tennial year, it was known that the old landmark in the Montecito Valley was to be cut down and a portion of it removed to the exposition at Philadelphia; but it was whispered that relentless Age, who is no respecter of grapevines, was beginning to impair its vitality, and that the inevitable was only hastened a little by the intervention of man.

No record was kept of the time of planting, but from events connected with the family upon whose ground it grew, it was believed to be seventy-five or a hundred years old. The measurement of its trunk is given as three feet ten inches in circumference, and the arbor about seventy-five feet square. Its death was believed to be premature, the result of changing the course of a small stream that had flowed near its roots.

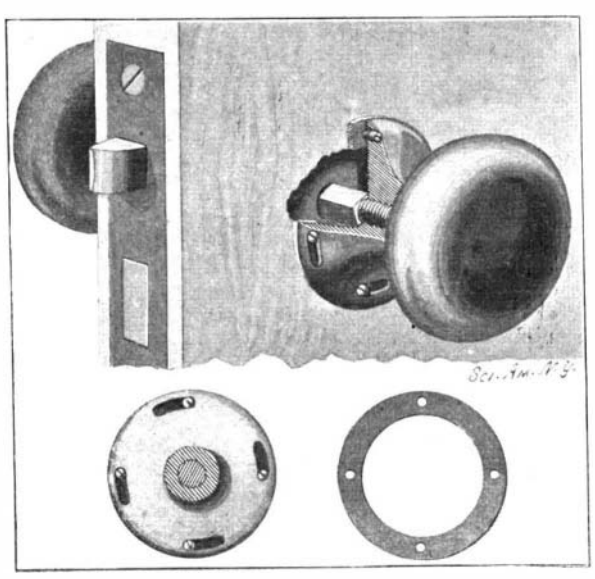
But another vine nearby, a cutting from the original, had attained to nearly this size, so Santa Barbara could still boast of having "the biggest grapevine in the world." In '99 this vine succumbed to a disease of the roots, perhaps invited by age, and its body now rests in the Santa Barbara Chamber of Commerce. Its irregular trunk attained a girth of four feet four inches at eighteen inches above ground, or five feet seven inches at forty-two inches, and its maximum yield was four tons in a season. It was believed to be seventy-five years old.

In the Carpinteria Valley, a few miles further from the city, a third vine has surpassed both of the others in size. It was planted in 1842 by Joaquina Lugo de Ayala, and has therefore just completed its three-score years. The first election in Santa Barbara County under American rule was held beneath its ample shade. This latest candidate for the world record is double from the surface of the ground up; the two parts are knit together in a David-and-Jonathan-like embrace to a height of about five feet seven inches, where they separate into huge branches, the largest having a circumference of three feet. Six inches above the ground the vine measures eight feet five and a half inches in circumference, and it covers an area one hundred and fifteen feet square (the whole back yard), sixty posts supporting the framework. The owner says that, were provision made, it would spread over a greater surface, but it is pruned every year. Fabulous tales are told of the grapes this vine produces. That it did actually yield ten tons in a recent season seems to be authentic.

An effort was made to secure a part of the original Montecito vine—taken to Ohio after the Centennial—for the Santa Barbara exhibit at the World's Fair, but terms could not be made with the owner. At the time of the succeeding Mid-Winter Fair at San Francisco, an offer of a thousand dollars for the Carpinteria vine was refused, else its lease of life would have been cut short.

DEVICE FOR SECURING DOOR-KNOBS.

