tence: 'Take a piece of cork in one hand and a bullet in the other, and drop these two objects at the same moment from the same height." A. The article which you quote from the Encyclopædia Britannica was written by Prof. Ball, Astronomer Royal of Ireland at the time he wrote it. It is hardly likely that he was in error on so simple a matter as the fall of a cork and a bullet from the hand to the ground. Have you tried it for yourself? Had you done so, you could hardly have written the letter to us. The experiment is simple. So are others given by Prof. Ball. Try them till you are convinced that it is the matter of the earth which draws bodies down to its surface, and that the rate of fall is not dependent upon the weight or the density of the body falling. This was demonstrated by Galileo at the Leaning Tower of Pisa before the immortal demonstration of the law of gravitation by Newton. The paragraphs you refer to have no dependence upon the other fact that the lightest and heaviest bodies fall alike in a vacuum. They refer to the fact that all moderately heavy bodies fall practically alike through the air. Very light things are retarded enough by the air to have their rate of fall changed by the resistance of the medium through which they are falling.

(10183) H. M. asks: 1. Why are the guns on battleships not larger than 45 caliber, 12-inch? Is it because they are strong enough, or because an ordinary ship is unable to carry larger guns? A. 45 calibers is found to be the maximum length which can be used to advantage for the 12-inch gun. The greater length would prove cumbersome, and necessitate larger turrets to accommodate the greater weight back of the trunnions. 2. By what formula is the displacement of ships known before they are launched? A. The displacement of ships is found by calculating the cubical bulk of the ship below the water-line. 3. Would it be possible to build torpedo boats of say 400 tons with a speed of 45 knots? A. In the present state of the art it would be impossible to build a hull of 400 tons displacement which would float horse-power necessary to give a speed of 45 knots. The "Viper," a torpedo boat of slightly over 400 tons, holds the record for speed of slightly over 36 knots an hour. The horse-power increases as more than the cube of the speed, and hence the weight of the engines to give a propeller thrust suitable for a speed of 45 knots would be altogether prohibitive. 4. a. A description of the 21-inch torpedo in use in the United States navy. A. The United States 21-inch torpedo was described in the SCIENTIFIC AMERICAN of January 6, 1906. b. A description of the 45-centimeter torpedo in use in the German navy. A. We are not aware that any data regarding the German 45-centimeter torpedo have been made public. 5. Is there any work giving complete statistics of all rapid-fire guns in use in the large navies? A. Brassey's Naval Annual gives full statistics. 6. Please put an article in your paper that treats of the new shins now building in England, i. e., "Dreadnought," armored cruiser "Orion," T. B. destroyer "Afridi," and the special type torpedo boat that is intended to make 36 knots per hour A. The "Dreadnought" was illustrated and described in the issue of the SCIENTIFIC AMERI-CAN of August 25, 1906. We have no data respecting the other vessels mentioned.

(10184) E. R. asks: Will you please state in your query column how many revolutions the earth makes in 365 days? A. The earth makes 366 revolutions on its axis in 365 solar days. One rotation of the earth on its axis is completed when a star which was due south last night is to-night in the same position. Since the earth is also moving in an orbit around the sun, the star seems to reach the south point about four minutes earlier each night than it did the previous night. The earth must turn on its axis about four minules of time more to bring the sun to the same place day by day. This extra time constitutes the difference in length between the solar and the sidereal day, and in a year causes that there shall be one sidereal day more than there are solar days. There are 365 solar days and 366 sidereal days in each year. T e sidereal day is the true measure of the rotation of the earth on its axis with reference to a star or to a fixed point in abso-

graphs cannot possibly refer to bodies falling and also burns the copper. This is what is in a vacuum seems to be shown by the sen meant by a "short circuit." 2. How may a small, practical, 110-volt current electric heater be made? Is not German silver wire the best for this purpose? A. If you want an electrical heater which may be attached to a lamp socket, wind about 200 to 220 ohms of fine German silver wire on porcelain tubes and mount in some convenient fashion. SUPPLE-MENT 1112, price 10 cents, contains valuable data concerning electrical heaters. 3. What is 'in English, and the former will be found the smallest size of wire allowed by the Fire Underwriters' Association for wiring building with 110-volt current? I have been using what is known as No. 14 rubber-covered for my outside, and No. 14 weather-proof for my inside wiring. In this am I meeting the requirements or not? A. No. 14 wire is allowed by the Underwriters to carry 12 amperes in rubber insulation, and 16 amperes in other insulations. 4. Do wires necessarily need to be soldered in joining them to make them more electrically and mechanically perfect? A. In good work wires are always soldered at junctions to other wires. No other connection is allowed.

