

HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters or no attention will be paid thereto. This is for our information and not for publication.

References to former articles or answers should give date of paper and page or number of question. Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all either by letter or in this department, each must take his turn.

Buyers wishing to purchase any article not adver-tised in our columns will be furnished with addresses of houses manufacturing or carrying

Special Written Information on matters of personal rather than general interest cannot be expected without remuneration.

Scientific American Supplements referred to may be had at the office. Price 10 cents each. Books referred to promptly supplied on receipt of price.

(9242) B. Jonas says: You would oblige me much by answering the following question: I have a galvanic battery giving 15 volts 70 amperes. Is it practically possible to charge with it a 110-volt storage battery? A. storage cell requires two and a half volts in the charging current and 4 to 61/2 amperes per square foot of surface of positive plate, reckoning both sides. The 15 volts which you have in your battery will therefore charge six cells at once. You can divide the storage battery into parts, and charge them successively. It will be a slow job, as there will be nine sections to be charged. It would be far more economical in both time and money to have a connection to a heavy current in your city, and charge the pattery in two sections at the same time.

(9243) F. B. P. says: Will you kindly tell me how much water will be discharged per hour through a pipe 1/8 mile long

6 inches dia., fall 11/2 inches to 100 feet 9 inches dia., fall 11/2 inches to 100 feet 12 inches dia., fall 11/2 inches to 100 feet 24 inches dia., fall  $1\frac{1}{2}$  inches to 100 feet

through square box 12 x 12 inches, same length and fall. Don't want any laborious calculation, but an approximate estimate. Water at mouth of pipe covers the mouth 2 or 3 inches. Pipe at outlet to have free, unobstructed discharge. It is said that a pipe running full will not discharge so much as one not quite full. If that all ready for action, an electric current will is so, I take it that a small obstruction at flow from it as soon as it is set up. They are mouth (where mouth is fully covered by water) not usually made in this way, but charged for would regulate the flow, so that the pipe would use after they are set up. 4. How much not run quite full. Or would the unobstructed water will a volt-ampere decompose? A. outlet in that length of pipe (1/8 mile) operate | Water cannot be decomposed by a current so as to prevent the pipe running full? Can you whose pressure is 1 volt. At least 1.48 volts refer me to some work on farm drainage, mod- are required to overcome the counter E.M.F. ern drainage by tiling, etc.? Can you refer me of the hydrogen and the oxygen and produce to back numbers of Scientific American con- any decomposition. taining articles on that subject? If so, I will equivalent of hydrogen is 0.00001038 gramme, write for them. Can you refer me to work on and of oxygen, 0.00008283 gramme. One farm buildings? A. Referring to your inquiry re- ampere will therefore decompose the sum of garding the flow of water through a pipe  $\frac{1}{16}$  of these numbers in one second, or 0.00009321 a mile long, with a fall of 11/2 inches to each gramme. This is reduced to ounces by divid-100 feet, we would say that a 6-inch pipe will ing by 28.35. deliver approximately 5,900 gallons per hour. a s-mon pipe will deliver approximately 13,000 to build a house for our own residence. It to match others. How would it do to build a 72-hour coke. We believe, however, that the deliver approximately 34,500 gallons per hour. It to match others. How would it do to build a 72-hour coke. We believe, however, that the deliver approximately 34,500 gallons per hour. A 12-inch square box will deliver approximately cellar floor to the peak of the roof. We have tween inner and outer walls? There are no deed, and that the amount of this difference A 9-inch pipe will deliver approximately 15,700 43,200 gallons per hour. A 24-inch round pipe a 6-horsepower (rated) gasoline engine, by will deliver approximately 207,500 gallons per means of which we desire to light the building given fall, and a given quantity of water flowing, the velocity of flow will be greater if the pipe is large enough, so that it does not flow of electrical solutions. We know practically nothing

swer correct? If so, what I know about astronomy goes for nothing. There is an annual revolution only about the north star. If there to east, there would be two apparent revolu-

one a motion of rising and setting in the of the Board of Fire Underwriters; there power applied to the axle, or the effective same manner as the sun, due to the rotation are usually State laws also. If you of the earth on its axis; the other a motion not insure, you may of course put the over from east to west, or if facing the north pole, over from right to left. This is caused are of the opinion that it would be safer by the revolution of the earth around the sun, and is accomplished in a year. Because of this motion, a star sets about four minutes earlier each night than it did the night before. The constellations in the north, which never set, have this motion, and can be seen to occupy all positions around the north pole in a year. The Great Dipper is below the pole at one time, and six months later, at the same hour of the night, is directly above the pole, 180 deg. from its former position. We do not think our answer on this point is wrong.

