In a previous article it has been

pointed out that all kinds of mat-

ter, either in a soug, liquid or gas-

eous state, contair electrons. in

all substances a large number of

these electrons are very intimately

associated with the central nuclei

of the atoms. "This is due to the

attractive force between positive

nuclei and negative electrons. A

given positive charge on a nucleus

of an atom can hold bound to it-

self only a certain number of elec-

trons, normally. The sum of the

negative charges of all the elec-

trons associated with an atom

equals the positive charge of the

atom's nucleus. Also, these elec-

trons are constantly in motion

about the nucleus in a similar

manner, as are the planets around

the sun in our solar system. The

sun is probably the positive nucleus

and the planets are the negative

charges if the solar system is con-

sidered as one arm of the uni-

verse. It is quite well known that

the stars are suns around which

planets revolve similarly as do the

planets of our system. Perhaps

this force is what keeps the vari-

cus systems from flying apart.

Getting back to the tiny atom,

however, it is seen that these elec-

trons are bound quite closely to

When the "soft" vacuum tubes

tre used for radio detectors a very

close regulation of filament cur-

cent is usually required. Ordinary

rheostats, unless equipped with vernier control, often do not give

fine enough current control. This

is because there is a decided

change in resistance when the contactor moves from one turn of re-

sistance wire to the next. The

novel feature of giving the smooth-

est possible control with the great-

est ease. It is known as a com-

pression type rheustat. A column

of specially treated graphite discs.

assembled in a porcelain container,

forms the resistance element. The

resistance of the graphite discs va-

ries with the pressure applied by

with the editor by mail?

changes of current are 'n jumps. The rheostat illustrated has the

the nucleus of each atom by the the last one.

APPARATUS AND DEVICES

By RALPH BROWN, RADIO ENGINEER

A NOVEL NEW FILAMENT RHEOSTAT.

BY E. H. LEWIS

attractive force. They are thus

In addition to the bound elec-

trons, there may be other elec-

trons present whier ar not close-

ly associated with any particular

atom or atoms. Taey are free to

move through the substances in

the spaces between the atoms.

These are called 'free electrons."

Good electrical conducting ma-

terials contain a large number of

these free electrons, while those

materials known as insulators

contain very few in comparison.

The quality of any substance as

an electrical conductor depends

upon the number of free electrons.

Under certain conditions, these

free electrons may move from one

part of the conductor to another.

and there is a drift a " the negative

charges. The drift may be com-

paratively slow, even chough the

cause of the drift may tend to

make them move very rapidly.

This might be compared with a

number of billiard balls, all lined

up on a table, one of the end

balls being struck with a cue. The

motion of the cue might be very

rapid, but the motion of each indi-

vidual ball would be slower, while

the motion is being communicated

through all the balls in the line to

an adjusting knot and pressure

screw. The resistance depends

only upon the presure applied to

the column of discs, and since the

pressure can be regulated to any

desired degree the filament cur-

rent can be adjusted to the small-

est traction withou; any disturb-

ing noises in the tead telephones.

There is no sudder current change

nor any point just a little too high

or too low. The rheostat gives its

porcelain, the pressure screw act-

ing on the disc through a cross

piece or equalizer. A small spring

lits this pressure equalizer from

the discs when the pressure is re-

lieved, so that the circuit is opened and the filament lighting battery

(A battery) is disconnected when

The same rheostat may be used

with the ordinary uetector and am-

pliffer tubes, or it may be used with the five wat: power tubes

without any alteration. The idea is

not entirely new, but this is the

first time it has been used in con-

nection with filament rheostats

The construction is patented. At

may be noted in the illustration.

the rheostat may be easily mount-

ed back of a panel in a cabinet re-

ceiver or amplifier. It takes very

little space f. : mounting.

The graphite discs are assembled in two small columns in the

own vernier adjus. ment.

not in use.

Will readers interested in these radio articles kindly communicate

called "bound electrons."

INSTRUCTOR NEW YORK Y. M.C.A. RADIO SCHOOL

FREE AND BOUND ELECTRONS.

