

## AUTOMOBILE

II Maxwells stand second in number of cars sold during the past year. No more could be sold because no more could be made

##  

 2 H. P. Touring Car$\mathbf{\$ 1 . 4 5 0}$ 12 H. P. Tourab
$\$ 825$ The Maxwell Catalogue is more than a book of
Specifications. It isa complete treatise on the comparative meritit of the various systems of automebile
construction. Sent tre if you write Dept. 11 . MAXWELL-BRISCOE MOTOR CO. HUDSONTERRACE, TARRYTOWN.
MAIN OFFICE AND FACTORY.
$\qquad$
Menbibt nt A. C. A. C. Aur Manum anctures Assocition, N. Y.


THE INTERNAL WORK OF THE



A Desirable Xmas Gift.
Recording Thermometer
 THE DRAPER MF G. Co.

Instructive Scientific Papers ON TIMELY TOPICS

Price 10 Cents each by mail ARTIFICIAL STONE. By L. P. Ford. A
paper of immense practical value to the
Sity architect and buider.
CAN SUPLEMENT
I
THE SHRINKAGE AND WARPING
SUPPLEMENT 1500 .
CONSTRUCTION OF AN INDICAT-
 TIFIC AMERICAN SUPPIEMENT 1500. By T. H. Brakesley. M.A. An admirably
written, instructive and copiously 1 illustrated article.
MENT
No. 1493.
HOME MADE DYNAMOS $\begin{gathered}\text { AMERICAN SUPRLEMENTS } \\ 16 i \\ \text { and } 600 \text { conc }\end{gathered}$ tain excellent articles with full drawings.
 scribe their construtcion so clearly that any
amateur can make them.
DYNAMO AND MOTOR COMBINED.

ELECTRICAL MOTORS. Their ConStruetion at Home. SCIENTIFIC AMERICA Price 10 Cents each, by mail Order through your newsdealer or from
MUNN \& COMPANY $\underbrace{361 \text { Broadway }}$ \& COMPANY $\begin{aligned} & \text { New York }\end{aligned}$
from a purely architectural standpoint, the
book should prove of great value in this coun

INDEX OF INVENTIONS For which Letters Patent of the
United States were Issued for the Week Ending November 20, 1906,
AND EACHBEARINGTHATDATE
rsee noteatend of list about copies of these patents.


Any Size or Shape
Steel Towers Any Height The Baltimore Cooperage Co baltimore city, md.


The Genuine


The Genuine STOCKS and DIES Acknowledged to be the best, Difirent sizes and THE ARISTRONG MFG. Co., Bridgeport, Conn.


## SPARK COILS

## Their Construction Simply Explained

Scientific American
$\mathbf{1 6 0}$ describes the matioment
 engine ientition. American supplement
1522 explains fully the construction of a
152. ju22-explains fully the construction orgi 1124 sientific American supplameny spalk coil $\mathbf{k}$ cientific American supplement 1087 gives a full account of the malising of
an alternating current coil giving a 5 -inch
spark. Scientific American Supplement
1527 describes a
4-inch spark coil and con
 1402 Eives data for the construction or coil will be supplied for 70 cents. Any single copy will be mailed for 10 cts . MUNN Q
361 Broadway