(9245) M. P. C. says: Please answer the following question: I have a double-acting steam engine, the cylinder of which is 1½ inches x 3 inches, speed 290 revolutions per minute. I wish to make a double-acting steam pump, to be connected directly to the engine piston rod. What should be the diameter of each inlet valve and each outlet valve? What Minerals sent for examination should be distinctly should be the dimensions of the cylinder? What marked or labeled. should be the size of the suction pipe and the discharge pipe? What should be the dimensions of the air chamber? What form of valve would be most suitable and simple? A. In reply to your question about a doubleacting steam pump which could be connected directly with your engine, making 290 revolutions per minute, with a stroke of three inches we would say that this speed is too high for any direct-connected pump to work satisfactorily. We doubt if the valves would open and shut smoothly in the length of time that would be available under the conditions you mention.

> (9246) A. L. asks: 1. Why is an electric current generated when the two wires are connected together of the Edison-Lalande battery? A. The current flows when the two wires from a cell are connected, because the chemical action is ready to begin at the instant of closing the wires. Most cells have no chemical action in them till the wires are connected; then the chemical action starts, and the current is generated. 2. How can copper be reduced to copper oxide or black oxide of copper? A. Copper is reduced to the oxide by passing oxygen over and through red-hot copper. It is far better to buy the copper oxide if you desire to use it in a cell. 3. If the same chemicals are put in at first in a storage cell, will the cell generate electricity the same as a primary cell? A. It The electrochemical

(9247) W. & Co. say: We are about hour. Each one of these pipes will deliver the with 50 16-candlepower electric lights through maximum amount when running full. With a the medium of a storage battery that will full, than it will be if a pipe is used so small of electrical science save what is picked up that the pipe must flow full; but for any given in our ordinary contact with it; but we desire sized pipe the maximum flow will occur when to do this job ourselves, partly as a means the pipe is full. It is immaterial whether you of self-education on the subject, even if in regulate the flow of water at the entrance or the end it should cost more than would the at the outlet, provided both are under water. employing of an expert to do the job, and arranged so that you could allow a free circu-We would refer you to, and can supply you then we know nothing about the practical lation of air through it or not, as you wished, with, the following books: "Irrigation of Farm, working of it after it is installed. What we Garden, and Orchard," by H. Stewart, price want to know is as follows: How and with Garden, and Orchard," by H. Stewart, price want to know is as follows: How and with be arranged by means of a small slide or \$1.50; "Drainage of Farms," by French, price what kind of wire should the building be damper. \$1.50; "Prainage for Profit and Prainage for wired? Would it be safe to bury permanently Health," by G. E. Waring, price \$1.50; also the wires in the concrete without pipes? Is be so kind as to give me information about; "Barn Plans and Outbuildings," price \$1.50, and "Stables and Outbuildings," price \$2.50. (9244) G. W. D. says: In your paper of battery would you advise? The dynamo will of September 19, 1903, Query 9174, F. M. L. have to be connected to the engine by belt, as asks for information in regard to the "Big when not in use generating electricity, we de-Dipper." He states that "at present" (I sup sire to use the engine for running an air pose about September 1) the handle of the compressor for refrigerating purposes, a pump "Dipper" points toward the earth in the early for pumping water to tanks in the attic, and evening, which is incorrect unless he was 10,000 a lathe and other tools in the shop in the miles to the eastward of the United States. At cellar. If necessary we can send you blue that date (September 1) the "handle" pointed prints of the house plans, showing the location upward about 45 degrees west between 8 and of all lights, and engine, as well as the desired 9 o'clock, and therefore would point toward location of the electrical machinery and keys the earth in 9 hours, or between 5 and 6 or switchboards. If there is any book you o'clock in the morning. However, this is not advise as covering these specific points, kindly the object of this communication. Is your an- let us know the title and price; but we would prefer that you would give us the information we desire as covering this particular case. A. There are many insulated wires suitable was a diurnal revolution from east to west, for wiring a house. You can safely buy the while the earth's diurnal motion is from west wire which any reputable dealer in your city may have in stock or may recommend. The tions of "Dipper." A. There are certainly two installation of the wires, lamps, switches, cut-