> probably do, or may be expected to do. W_e character. The main feature is the classificadoubt if he tells any one, even if he knows himself, what he expects to do. We may say that there is no chlorine in cobalt, and no motive power in chlorine. We are sure that Mr. Edison does not expect to find either of these results in his investigations. 2. In antebellum days here in North Carolina, by rubbing a pocket knife blade across the points of the old flat strap iron on the railroad track, the blades of the knife so rubbed became highly magnetic, capable of lifting iron or steel objects of considerable weight, a fourpenny nail or larger perhaps. I have so done often my-

NEW BOOKS, ETC.

DICTIONARY OF ENGINEERING IN ENGLISH AND SPANISH. By Andres J. R. V. Garcia. New York: Spon & Cham-1906. berlain, 32mo.; pp. 150. Price, \$1.

The user will find some 3,000 technical terms in this little dictionary. The author provides two indices, one in Spanish and one specially valuable in translating from Spanish into English. The English index has been made as complete as possible without causing it to become too voluminous. The book is well adapted to satisfy the demand for an upto-date technical dictionary of the terms in general use by engineers using one or the other language.

ILLUSTRATED TECHNICAL DICTIONARY. Vol. I. Compiled by K. Deinhardt and A. Schlomann, Engineers. New York: McGraw Publishing Company, Engineers. 1906. 16mo.; pp. 403. Price, \$2.

This is the first volume of the American edition of a series of technical dictionaries (10186) J. C. B. says: 1. In what prepared by K. Deinhardt and A. Schlomann, probable way does Edison expect to utilize eleven volumes being in contemplation to give cobalt? Can he use the chlorine gas from it successively the industries of electricity, steam, as a motive power? If not, how to use it in hydraulics, mechanical handling of railways, storage batteries? A. We regret to say that bridges and structures, metallurgy, architecwe are not able to answer your inquiry, "In ture, and naval construction. The dictionary what probable way does Mr. Edison expect to is published on a new plan, and one that aputilize cobalt?" etc. It would be a hazardous pears more nearly to meet the numerous rething to attempt to tell what Mr. Edison will Quirements of thorough technical work of this tion'.whereby related subjects are brought together, the reference to any particular subject being obtained through a general index of the terms for all the languages covered. These are six in number. In addition to the German, English, French, etc., terms, the symbol or illustration of the term is frequently given. The work seems carefully prepared, with few typographical errors, and should be found useful by engineers and other technical men. The present volume treats of titles used in metal and wood work, drafting and general terms, machine design, and general machine-shop

POLYPHASE CURBENTS. By Alfred Still. New York: Whittaker & Co., 1906. 12mo.; pp. 352. Price, \$2.50.

The use of polyphase alternating currents for the transmission and distribution of electric power is becoming so extended, that the present volume should prove a welcome addition to the literature of the subject. The book treats in a non-mathematical way of the theoretical considerations involved in polyphase work. Practical engineers and students without the necessary mathematical knowledge required for the study of more advanced works will find the text and illustrations of value in obtaining a clear and comprehensive knowledge of the subject. The non-mathematical treatment of polyphase currents has been made possible to a large extent by the author's extensive use of graphical methods.

PERPETUAL CARE IN AMERICAN CEMETERIES. Reprinted from Park and Cemetery and Landscape Gardening, with additions of criticisms, and forms of contracts used by different cemeteries. Chicago: R. J. Haight, 1906. 12mo.; pp. 62.

LAYING AND FINISHING HARDWOOD FLOORS. By Frank G. Odell. New York: David Williams Company, 1906 1906. 12mo.; pp. 50. Price, 50 cents.

INDEX OF INVENTIONS For which Letters Patent of the United States were Issued for the Week Ending October 16, 1906.

AND EACH BEARING THAT DATE [See note at end of list about copies of these patents.]

 [See note as an analysis of the second se magnetic, capable of litting row or steel of the used in metal Attention derive, *J. S. Rever.* magnetic, capable of litting row or steel of the used in metal attention derive, *J. S. Rever.* magnetic, capable of litting row or litting derived rates a formation of the reverse of the used in metal attention derived, *J. S. Rever.* magnetic structure of the used in metal attention derived rates a formation of the reverse of the used in metal attention derived rates and the derived rates at the derive