## Alcohol

## Its Manufacture <br> Its Denaturization <br> Its Industrial Use

The Cost of Manufacturing Denatur=
ized Alcohol in Germany and German ized Alcohol in Germany and German
Methods of Denaturization are discussed by Consul-General Frank H. Mason in
ScIENTIFIC AmERICAN SUPPLFMENT I550.
The Use, Cost and Efficiency of Alco bol as a Fuel for Gas Engines are ably ex-
plained by $H$. Diederichs in ScIENTIFIC AMERICAN SUPPLEMENT I596. Many clear diagrams accompany the text. The article considers the fuel value and physical pro alcohol engine wherever they may be dif-
ferent from those of a gasoline or crude In Scientific American Supplement 158 the Production of Industrial Alcohol
and its Use in Explosive Ilotors are treated at length, valuable statistics being
given of the cost of manufacturing alcohol iven of the cost of manufacturing alcohol
from farm products and using it in engines. French Clethods of Denaturization conlished in Scientific American SuppleHow Industrial Alcohol is Made and
Used is told very fully and clearly in No. 3, The Most Complete Treatise on the Mo= dern Manufacture of Alcoliol, explaining u'derlie the process without too many
we rerisome technical phrases, and describ ing and illustrating all the apparatus re quired in an alcohol plant is published in 1604 and 1605. The article is by L. Baudry de Saunier, the well-known French autho-
rity. lish a digest of the rules and regulations wiil permit the manufacture and denaturation of tax free alcohol.
The Sources of Industrial Alcohol that is the Farm Products from which al-
cohol is distilled, are enumerated by Dr. h. W. Wiley in Scientific American SUPPLEMENTA relative alcohol content compared. Arts and in the Home are discussed

$$
\begin{aligned}
& \text { Arts and in the Home are discussed. } \\
& \text { Any Single Number of the ScIENTIFIC }
\end{aligned}
$$ American or Supplement will be sent for ro cents by mail. The entire set of papers above listed will be mailed on receipt of

Order from your newsdealer or from the

## MUNN Q COMPANY

361 Broadway.





## $\mathfrak{| c}$





## INNER TUBES

Obviate Tire Troubles STRONGEST TUBES imported or Domestic
PARKER, STEARNS \& CO.
228 and 229 South St., New York, U. S. A.


## To Book Buyers

We have just issued a new 112-page catalogue of recently published Scientific and Mechanical Books, which we will mail free to any address on application
MUNN \& COMPANY Publishers of Scirntific Amprican
361 Broadway, New York

Factory Clerks and Superintendents

We can help you to increase your earning power from 25 to $50 \%$ by mears of our Course

of Instruction in COST ACCOUNTING. of Instruction in COST ACCOUNTING
We can teach you not only to devise and instal a system for the place you now fill, bu to build factory systems for others. In fact we can teach you to become a COST
EXPERT. Hundreds of our students ar to-day filling the best positions. Do you want to be helped as we have helped them Let us show you how we do it. It costs nothing to investigate. and we give you all the cost is smal which to pay it. A few of your spare hal hours for the next few months will put you in a position to demand far more salary o to produce far better results. There is no way to advance except through knowledge. Let us teach you. Drop us a postal card
and ask for our plan for teaching you how

Expert Cost Accountant
The International Accountants' Society, Inc.
59 FORT STREET, DETROIT, MICHIGAN


WELL ${ }_{\text {mandiles }}^{\text {palimes }}$
suanew wells in any. With engines or horse powers.
on wheels or on sills. Wind
Strone simple and Strong, simple and durable, Any mechanic ca
operate them easily
Send for catalog.
WILLIAMS BROS., Ithaca,

##  Cancrete Bililing Bocks

 The article clearly, describes the proper com
position and mixure of concrete and gives Scientific American Supplement
proporition of gravel and sand to be used in
1538 gives the

 These articles constitute a sp
on the subject of reinfored
ing better has been published

Scientiflo American Supplement 997 contains an
article by Spencer Newerry in which prac-
tical ticate are given.
crest
Scientific American Supplements 1568 and 1569
present a helpful account of the making of Scientific
critical $\begin{gathered}\text { American } \\ \text { review of }\end{gathered}$ Supplement $1534 \begin{gathered}\text { gives a } \\ \text { the }\end{gathered}$ Scientific
give a
American
resume in give a resume in which the various systems
of reinforce. concrete construction are dis.
cussed and illustrated. Scientific American Supplement 1564 contains an
article by Lewis
merists and Lefects of reicks, in which the
inced concrete are
 some practical illustrations by Walter Loring
Webb.
 Scientifio American Supplement 1574 discusses
steel for reinforced concrete. Scientific American Supplements 1575, 1576, and
1577 contain a paper by Philip L. Wormley.
Jr


Each number of the Supplement costs 10
A set of papers containing all the articles
above mentioned will be mailed for $\$ 1.80$.
MUNN
361 Broadway, New York City

Classified Advertisements
 seven wor
panied by
request.