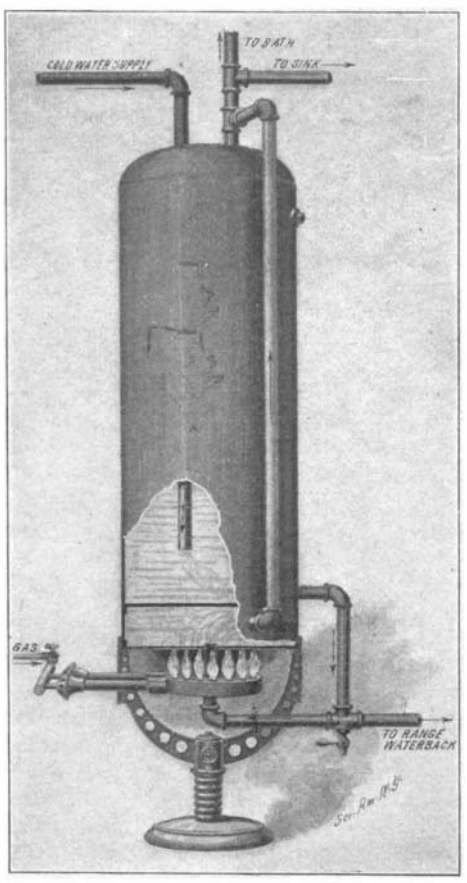
By means of the invention described below, idle movement of the door-knob is avoided and the knob is prevented from becoming loose on the spindle or from being detached therefrom. The natural operation of the parts continually tends to tighten the knobs on the spindle, and just sufficient movement is allowed to operate the latch. Our illustration shows an ordinary door lock provided with this improved device. The spindle which operates the latch is threaded oppositely at each end to engage the door-knobs. The knobs are rigid and integral with the shanks and roses or escutcheons. Fastened to each side of the door and surrounding the spindle is a bearing-annulus. Against these annuli the roses or escutcheons bear so as to turn thereon, and this turning movement is limited by pins or screws carried rigidly on the door and projecting through the annuli into arc-shaped slots formed in the roses of the knobs. The slots are of such length that they will allow the knobs the movement necessary for throwing the bolt of a lock. In assembling the parts the knobs are screwed up on the ends of the spindle until the roses or escutcheons bear snugly against the annuli, and the pins are projected respectively through the slots and through the holes in the annuli, thus holding the latter in position. It is evident that this arrangement securely holds the knobs, prevents idle movement, and permits just sufficient movement for operating the latch. Patents for this invention have recently been granted to Mr. Thomas G. Leslie, of East Melbourne, Victoria, Australia.



DEVICE FOR SECURING DOOR-KNOBS.

A SUMMER WEATHER WATER BOILER.

Probably every housewife who has perspired through a hot summer's day in the small kitchen of a small city apartment, will appreciate at its true worth the simple arrangement shown in the accompanying engraving. Rather than keep up a hot fire during the summer months, many housekeepers do their cooking on small oil stoves and gas ranges. The convenience of this arrangement is, however, offset by a serious objection, namely, the lack of a ready supply of hot water; for the water has to be heated in kettles or pails on the limited surface of the gas range. J. P. B. Sadtler & Co., of 231 Park Avenue, Baltimore, Md., are the makers of a boiler and heater particularly adapted for hot weather service.



A SUMMER WEATHER WATER BOILER.

As illustrated, the boiler is supported on a suitable standard and is heated by a small gas heater. The heater is provided with adjustable valves for the admission of air and consists of a perforated chamber through which the mixed air and gas flow so as to produce a hot blue flame. This provides a very intense heat of limited distribution, so that its energy is confined to the boiler and does not appreciably affect the general temperature of the room. The heater is absolutely odorless and, being situated under the boiler, takes up no room. There are no coils nor complicated mechanism to get out of order and its simplicity should appeal to all. But aside from this an important feature of the apparatus may be found in the construction of the boiler. It will be seen that the boiler is divided into two sections by a false bottom. The lower section being very shallow will be rapidly heated by the burner. Water from the upper section passes out through a pipe near the false bottom, and passing through the center of the burner enters the lower section from below. In this section the water is thoroughly heated and passes through a pipe into the upper section at the top, thus keeping a constant circulation. Bath room and sink connections are made directly to the latter pipe, so that a dozen gallons of hot water can be had in 15 minutes or the entire contents of the 32-gallon boiler may be heated in 45 minutes. The internal arrangement of the boiler prevents the accumulation of mud which so often causes slow heating of the water, and the heater stirs up the water to such an extent as to loosen the sediment, when it may be drawn off through a stop-cock shown at the right of the boiler. It will be seen that connection may be made to the water-back of a range whenever desired and equally as good results obtained; though it is claimed that the gas burner will do its work at a much smaller expense. Where a great quantity of hot water is wanted the water-back of the range and the gas burner can be used at the same time and a continuous flow of hot water can be had.

