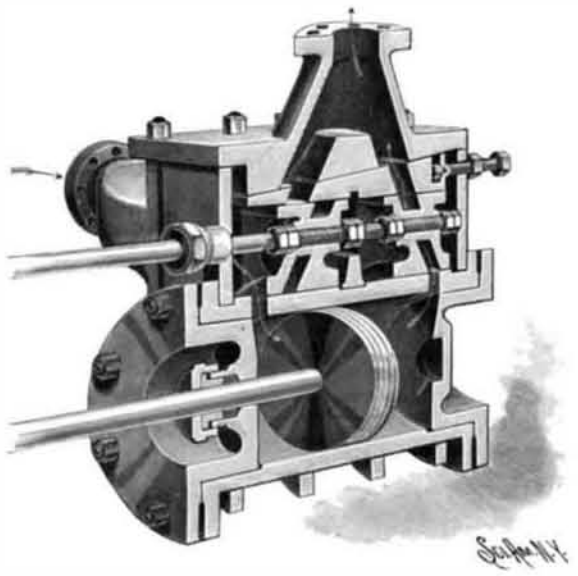
AN IMPROVED SLIDE VALVE.

According to the improvement represented by the illustration, the steam chest is connected at its ends with the cylinder ports, and the slide valve operating in the chest has exhaust ports registering with the cylinder ports and with ports in an adjustable plate connected with the exhaust chest. The invention has been patented by Mr. Albert B. Van Wegen, of Coudersport, Pa. The adjustable plate, in which are ports registering with the exhaust ports, engages the tops of the valves and is fitted to the underside of the exhaust chest. It is wedge-shaped and is adjustable by means of a screw, to take up wear, so that a steamtight joint



VAN WEGEN'S BALANCED VALVE.

is at all times formed between the valves, the plate, and the exhaust chest. The valves are connected with each other by a valve stem, nuts screwing on the threaded inner end of the stem for properly adjusting the valves relative to the ports. The bearing surface of the valves is preferably shaped according to the exterior surface of the cylinder, on which a circular valve face is thus formed. The several parts are fastened in position by means of clips passing around the cylinder and whose ends pass through and are tightened up by nuts on flanges on the outer edges of the exhaust chest. With this valve arrangement full provision is made for delivering the live steam directly through straight ports, and the valve freely moves within the steam chest without requiring much pushing or pulling power.

A MACHINE TO HARVEST STANDING CORN.

As this machine is drawn between two rows of standing corn, the stalks severed by the knives are received by the farmer or his helper as they naturally fall back on the platform of the machine, the stalks being laid with their butts rearward on a dumping platform or cradle, where they may, when a sufficient quantity has accumulated, be conveniently tied in the form of a

AN IMPROVED CORN HARVESTER.

shock, and deposited upon the ground in an upright position. The improvement has been patented by Messrs. Charles A. and Harold A. Low and Albert M. Messenger, of Lake View, Iowa. The cutting knives are secured upon beveled side portions at the front of the platform, there being guards at the rear outer edges of the knives, and at the rear of the platform on each side is a railing formed of two uprights and an upper cross bar. Between these railings, and fulcrumed upon the rear uprights, is a dumping platform or cradle, which normally lies horizontally upon the platform, but it may be raised or lowered by a forwardly extending handle. A flexible shaping strap, preferably formed of spring metal in a substantially U shape, is centrally attached to the dumping cradle, and pivoted to the rear uprights is a guide yoke whose shanks extend downward to the cradle, their lower ends having friction rollers adapted to engage the under faces of the side bars of the cradle. A retaining chain connects the shanks of the yoke with the main platform of the vehicle, limiting the downward movement of the yoke as the shock is being dumped. There is on one of the uprights a twine box and on the opposite upright is a catch to receive and hold the free end of the wire or cord, which may thus be conveniently arranged for the binding previous to commencing the formation of a shock. By means of the shaping strap the stalks are first drawn closely together before tying, after which, upon lifting the cradle, they are tipped over upon the ground. As the machine is drawn forward after dumping the shock, the cradle is restored to a horizontal position, the guide yoke being simultaneously slipped from over the shock, and, by the engagement of the rollers upon its shanks with the cradle, the yoke is carried to its normal angle, tipping slightly to the rear from the vertical.

New Agricultural Machines Called For.

Secretary of Agriculture Morton declares that the plow used by the American farmer is an enemy to fertility, and that the invention of some means of stirring up the soil and subsoil is very badly needed. He believes that the common plow, when used in stoneless soils, packs every furrow it passes over and renders it impervious to rain. The secretary explains this fact as follows:

"The draught of the plow is downward to such an extent that the full force of the team's strength is exhausted in pressing the bottom of the furrow into a polished trough for the conduction of rain down the side hills. It is necessary to stir up the soil and subsoil for eighteen inches. If, for instance, it were possible to loosen the soil and subsoil down for three feet all over the State of Nebraska, we could then, with an annual rainfall of twenty inches, make abundant and profitable crops. Until deep plowing—through subsoil tillage—becomes universal in that commonwealth, there will be, year in and year out, no certainty of remunerative crops.

"Prof. Shaler, of Harvard, estimates that the present inefficient and ill resulting methods of plowing, especially upon undulating lands, cost the agriculturists of the United States 250 square miles of soil each year by erosion. Everywhere in Nebraska, where torrential rainfalls are so frequent, the side hills verify Prof. Shaler's theory as to the annual waste of washed lands.