 For further in tormation acdores, Tobiac
 lozue Free. We also foy Mapic Machines. Fims , Silies.



 est Poik street, Chicago.


 estimate, stating quantity. Hayyes Ma.
465.75 Mavbury Avenue, Detroit, Mich.







## TYPEWRITERS.

TYPEWRITERS OUR OWN MANUFACTURE fully
guaranted at special prices to those



 TYPEWRITERS.-Hor a minister, lawyer, literary $m$ an
or woman, or any person who write, or tor people who




bOOKS AND MAGAZINES.





 836,111
866,111





## IVER JOHNSON

## Safety Automatic Revolvers

against the wall, or drop it on the floor it cannot possibly ter discharged in any hev the against the wali, or drop it on the hoor, it cannot possibly be-cischarged in any hut the
one way through the famous safety lever, which is operated solely by puling the trigger. Accidental discharge impossible.
For straight, shooting and hard shooting it is unexcelied by any other revolver, no
matter what its name or price. It is compact, Eraceful, easy to carry, easy to handle- in every way a gentieman's weapon for pocket, desk or home.
Our Free Booklet, "Shots," Tells You More in Detall

 IVER UOHNSON'SRARMS AND-OYCLE WORKS



Iver Johison, Safety Automatic Revolver, acciderital discharge impossible, 22 and $3^{2}$ calibre, 3 -in. barrel (or 38 calibre, $31 / 4-\mathrm{in}$. barrel), hard, rubber stock. nickeled finish, $\$ 5.00$. P Pocket size, 2 -in. barrel, same price; 4 -in. barrel, 50 c ; 5 -in. $\$ \mathrm{x} .00$; 6-in. $\$ 1.50$ extra. Pearl stock, 32 calibie, $\$ 1.25$ extrat 38 calibre, $\$ \mathrm{Ir} 50$ extran Blued finsh, any size, 500 .

Iver Johnson Safety HammerSAFE less Revolver, \$600 $3 \mathrm{n}^{3}$ or 38 calibre, furnished with same choice of Fnisfics, stocks and lengths of bars rel at same additiona! costs as on Hammer. Pocket size, $3^{- \text {inch }}$

hristmas

Tree


# By T. BYARD COLLINS 

12mo, 374 pages, 106 illustrations, cloth, price $\mathbf{\$ 2 . 0 0}$

THIS new and authoritative work deals with the subject in a scientific way and from a new viewpoint. Dr. Collins has devoted his lifetime to the study of changing economic agricultural conditions. "Back to the soil" was never a more attractive proposition and never so worthy of being heeded as during these opening years of the twentieth century. Farm life to-day offers more inducements than at any previous period in the world's history, and it is calling millions from the desk. The reason for this is not at first obvious, and for this reason Dr. Collins has prepared the present work, which demonstrates conclusively the debt which agriculture owes to modern science and the painstaking government and State officials. Much of the drudgery of the old farm life has been done away with by the use of improved methods, improved stock and varieties. All this tends to create wealth by increased value of the product and decreased cost of production. Irrigation, the new fertilization, the new transportation, the new creations, the new machinery, all come in for a share of attention. The illustrations are of special value, and are unique. All who are in any way interested in agriculture should obtain a copy of this most timely addition to the literature of agriculture. A full table of contents, as well as sample illustrations, will be sent on application.