lute space.	"In winter in the north temperate gong in fact	neat, ingitting, telegraphing with and without	way, W. W. Ruhle 833.246
(10185) H P C oaka 1 Why is it	everywhere north of the equator, the sun	wires, electric measurements, theories of elec-	Carpet sweeper, O. H. Sawdy
(10105) 11. D. C. asks. 1, why is it	everywhere horan of the equator, the sun	tricity advanced by modern thinkers. The book	Cashs, cleansing and coating apparatus of
	shines at suprise and sunset on north sides of		and for the interior of, H. Waihel 833,356
will not short-circuit the current, while a piece	houses which face due south. Has refraction		Caster, A. A. Fisher 833,453
of small copper wire of about the same length	of sun's rays anything to do with the fact?"	THE MANAGEMENT OF ELECTRICAL MA-	Castrating hox, O. Neff
as the filament of the lamp, when placed in	We do not understand the fact to be as you	CHINERY. By FIANCIS B. Crocker, E.	Cement facing slab X. Kuzmier
	state it. At the autumnal equinox in Septem-	M., Ph.D., and Schuyler S. Wheeler.	Change making machine, J. N. Warner 833.568
	ber, the sun rises in the east and sets in the	D.Sc. New York: D. Van Nostrand	Chart, astronomical, C. H. Wyman 833,433 Chart, protector C. P. Nutter
	west the world over. In that position the sun's	O 1000 10 000	
		Dute 01	Weaver
	rays at rising and setting would glance along		Chuck, H. P. Townsend
wire, provided, of course, that the current is	the north and south sides of a house which		Churn dasher, W. E. Wynne
on. Do I not, therefore, have reason for	faces south. The same is true at the vernal	the management and practical utilization of	Cigars and other articles, apparatus for
thinking that the air has something to do with	equinox. From September 22 till December 22	dynamos and motors contained in this book	the treatment of, A. Lerber
this? A. When the globe of an incandescent	the sun moves to the south, till on the latter	of Drs. Schuyler and Wheeler first appeared as	Circuit breakers, interlocking device for, C. H. Hill
lamp breaks, the hot filament is instantly	date in your latitude it rises about 29 degrees	a series of articles in the Electrical Engineer	Circuit closer, Bielak & Belock
hurned by the oxygen of the air just as any	south of the east point and sets the same dis-	some fifteen years ago. The arrangement is so	Circuits, protective device for alternating
other piece of carbon would be. The current	tance south of the west point. It is obvious	that the different subjects are treated sepa-	Current, D. Anwrews
is not short singuited by the flamont. The flagh	that its rays cannot in these positions shine	rately and in proper order, with headings of	Cistern, J. S. Attenhofer
is not short-circuited by the mament. The hash	that its rays cannot in these positions on the	heavy tange to fagilitate reference to the sub	Clamp, P. Broadhooks
of light which is seen is due to the chemical	on the north sides of houses which face south.	distance The polyme is intended to be simply	Clasp, D. O. McHugh 833,539
action of burning the filament, and not to any	Refraction could not produce any such effect	alvisions. The volume is intended to be simply	Clock winding indicator, T. J. Arneson 833,657 Clothes line holder, Dart & Maass
electrical action. When the circuit is bridged	as this. It changes the apparent position of	the basis of a more claborate doutment of the	Chutch friction P Modert 833 537
by a short copper wire, the resistance of the	the sun on the horizon about the diameter of	subject in a future work, but as such will be	Coke and gas making apparatus, F. Logan. 833,611
copper wire is small and a large flow Pof	the sun, or about a half degree; more exactly,	found of value. The present edition is, of	Coke and gas, producing, F. Logan
amperes takes place, which heats and melts		course, brought up-to-date in all its phases.	Collar, W. Scott

OCTOBER 27, 1905.
Collars, neekties, etc., device for holding, E. C. Bates, ..., device for holding, E. C. Bates, ..., device for holding, Coloring matter lake, C. Immerbeiser, ..., \$33,366 Concrete block, W. Kupper, ..., \$33,771 Conveyer, J. H. Olizan, ..., \$33,371 Conveyer, J. H. Olizan, ..., \$33,347 Conveyer, J. H. Olizan, M. C. Schwab, \$33,250 Conveyer, gravity, C. O. Hiler, ..., \$33,347 Conveyer, gravity, M. C. Holerah, \$33,250 Conveyer, gravity, M. C. Holerah, \$33,250 Conveyer, gravity, C. O. Hiler, ..., \$33,250 Conveyer, gravity, C. O. Hiler, ..., \$33,375 Conveyer, gravity, C. O. Hiler, ..., \$33,276 Consequence, gravity, M. C. Holerah, \$33,250 Conveyer, gravity, C. O. Hiler, ..., \$33,250 Conveyer, gravity, M. C. Holerah, \$33,251 Conveyer, gravity, M. C. Holerah, \$33,251 Conveyer, gravity, M. Lucas, \$33,351 Cornat plns, turning, W. H. Lucas, \$33,662 Conting device for starched laundrich goods, J. W. Ormsby, \$33,551 Curtison, A. L. & R. L. Baker, \$33,661 Curtain fature, automatic attaching, San gurter, J. W. Parker, \$33,661 Curtain and shade bracket combination, B. \$33,662 Curtain pole, C. H. Hookey, \$33,552 Curtain pole, C. H. Hookey, \$33,551 Curters in milling and cutting heads, means of fring, W. Vennberer, \$33,331 Cutters in milling and cutting heads, means of fring, W. Wennberer, \$33,331 Cutters in milling and cutting heads, means of fring, W. Wennberer, \$33,331 Cutters in milling and cutting heads, means of fring, W. Wennberer, \$33,331 Cutters in milling and cutting heads, means of fring, W. Wennberer, \$33,331 Cutters in milling and cutting heads, means of fring, W. Wennberer, \$33,331 Cutters in milling and cutting heads, means of fring, W. H. Keeves, \$33,335 Contain grave, J. Means, \$33,55 Contain pole, T. H. Horkey, \$33,55 Contain pole, C. H. Hookey, \$33,550 C