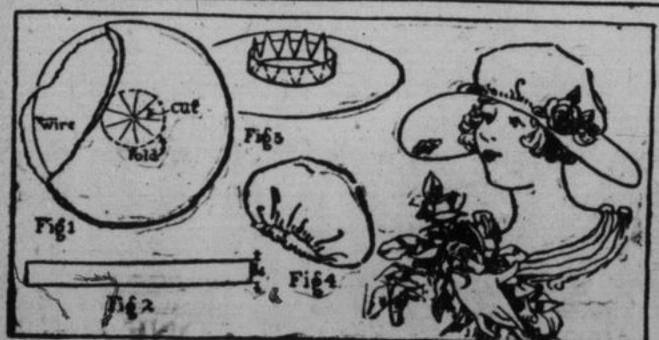
LOOP STUDY SPORTS

THE JUNIOR BRITISH WHIG

BIGGEST LITTLE PAPER IN THE WORLD

HUMOR PLAY WORK

.. CREPE PAPER MILLINERY



BY FLORENCE WINE 'A "picture" hat to match your orrandy dress is just the thing to start in figure 3. off the summer days. It is the "summeriest" outfit you could possibly or of paper in a contrasting color, the hat will be right at home at a garden party or any of the summer "doings" which call for an organdy dress. To make the hat you need one fold

of the crepe paper, two No. 15 wires, which are extra heavy, one spool of

Forming the Circle Now that you have all these materials together, let's begin. First, join the two wires to make a circle. You will have to decide yourself how big around this circle should be. It ends on how large you want Cut the circle of the crepe paper

ust one inch larger in circumference than the circle you made with the wires. To cut the paper out, you can lay your wire circle flat on the paper and mark around it a circle one nch wider. Paste the wire and lay It on the circle of paper, folding over the extra inch of paper, just as shown you have made for masquerade parties n figure 1.

Cut the top circle for the brim next, allowing a quarter of an inch for turning. Put paste on the covered wire and place the top circle on it, making the edges fit together smoothly, the way it does in figure

To Make the Crown Now that you have completed the brim, put it aside for a while and start on the crown. Cut from a lightweight cardboard a headband two

inches wide and in length equal to your head size. This band is shown

Fasten the two ends of the band meriest" outfit you could possibly together with paper clips or gummed wear. Made of crepe paper and tape. Lay this headband in the center trimmed in flowers of satin ribbon of the brim and cut the crepe paper into diamond shapes and paste to the headband, as in figure 2. This holds the brim firmly to the headband. fine tie wire and one piece of card- can figure this out yourself. Gather Wenona felt this was no occasion for

How to Trim

Now your hat is finished, except for ng it around so that they will is flowers. You may buy these, or Wenona nodded again, she went on, make them yourself out of scraps of "I lost a brother, too. But I haven't satin or some crepe paper.

If you wish your hat to last all through the summer, give it a light coating of liquid varnish such as chek or crystalline. You will find that you have a "regular" hat, very different from the flimsy paper hats or fancy cree programs. The others came to pleces the next day, but this hat, if you have made it carefully, will wear as long as a cloth hat and any reason for feeling so bad. will always look fresh and dainty.

Why not make Paper Hats for the Church Bazaar this summer? These articles will furnish you with a number of pretty models that can be made in all the colors of the rainbow.

The Monkeys

ran a way

with the



Get them back and make a

wer to yesterday's: Maurice, Horace.

FIFTEEN BOILS

ON NECK

AT ONE TIME

Any one who has suffered from

bolls can sympathize with poor old

THE SHORT STORY, JR.

say. "I don't think it's tender-heartdness. She knows very well how pretty she looks when she's in tears." When Memorial Day came, Wenona was in her element. She was going to be in a decorative float that was to be part of a parade to the cemetery. She was dressed in a new summery dress, and her hair had never curled so prettlly before. When the float reached the ceme-

down to rest near a grave in one For the crown, cut a circle of the the crowd for a while. She happened crepe paper about 54 inches around. to look over and saw a girl of about It may have to be a little larger or her own age sitting there with her the crown at the headband, as shown smiling. She took out a handkerchief



isn't as though it was so sudden. He came home, with his lungs bad, knowing he couldn't get well. And he didn't. But we had him with us again for a while and we were glad for that. Maybe you think it's funny I can talk like this without crying, but you see we talked it over. He said he wanted me to be a "mourning glory-cut the mourning and think of the glory. And when I want to have a good cry I think of that and the way he said it, and it isn't so

A flush of shame made Wenons's face scarlet. She dropped her flowers and hid her head in her arms. And that was the last of "the sprinkling

His Loss

Mike (after crawling out of a freight car): "There, I rode all the way from Milwaukee to Chicago is a carload of hard coal and there was a carload of soft coal right behind me and I never

The Story of Carol Kennicott

There was no Burdock Blood Bitters in those days, so Job had to suffer in silence. Now-a-days no one need endure the misery of boils. Boils are simply evidences of the bad blood within coming to the surface and just when you get rid of one another seems ready to take its place and prolons your misery.

All the poulticing and lancing you may do will not stop more coming. What you have to do is take

BURDOCK BLOOD BITTERS and the blood will be cleansed of all its impurities, and then every boil will disappear.