## Valuable Books Home Méchanics for Amateurs





TWENTY=THIRD EDITION EXPERIMENT AL $\underset{\text { By GEORGE }}{\text { I. HOPKINS }}$ SCIENCE.
 EXP \&iLIMENYAL SCIENCH is So sell Enown to
many of our readers that it is hardy necessary now to
give a description of


REVISED and ENIAARGED EDITION The Scientific American
คnnamand $\begin{aligned} & \text { Of Receipts, } \\ & \text { Notes and g } \\ & \text { Queries. so }\end{aligned}$ Cloth. $\$ 6.00$ in Sheep.



900 New Formulas. 900 New Formulas.
The work is so arranged
as to be of use not only to the specialist, but to the
general reade. It should
have a place in every home and workshop. A
circular contaning f il
Ta sabe of Cont ont will
be sent on aplication. be sent on aphlication.
Theose whadready have
the Cyclopedia may obtain
1901 APPENDIX.
Price, bound in cloth, 81.
Price, bound in cloth, 81.00
postpaid.
MACIC Stage Illusions and Scientific Diver


UST' PUBLISHED
Scientific American Reference Book

 MUNN \& CO., Publishers, 361 Broadway, NEW YORK
$\mathrm{C}^{836.46}{ }^{83666}$


Not a scrapbook, and not a fiction magazine, The World's Work tells the human stories of every month's greatest activities, and illustrates them with an unequalled richness of clear and interesting photographs. It is a record of all the inportant things that go in politics, business, education, books, art, human achievement. In the coming year will appear

THE WORKINGS OF THE TRUSIS: A remarkable series of articles by Mr. C. M. Kt:ys, unveiling the methods, showing just where they are benefits and just where they are menaces.
DOES H,ARVARD DO ITS JOB? Not Harvard alone, but Yale, showing how our universities are doing what them
MEDICAL SENSE AND NONSENSE. The death-rate has been lowered but life shortened. Marvellous discoveries o every man and woman the ways in which life can be lengthened.
WHAT OTHER COUNTRIES CAN TEACH US. Stories of the things they do better in England,
Holland, Germany, Canada, Japan.

THE AMERICA OF TOMOR ROW. What our cittes, our transporta tion, our fortunes, our living and working
will be in 25 years if present tendencies THE MEN WHO ARE MAKING TODAY. That mysterious figure Mr. E. H. Harriman, explained. The real
Taft, " Secretary of Peace," shown as he is. Other notable Americans pictured and analyzed THE SECRET OF BUSINESS SUCCESS. Not a series on business tions of big businethods, but intimate revelaand fighting their battles, showing how they INVESTING YOUR MONEY. Regular montlily articles that will tell in-
vestors, big and little, what they want to know about sound investments.

These are but a few of many timely features
Wideawake Americans need this magazine. SUBSCRIBE NOW. 25 cents a copy, $\$ 3.00$ a year.
Send your name on a postal and receive further details of special interest.
Doubleday, Page \& Company
133 EAST 16th STREET, NEW YORK


New Catalogue of Scientific and Technical Books
A new 112-page Catalogue is now ready for distribution. It is entirel technical nature. Copies are being mailed to all subscribers to our periodicals, but those who purchase our publications at news stands, or read them in libraries, should send at once for a copy of our


THE PREST-OELITE C 0 ., Dept. 18, Indianapolis, Ind.

## Tours

Personally Conducted - Exclusively First-Class-to Cali-fornia-January 10th, February 7 th and March 2nd under the auspices of the tourist department, Chicago, Union Pacific and North-Western Line;
Include all expenses
-hotels, railway fare, sleeping car and dining car accommodations of the finest character, and numerous side trips. So arranged as to spend the disagreeable portions of the win-
ter months in comfort and ease. ter months in comfort and
Write for itineraries and full particulars to S. A. Hutchinson, Manager, 212 Clark Street, Chicago, Ill.


A MONTY MAKING





Anjone sendng a sketch and deseription chay



## Scientific American.

## 




