters may build a good serviceable storage battery at little cost. One cell should be allowed for every two volts and each cell may contain two or more plates, according to the desired capacity. A two-plate cell will give about 10 amp. for one hour when fully charged if the plates are about 4 in. by 5 in.

The containers may be of glass or hard rubber. Make a wooden mold for the lead framework of the plates as shown, or, if you can obtain molding-sand, mold them from a wooden pattern. The plate should be 3/8 in. thick when finished. Provide a quantity of sheet lead 1/16 in. thick. Cut this into strips 3/8 in. wide, bend as shown and press into the spaces in the plates, honeycomb fashion.

The plates are then ready to be "pasted." You will need some sulphuric acid, red lead, or litharge. Six ounces of the latter will be sufficient for six or eight plates. Mix the acid with ten parts distilled water and enough of the litharge to make a thick paste, which is pressed into the spaces in the plates. Enough for only one plate should be mixed at a time, as it sets very quickly. The plates are then baked in an oven until hard.

Curing is accomplished by wetting the plates several times and allowing them to



How to mold and assemble battery plates

dry. The first time they should be merely sprinkled with the diluted acid. As the acid has considerable effect on the uncured plates, they must be wetted gradually. After being sprinkled and dried, the plates may be quickly dipped again and, when dry, dipped for a longer time. Increase the