HARVESTER REEL.

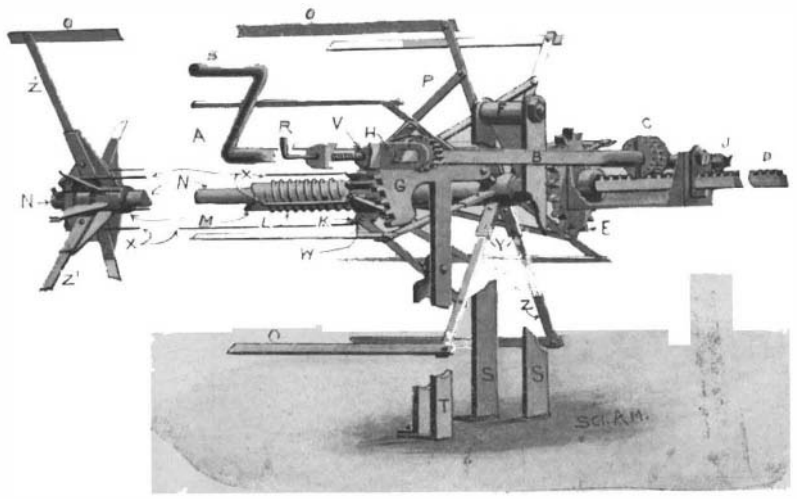
The harvester reel which is illustrated herewith possesses many advantages over those in common use. The reel is so constructed as to permit any desired variation in its diameter, the parts being held firmly in any position to which it may be adjusted. The reel may, therefore, be quickly reduced in diameter to avoid obstacles, and thus prevent breakage. It may also be quickly folded into small space for housing or to permit easy access to the sickle bar and other parts of the machine which often need attention. Being foldable, the reel may be easily moved from one field to another.

The illustration shows the mechanism partly broken away for the purpose of bringing out details. The reel-shaft, *M*, which is hollow, is provided with a driving sprocket, *E*, and is journaled in the bearing link, *F*, which swings from a rod supported by the standards, *SS*. Fixed to the hollow shaft, *M*, are the reel-hubs, having pairs of radial flanges, *Y*, in which the arms, *Z* and *Z'*, are pivoted. At their outer ends, these arms are connected by cross bars or beaters, *O*. A sleeve, *K*, is loosely mounted on the reel-shaft, and to this are pivoted the links, *P*, which connect with the arms, *Z*. By pulling the sleeve toward the outer hub, it is evident that the arms, *Z* and *Z'*, will be drawn from the vertical, thus reducing the diameter of the reel. When the sleeve is released, the spring, *L*, which is coiled between the outer hub and the sleeve, operates to return the latter to its initial position.

The mechanism for operating the sliding sleeve consists of a rod, *N*, which extends through the hollow shaft. Just beyond the outer hub this rod is reduced in diameter, and carries a disk loosely mounted thereon and abutting against the shoulder thus formed. A number of rods, *X*, connect this disk with the radial arms, *W*, of the sleeve, *K*. The opposite end of the rod, *N*, is formed into a rack, *D*, and is supported in a frame loosely mounted on the shaft, *M*. A crank-shaft, *B*, finds bearing in this frame and is provided with a barrel pinion, *C*, slidably mounted thereon. A slotted link on the end of the frame serves to hold the rack in engagement with this pinion. The near wall of the pinion forms a clutch member which normally engages a pin on the shaft, *B*. A coil spring on this shaft abuts at one end against a washer, *J*, and at the other against the frame, tending to hold the clutch members in engagement. The near end of the shaft is made vertically adjustable, and is held against rotation by a mechanism now to be described.

A standard, *T*, is secured to the harvester frame and carries a locking rack, *G*. A bracket, *H*, which is secured to this standard, carries a dog, *R*, which, under tension of spring, *V*, is held in engagement with the locking rack, *G*. The bracket also holds, between the arms of a yoke, a ratchet wheel slidably mounted on the shaft, *B*, and engaged by a spring pawl. This sliding connection permits the reel shaft to be swung on the link, *F*, to any desired position.