work in, in any way you please. We and in every way better to employ an intelligent electrical man to plan and put up the plant and teach you all about it. Every man to his own trade is a safe rule. not advise the burying of bare wires in concrete. Insulated wires should be used. The underwriters here require the wire to be placed in iron pipes also. You can get a copy of the rules of the underwriters on application to the New York Board of Fire Underwriters, 32 Nassau Street, New York city. The conduits for the wire should be left in the concrete, so that the wires may at any time be accessible. As to the dynamo, we would say get any dynamo which is easily accessible in your city, so that repairs and replacement of parts can be made easily. If you get a machine made at a distance, it may have to lie idle for weeks while you wait broken or burned-out part. The Westinghouse for machinery bearings similar to babon the voltage of the lamp, half as many cells babbitt metal properly of 16 candle power for six hours on one necessary. charge.

plied with water from a spring situated 68 feet: piers or columns. Will there be any difference below the water tank in the attic of the house, in weight upon the center pier or column, and about 200 feet distant in a horizontal directive whether cut in the center directly over the cention. The water is raised by a hydraulic ram, ter column, or if the girder remains in a whole bottom of the latter. Would it be a good plan uniformly loaded, and if the piers are absoluteto pass a lightning rod through the roof of ly level, the maximum stress in the girder will the house and into the water in the tank, in-stead of "grounding" the rod outside in damp length were used, by a small amount. The earth? The water tank is of wood lined with formulas for calculating the stress for such tinned copper. The water pipes are of galvan- "continuous girders" are very complicated, and ized iron. A. We would not advise passing a the results are inaccurate if there is even a and into the water in your tank, instead of reason such "continuous girders" are usually grounding the rods outside the house in damp not considered good practice in bridge conearth in the regular way. Water is not a good struction; and in building construction are conductor, and we do not consider it good prac- usually figured on the same basis as simple tice to have any part of a lightning rod pass girders extending over but a single span. inside of a dwelling.

the chimney, what is the cause of your trouble but the ordinary gas coke will burn satisfactween the inner and outer walls of the chim- arranged. ney would remedy the difficulty. It would probably be well for you to have this air space according to the weather conditions. This could

(9250) P. J. V. V. says: Would you review of the state of wireless telegraphy public review of t be so kind as to give me information about lished in the columns of the SCIENTIFIC this country, and the machines they use for it? Could you recommend me a book or treatise which gives full explanation on the subject? A. Shovels and pickaxes are made in this country in a great many different ways, different manufacturers using different processes Shovels are usually stamped from sheet steel, either by hydraulic pressure, steam hammers or drop forges, and pickaxes are usually dropforged from wrought iron or mild steel. Tooled steel points 3 or 4 inches long are then welded to the picks with a forked or double scari weld. We know of no treatise on the subject which would give you any detailed information.

(9251) C. W. N. says: Please answer through your query columns as to the meaning autobiography and astronomical anecdote, in recent advertisements of "brake horse pow- Prof. Newcomb has known almost every sciener," mostly applied to motor bicycles and automobiles. A. The meaning of "brake horse power" as applied to motor cycles and automobiles is "power which the engine is able to striking incident which makes their narration

do horse power of the engine, from the power developed inside the cylinder. The difference between the two is the friction of the engine.

(9252) H. L. E. says: Will you please let me know where I could obtain an enlarged engraving of the American beam engine, such as appears on a marine engineer's certificate or license? It is as good an engraving of this kind of engine as I have ever seen (but it is a little too small). It also shows the engineer starting the engine. Do you suppose you could obtain one of the blank certificates for me, as I do not want them for any dishonest purpose, only, as I said before, I like the engraving very much, as it shows all the parts of the engine very clearly. A. We know of no engraving like the one on the marine engineers' certificates and we do not think it will be possible for you to obtain one of these certificate blanks without passing the necessary examinations.