P. E. I., writes:-"I was troubled timwith boils for some time, and had as many as fifteen on my neck at once. After taking one bottle of Burdock Blood Bitters they commenced to get better, and after I had taken two bottles I was relieved of them and felt much better. I think B. B. B. is a grand blood medicine, and can recommend it highly."

Milburn Co., Limited, Toronto, Ont.

maturely gray, brittle, lifeless and had shot the mallard at which they Kennicott considered the matter full of dandruff, quick action must be had fired together.

Get from any drug or toilet counter to-day a bottle of Parisian Sage and use as directed-there's nothing else so simple, safe and effective.

women whose luxurious, soft and garnet and silver. The voices of the stewing and experimenting?" fuffy hair is greatly admired. "It men, waiting for the last flight, were keeps away all dandruff-my hair is clear in the cool air. never dry, faded or scraggly, but retains its natural color and beauty."

Parisian Sage is inexpensive, and noney refunded if not satisfactory. McLeod's Drug Store sells lots of it.

The minute you put your feet in a poisonous exudations at the car. that puff up your feet and cause sore, inflam-

bunions. Get a box of away.

Continuess is not weakness.

MAIN STREET

By SINCLAIR LEWIS

Kennicott had forgotten it in ten Mr. Roy McSwain: High Bank, minutes; and she forgot it-this

For the past 45 years B. B. has first lesson in shooting, in keeping kidnapped my idea. He wants the been manufactured only by The T. her eyes open, not wincing, under- Community Day, but he wants to standing that the bead at the end of have some politician 'give an adthe barrel really had something to dress.' That's just the stilted sort of A REAL HAIR SAVER do with pointing the gun. She was thing I've tried to avoid. He asked radiant; she almost believed Sam Vida, and of course she agreed with If your hair is falling out, pre- when he insisted that it was she who him."

She sat on the bank of the reedy, tramped up-stairs.

"Mark left!" sang Kennicott, in s long-drawn call.

Three ducks were swooping down in a swift line. The guns banged, and a duck fluttered. The men pushed their light boat out on the burnished lake, disappeared beyond the reeds. TRED, ACHING FEET Their cheerful voices and the slow splash and clank of oars came back to Carel from the dimness. In the sky a flery plain sloped down to a "TIZ" bath you feel pain being serene harbor. It dissolved; the drawn out and comfort just soakings lake was white marble; and Kenniin. How good your cott was crying, "Well, old lady, how tired, swollen, burn- about hiking out for home. Supper ing feet feel. "TIZ" taste pretty good, eh?"

instantly draws out the "I'll sit back with Ethel," she said

It was the first time she had called Mrs. Clark by her given name; the "TIZ," and only first time she had willingly sat back. "TIZ," takes the pain a woman of Main Street.

and soreness out of "I'm hungry. It's good to be n--corns, callouses and gry," she reflected, as they drove

"TIZ" at any drug or | She looked across the silent fields department store for a few cents. to the west. She was conscious of an Your feet are never going to bother unbroken sweep of land to the you any more. A whole year's foot Rockies, to Alaska; a dominion which will rise to unexampled greatness when other empires have grown

Miss Mourning Glory

Every one said that Wenona was regular sprinkling can. She had pretty eyes and a pouting mouth, and on the slightest cause her mouth would tremble and her eyes would fill with tears. "I can't help it." she would say, "because I'm so sympathetic. I can't bear to have my feelings hurt or to see any one suffer." "Humph," her grandmother would

tery, the girls in their gay dresses climbed out and began distributing their baskets of flowers over the graves. More than one person smiled tenderly to see the pretty girl with her eyes full of tears, as she carried an armful of roses. The day was hot and Wenona sat

smaller to fit your head size. You chin in her hands, smiling at her. in figure 4. Then fasten the crown and wiped her eyes. The girl was all sympathy. "Oh," she said, "I hope I'm not bothering

you? Did you lose some one in the adding the trimming. You might make your hat in a contrasting color and have the trimming match your dress.

war. too? A brother, maybe?"

Wenona gulped and nodded, wishing it were so, and feeling dramatic. the brim of your hat. The wires may or else do it the other way around. "I s'pose he was killed at the



hard, after all."