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The Use, Cost and Efficiency of Alcohol as a Fuel for Gas Engines are ably ex-plained by H. Diederichs in SCIENTIFIC AMERICAN SUPPLEMENT 1596. Many clear diagrams accompany the text. The article considers the fuel value and physical properties of alcohol, and gives details of the alcohol engine wherever they may be different from those of a gasoline or crude oil motor.

In SCIENTIFIC AMERICAN SUPPLEMENT 1581 the Production of Industrial Alcohol and its Use in Explosive Motors are treated at length, valuable statistics being given of the cost of manufacturing alcohol from farm products and using it in engines. French Methods of Denaturization constitute the subject of a good article published in SCIENTIFIC AMERICAN SUPPLE-MENT I 599

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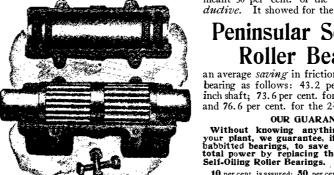
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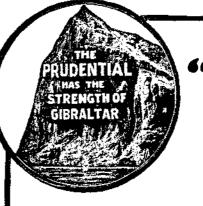
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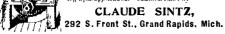
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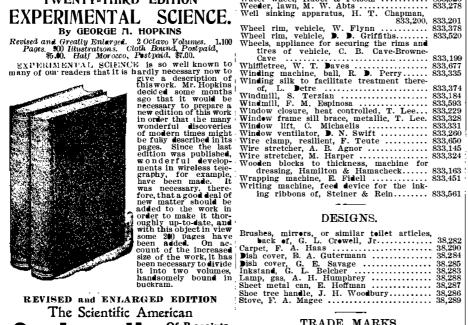
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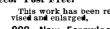
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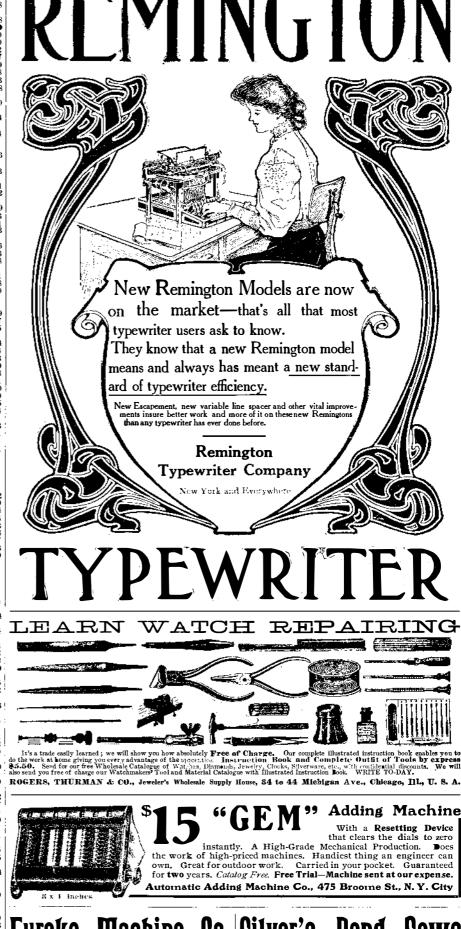
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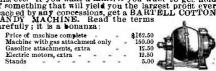
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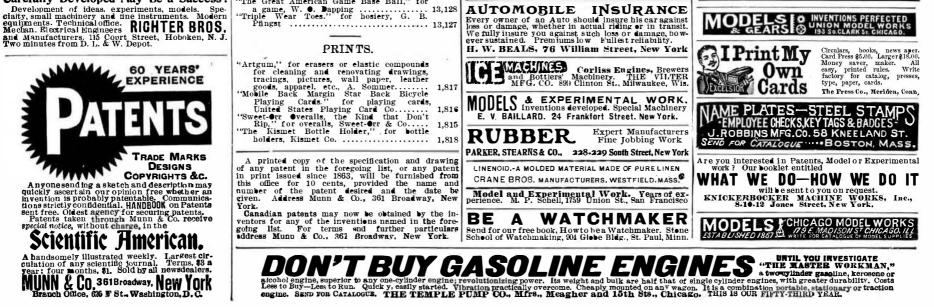


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