It will be seen that when the shaft, *B*, is rotated, the pinion, *C*, is caused to rotate, and thereby the rack, *D*, and rod, *N*, are moved outward through the hollow shaft, *M*, causing the reel to fold. The reel is held in any position of adjustment by the ratchet wheel on the shaft, *B*. When it is desired to expand the reel, the shaft, *B*, is moved backward longitudinally, thereby releasing the clutch and allowing the pinion, *C*, to rotate freely, whereupon the spring, *L*, causes the reel to expand as previously described. A



CONSTRUCTION OF THE HARVESTER REEL.

patent for this improved harvester reel has been granted to Mr. Ben ami Selph, of Hillsboro, Ohio.

IMPROVED VENEER BASKET.

A patent has recently been granted to Mr. Edgar Aber, of Jacksonville, Tex., for an improved veneer-basket. The basket belongs to that class which is now extensively employed in the packaging and shipping of fruit, and the invention lies in an improved construction whereby the article is made much lighter and stronger and does not require as much veneer stuff in its manufacture. Provision is also made for the secure attachment of the handle without the

IMPROVED VENEER BASKET.

necessity of nailing or stapling the same in place, thus allowing the handles to be placed in the bottom of the baskets when it is desired to nest the baskets and stack them for shipment or transportation. This is shown in Fig. 3 of our illustrations. The body of the basket is formed of two sections each bent from a single section of veneer so as to produce the bottom and two sides. The bottom is further strengthened by a long piece of veneer extending the full length of the basket and bent up at each end. These end portions are slitted as indicated in Fig. 2 to form an upstanding splint and two tongues. End portions of the basket are secured by these slitted ends, being held between the splints on the outside and the tongues on the inside. The end portions, as shown, are curved to close the corners of the basket. The usual reinforcement bands around the top hold all parts securely. The handle portion, which is bent to the shape shown in Fig. 4, is provided with a groove on each leg. The width of these grooves is equal to that of the outer band on the edge of the basket, so that when it is desired to fix the handle in place, the legs which are sharpened at the ends, are forced in between this band and the body of the basket until the band snaps into the grooves on the handle as shown in Fig. 1. A cover is also shown in this view which may be employed when desired. This cover rests upon the top edge of the basket and is secured by metallic fasteners designed expressly for this purpose. From the foregoing description it will be readily seen that Mr. Aber has invented a basket of very strong construction which may be cheaply and easily made and which can be very conveniently stacked for shipment.

A SIMPLE AND EFFICIENT WIRELESS TELEGRAPH RECEIVER.

BY A. FREDERICK COLLINS.

It is not often true that the cheapest appliance is the best, or the simplest apparatus the most efficient, yet there never was anything to which this seeming paradox could be applied more literally than the receiver about to be described for wireless telegraphy.

There are at present two distinct types of receivers employed in translating electric waves impinging on the coherer into readable Morse. The first is by means of a relay wound to high resistance and placed in series with a dry cell, and having in the auxiliary circuit a tapper for decohering the filings and a Morse sounder or ink-writing register. The second type is the acme of simplicity, cheapness and sensitiveness, and inasmuch as Marconi used this form in receiving the letter S in his first Transatlantic cableless signals, it may prove interesting to those who are following the advance of the art, as well as to those experimentally engaged in it, to detail its construction. In a word, this receiver consists of three parts only, namely, a coherer, an ordinary telephone receiver and a dry cell; while supplementary to these are the vertical wire or antenna and the earthed connection.

In the SCIENTIFIC AMERICAN of September 14, 1901, the writer described an experimental coherer, one that is eminently adapted for this new type of receiver, but even the turned brass work of this coherer may be dispensed with and one substituted for it that may be constructed for a few cents.