She wasn't depressed even when senile. Before that time, she knew she heafd Mrs. Bogart observe, "Now a hundred generations of Carols will we've got prohibition it seems to me aspire and go down in tragedy devoid that thoughts as we have, and I of palls and solemn chanting, the want him to develop them, not take humdrum inevitable tragedy of Gopher Prairie's version of them, struggle against inertia. That's my biggest work now-keep- "Let's all go to the movies tomor-

ing myself, keeping you, from 'edu- row night. Awfully exciting film," said Ethel Clark. But I'm not going to have him spoil- book but-All right, let's go," said

"They're too much for me." Carol sighed to Kennicott. "I've beer The Kennicotts and the Sam thinking about getting up an annual Clarks had driven north to a duck- Community Day, when the whole pass between two lakes, on an aut- town would forget feuds and go out for keeps," muttered Kennicott and and have sports and a picnic and a Kennicott had given her a light dance. But Bert Tybee (why did twenty-gauge shotgun. She had a you ever elect him mayor?) - he's

while he wound the clock and they

drawing comments on nothing. The Bert butting in," he said amiably, good fight, but I have kept the brown dusk was still. Behind them "Are you going to do much fussing faith." "Before going to bed I rub a little were dark marshes. The plowed over this Community stunt? Don't "Sure. You bet you have," said Parisian Sage into my scalp," says a acres smelled fresh. The lake was you ever get tired of fretting and Kennicott. "Well, good night. Sort

She led him to the nursery door, putting up the storm-windows pretty pointed at the fuzzy brown head of soon. Say, did you notice whether the her daughter. "Do you see that ob- girl put that screw-driver back?" ject on the pillow? Do you know!

what it is? It's a bomb to blow up ! smugness. If you Tories were wise, you wouldn't arrest anarchists: you'd arrest all these children while they're asleep in their cribs. Think what that baby will see and meddle with before she dies in the year

2000! She may see an industrial union of the whole world, she may see aeroplanes going to Mars." "Well, let's not scrap about it. "Well, I was going to read a new "Yump, probably be changes all

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made as quickly as you can

pour hot water into the cup

INSTANT POSTUM

delights the taste, and

causes none of the harm

that often comes from

"There's a Reason"

tea and coffee.

Here is a table drink

right," yawned Kennicott. She sat of the edge of his bed while he hunted through his bureau for a collar which ought to be there and persistently wasn't.

"I'll go on, always. And I am happy. But this Community Day makes me see how thoroughly I'm beaten." louder, "Yes, I guess you- I didn't quite catch what you said, dear." She patted his pillows, turned

down his sheets, as she reflected: "But I have won in this: I've never excused my failures by sneering at aspirations, by pretending to have gone beyond them. I do not admit that Main Street is a beautiful as it should be! I do not admit that Gopher Prairie is greater or more genorous than Europe! I do not admit that dish-washing is enough to satisfy all lake and found rest in Mrs. Clark's "Yes, it would jar you to have women! I may not have fought the

> of feels to me like it might snow to-"I haven't even started. Look!" morrow. Have to be thinking about

Reconstruction Hospital Saves

Injured Workers



DR. CHARLTON WALLACE Surgeon-in-Chief, the Reconstruction Hospital

TITH almost a million American industrial workers each year injured seriously enough to cause loss of time, laboring people and employers are watching with interest the development of the first hospital wholly devoted to the treatment of industrial disabilities and diseases. This institution - The Reconstruction Hospital, of New York-has treated patients from thirty-three states in the past two years and in the open-ing quarter of 1922 had patients from ten industrial states. The hospital's objective is to rehabilitate sufferers from industrial injuries and diseases by use of methods successfully developed during the world

"The Reconstruction Hospital is removing men and women from the compensational class and restoring them to the earning class," said Dr. Charlton Wallace, the surgeon-inchief. "The first hospital in America to be dedicated wholly to the care and after-care of industrial disbilities and diseases, it meets a need which the annual loss in inured workers makes imperative. Full use is being made of the therapeutic advances made during the war. As a result, The Reconstruction Hospital is restoring disabled men to their working ability in from one-third to one-half of the time heretofore required.

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As surprising as are the results reported above, thousands of men and women everywhere are obtaining equally wonderful benefits from the use of MASTIN'S VITAMON TABLETS. By increasing the nourishing power of what you eat and by acting as a general conditioner of the whole system, MASTIN'S VITAMON TABLETS often help to put on firm flesh and build up renewed energy in a remarkably short space of time. If you have lost weight, energy and ambition through down you owe it to yourself to start today to take MASTIN'S VITAMON TABLETS and watch the surprising improvement that may take place in muscle, bone and blood-building elements supplied in these tiny tablets.



tutes and so-called "yeast-vitaming tablets." MASTIN'S VITAMON TABLETS are fully guaranteed Remember, you must say MASTIN'S to get the Genuine and Original VITAMON TABLETS. At all good dispersion

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