"This is a matter of such vast importance," continued the secretary, "that I have asked Chancellor Canfield, of the University of Nebraska, to bring it before the sixteen hundred students in that institution and ask them to try and think out a new implement of agriculture which shall supersede the plow. It is a subject upon which the inventive minds of educated farmers should be concentrated. A proper solution of the difficulty will facilitate subsoil tillage and at the same time save both the crops and the soil.

"In my judgment the coming implement should spade the land and turn it over, as a man who pushes the spade with his foot into the ground, and, drawing the spade out, turns the soil upside down by the twist of his wrists. Possibly a rotary spader could be invented. Possibly an implement consisting of a large number of revolving knives could be made so that in passing over the surface of the field it should chop up the soil and subsoil for two feet in such a manner as to render the percolation of the rainfall, down to the depth at which the ground has been stirred, very easy and perfect."

[We think if the records of the Patent Office are examined, various devices for subsoil stirring, also spading and digging machines, will be found.—Editor SCIENTIFIC AMERICAN.]

Soap and Washing Compounds.

Two molecules of sodium sulphate and one molecule of sodium bicarbonate are dissolved in water. The solution is boiled and allowed to crystallize, when a new body, termed "a basic carbonated sulphate of soda," is formed, the crystals of which salt possess the following composition:

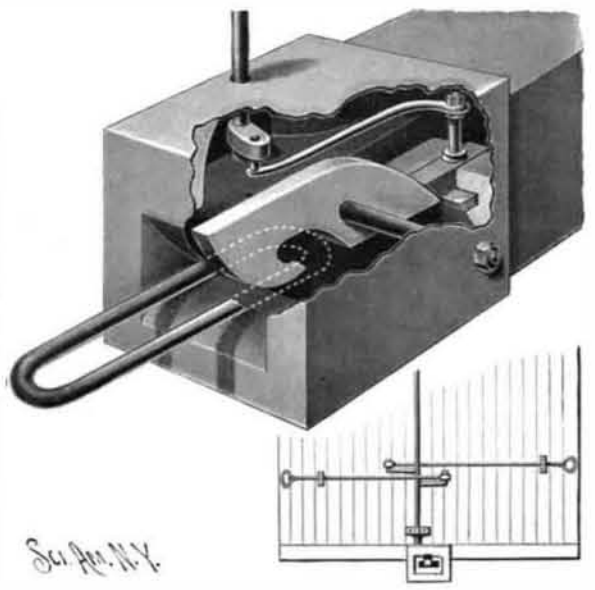
Sulphuric anhydride	21·27
Carbonic acid	5·15
Soda	31·50
Water of crystallization	42·08
	100·00

It is feebly alkaline, and is said to possess great detergent power.

In using this product for the manufacture of soap, six parts of fatty acids are heated to 120 degrees to 130 degrees C.; then five parts of the "basic carbonated sulphate of soda" (melted in its water of crystallization) are gradually added, and the whole boiled until the fatty acid is saponified. A washing powder may also be prepared by grinding together the sodium sulphate and bicarbonate in the dry state. It is said to be less hurtful to the skin and fabrics than ordinary soap is.

AN AUTOMATIC CAR COUPLING.

The illustration represents a simple form of coupling in which the old style of link is used, the coupling together of the cars being effected automatically, while the cars may be uncoupled from either side or from the car roof. For this improvement a patent has been granted Mr. Henry C. Morton, of Mint Hill, Mo. In a chamber of the drawhead is pivoted a latching hook having a downwardly curved hook nose, while the rear end of the hook has its top edge convex curved. Opposite and adapted to bear upon the rear end of the hook body is arranged a slide block having a vertical



MORTON'S CAR COUPLING.

post connected by a horizontal curved bar with an arm on the lower portion of a vertical shaft, the latter being extended up to the roof of the car, where it is provided with a hand wheel. On the vertical shaft are also two crank arms, just above the drawhead, as shown in the small view, a pull bar extending from each crank arm to one side of the car. When two cars are to be coupled, the link is introduced in one of the drawheads and held in horizontal position by the latching hook as indicated by the dotted lines, the coming together of two cars then causing the hook of the approaching coupling to slide upon and over the end of the coupling link, and drop by gravity to the locked position. When the cars are to be uncoupled, the train man, by means of the hand wheel or one of the pull bars, rotates the shaft to move forward the slide block, thus depressing the rear end of the hook and raising its front end, whereby the link is released.

A CONVENIENTLY ADJUSTABLE CHAIR.

The chair shown in the picture has a flexible back and seat, and is readily adjustable to permit one to sit or lie at any desired inclination. It has been patented by Mr. Hermann Evers, of Mazatlan, Mexico. The illustration represents the chair folded up, in extended position for lying down, and in a more upright position, with its foot and leg extension arranged to form

EVERS' FOLDING CHAIR.

a footstool, although, as will be readily seen, these are only a few of the various adjustments provided for. Its rectangular pivoted frames, supporting the seat webbing, are held in desired adjustment by the engagement of a cross bar connecting the pivoted legs with notches in the lower side bars, after the usual style of steamer chairs, and to the front ends of the side bars is hinged a foot and leg rest. The hinge connection consists of links and a cross bar, forming a double hinge, and the front end of the leg rest is supported by a frame adjustable to any desired position for sitting or reclining, or permitting the extension to be folded back underneath and fastened to the chair frame, when the chair may be used as one without an extension.