The requirements are two binding posts, probably largest size, of the class known as double wood screw posts; these have two openings in each post, and are fitted with two set screws. A hardwood base, 3 inches wide, 4 inches long and ½ inch or ¾ inch thick should be provided, and the posts screwed into the surface at a distance of 1 inch from the ends. Two pieces of straight brass wire 2 inches in length and of such diameter that they will slide easily, yet not too loosely, through the apertures of the binding posts, are now provided. A piece of glass tubing 1 inch in length and having a bore of exactly the same diameter as the wires or coherer plugs, as they are termed, completes the coherer, with the exception of the powder or metal filings. Instead of silver or nickel filings, usually employed in coherers, carbon granules such as are found in telephone transmitters are used, or if these are not to be obtained easily a piece of arc light carbon may be powdered and this inserted in the tube. The amount required may be roughly estimated at 1-16 inch in length when compressed between the coherer plugs.

A carbon coherer has a great advantage over a metal filing coherer, in that it is seif-restoring, that is to say, no tapping is required to decohere the particles, but it assumes its normal high resistance the instant the incoming electric wave ceases to impinge upon it. Another point in favor of the carbon coherer is that the tube does not require exhaustion, since carbon does not oxidize in air like metals. Iron filings are also self-restoring to a certain degree and may be used if desired.

To increase the sensitiveness of the coherer the ends of the brass plugs that are inserted into the glass tubing may be immersed for a moment in sulphuric acid and then dipped in mercury, the ends thus being amalgamated, after which the ends should be wiped with a dry cloth. The thin film of mercury will prevent the oxidization of the ends of the plugs.

After the carbon is placed in the tube insert the plugs. Fig. 1 shows the coherer complete. A telephone receiver of any description may now be pressed into service. A very excellent type of a telephone receiver known as the "standard" may be had for a dollar or less, but in lieu of this a pony telephone receiver may be employed with good results; however, the higher the resistance of the receiver coils the greater the sensitiveness of the receiving apparatus as a whole.

Our next step is to connect the coherer and receiver with a dry cell. In the lower opening of each binding post insert a piece of insulated wire—flexible wire is the best. Then connect the free end of one wire to a binding post of the telephone receiver; to the negative element of the dry cell connect the terminal of the other wire leading to the second binding

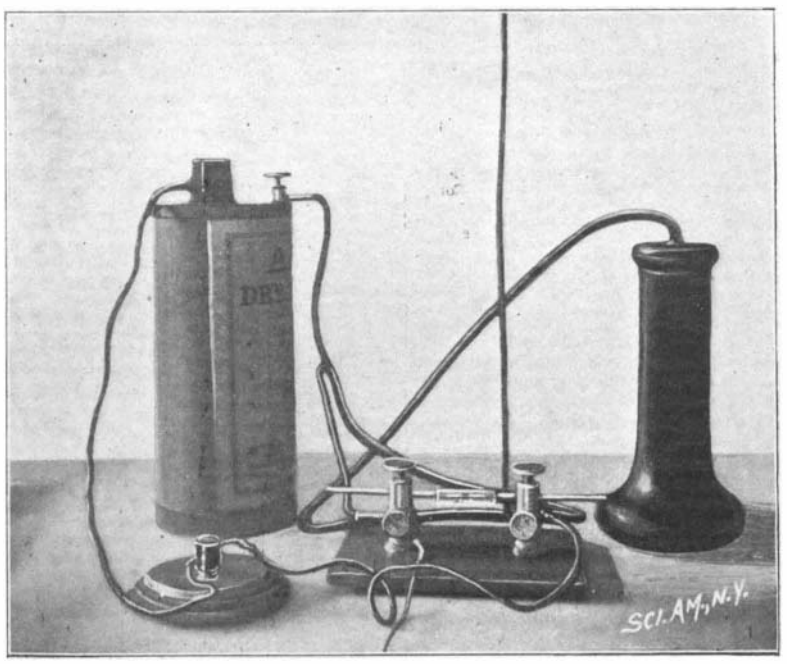


Fig. 1.—CHEAP WIRELESS TELEGRAPH RECEIVER.

post. The carbon of the cell is now connected with the other binding post of the telephone, or in other words, the coherer, dry cell and telephone receiver are connected in series as shown in the diagram, Fig. 2. A switch may be inserted in the circuit as shown, this saving time and trouble in throwing the current on or off. The antenna or vertical wire may be of No. 14 or 16 insulated, or bare wire or annunciator wire will answer the purpose admirably. This should be at least 30 feet in length and suspended outside the building from insulators either of glass or porcelain, and just as nearly vertical as possible until the level of the instrument is reached, when the wire may be bent at right angles and lead to the coherer. A wire of the same size leads to the ground and is soldered to a copper or zinc plate 12 inches x 12 inches, buried in the earth to a depth of a foot or two. A copper plate of the same size may be attached at the upper end of the vertical wire, exposing a greater surface for the reception of the waves.

This is the complete wireless telegraph receiver and only requires adjusting to be ready for immediate use. To obtain the maximum sensitiveness of the coherer withdraw one of the plugs from the granules until it barely touches them; now close the switch and place the telephone receiver to the ear, gradually slide the plug into contact with the carbon, giving it a turning motion to secure a finer adjustment. At first there

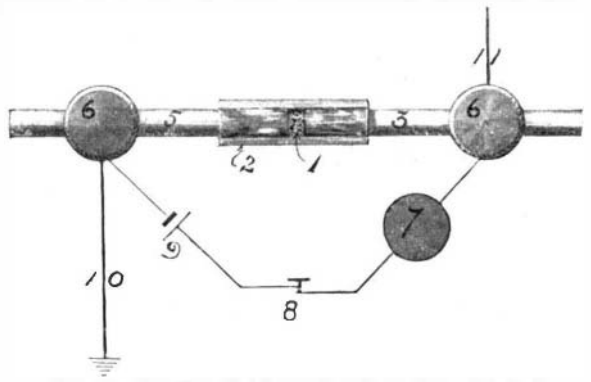


Fig. 2.—DIAGRAM OF WIRELESS TELEGRAPH RECEIVER.

will be no sound in the telephone receiver, but when the resistance of the granules is sufficiently reduced the current will commence to flow through the circuit and the varying degrees of contact caused by the current changes the resistance constantly and the telephone receiver responds accordingly. If the conductor plugs are forced in too tightly the carbon particles will become packed and the resistance lowered to such an extent that the current flows through the circuit without producing any audible effect; thus a value must be found between the maximum resistance when the conductor plugs are separated and the minimum resistance when they are forced tightly together. When the proper value has been ascertained the diaphragm of the telephone receiver will vibrate with a correspondingly great amplitude and the sounds will be the loudest; when this degree is obtained screw the conductor plug down firmly and open the switch.

To receive a message, simply place the receiver to the ear and close the circuit. When the waves are emitted from the distant station broken up into dots and dashes the telephone receiver will reproduce them by a series of rapid vibrations that are characteristic and easily differentiated by the listener.

There is another use to which this wireless receiver may be put, and this is the study of atmospheric electricity on the difference of potential between the strata of charged air through which the antenna passes and the earth immediately under it. For instance, if the air is charged positively the earth will be represented by a negative charge, and this difference will in equalizing in the coherer produce marked audible effects in the telephone receiver; to the trained observer storms may be determined with considerable accuracy, though they may be raging many miles away at the time.

In all of the portable wireless telegraph systems now in use in the different armies this form of receiver has been adopted, because of its compactness, lightness, sensitiveness, speed, permanency and ease of adjustment.

It has for practical wireless telegraph purposes one objectionable feature, and that is its aptitude for registering atmospheric disturbances and thus often confusing the operator who is interpreting the Morse code, by false jamming. Operators, however, become so thoroughly proficient in deciphering the messages that they are usually able to eliminate the false from the true wave impulse.

From Chicago comes the news that woman has conquered still another field, over which man formerly reigned supreme. She is now employed in the stockyards in Chicago, the last place in the world that one would expect to find her. To be sure, she does not actually slaughter the animals, but even that may come in time. In the packing and canning factories some thousands of women have taken the places of men; if the business grows, as it has done in the last three years, thousands more will find positions. The work is light, is technically called "kitchen work," and consists in the cutting of dried beef, packing of cans, stuffing of sausages, etc.