(9253) A. D. W. says: I am informfor some part to be forwarded to replace a ed that there is an alloy on the market Electrical Company, Pittsburg, Pa., are near bitt metal, but possessing the advantage of reyou, and make perfectly reliable apparatus, quiring no oil or lubrication of any kind; my for every part of your installation, excepting informant, however, did not know the name of storage batteries. They will probably advise this alloy. It occurred to me that you would you just what to get from beginning to end, probably know if there is such a material to You will then have a homogeneous installation, be had. I want it for very high speed but The chloride accumulator is very largely used light work. A. In reply to your inquiry, we for house lighting and central station work. would say that there are a number of so-called You will not go amiss by selecting it. The antifriction bearing materials on the market, amount of battery you will require depends; but we know of nothing superior to genuine lubricated with oil. as the voltage. You will require 150 ampere- In order to reduce friction to the minimum, hour cells if you only wish to run 50 lights oil or lubrication of a similar character is

(9254) J. R. P. says: Girder is 15 (9248) T. C. says: A house is sup-inches high and 50 feet long, resting on three and the pipe supplying the tank passes into the piece? A. We would say that if the girder is lightning rod through the roof of your house slight settling of any of the piers. For this

(9255) B. M. M. says: Will you (9249) S. H. S. says: I have a chim-please give me the difference in the number ney on my house that causes lots of trouble of heat units contained in equal weights of during extreme cold weather in winter by the best coke and hard coal? Also, what is the "sweating" and leaking down into kitchen difference in the relative value of 24-hour, 48-The chimney rests on a support in kitchen, hour and 72-hour coke? What would cause runs up through the attic, and extends about coke to clinker and run on the grates, and 4 feet above roof-total length, 11 feet. The what is considered the best kind of coke for house is built of brick, and the wall forms furnaces and stoves, when used as a substitute one side of chimney below roof. The chimney for hard coal? A. We would say that there is larger than the ordinary chimneys, with a is practically no difference in the number of larger flue. What can I do to remedy this heat units contained in equal weights of the trouble? Must have the chimney rebuilt this best coke and the best hard coal. They are summer, notwithstanding it was rebuilt last both very nearly pure carbon, and each confall, but it crumbled badly last winter, on tains about 14,500 British thermal units per account of so much sweating and freezing pound. We know of no definite data regarding Would like to keep chimney same size as now the comparative value of 24-hour, 48-hour, and masons here that seem to know how to over- will vary with the kind of coal from which come the trouble. The chimney worked all the coke is made. Impurities, such as silicates right until it was rebuilt last fall. A. In and certain iron compounds, in sufficient quantireply to question concerning your chimney, we ties, would cause the coke to clinker if the fire would say that it is impossible for us to defi- were hot enough to fuse them. Connellsville nitely decide, without thoroughly inspecting coke is one of the best cokes on the market, and what should be the remedy, but we are torily; in fact, any coke makes an excellent inclined to believe that a small air space be substitute for coal when the drafts are properly

## NEW BOOKS, ETC.

LA TELEGRAPHIE SANS FIL. L'ŒUVRE DE Marconi. Traduit du Scientific American de New York. Par Emile Guarini. Brussels. 1903. Pp. 64.

MERICAN SUPPLEMENT. only traced the development of wireless telegraphy from the experiments of Hertz to the present time, but he has also shown what Mr. Marconi has accomplished, and what the prospects are of a syntonized transatlantic wireless telegraphic service. The work is to be commended for its conciseness and for its accuracy.

REMINISCENCES OF AN ASTRONOMER. By Simon Newcomb, author of "Astronomy for Everybody," "Popular Astronomy," etc. Boston: Houghton, Mifflin & Co. 1903. With photogravure portrait. 8vo. Price \$2.50.

Prof. Newcomb's Reminiscences are certainly most refreshing combination of scientific tist who is worth knowing; and his meetings with the distinguished men of the world have usually been marked by the happening of some tions of "Dipper." A. There are certainly two installation of the wires, lamps, switches, cut-develop and apply to the driving axle of the a matter of peculiar interest. Astronomers motions common to all the stars in the sky— outs, fuses, etc., should conform to the rules machine." The term is used to distinguish the will read with particular interest that portion of the "Reminiscences" which deals with the transits of Venus in 1874 and in 1882, and of the founding of the Lick Observatory.

TASCHENBUCH FÜR FLUGTECHNIKER UND LUFTSCHIFFER. Von Major Hermann W. L. Moedebeck. Berlin: Verlag von W. H. Kühl. 1904. 145 Textabbildungen und 1 Tafel. Pp. viii, 587.

Major Moedebeck is well known among airship enthusiasts as the editor of an excellent periodical devoted to the interest of aerial navigation, and as an authority in aerial mechanics. In this second edition of his admirable textbook, Major Moedebeck has associated with himself three or four well-known experimenters. The book is intended as an advisory reference work for aeronauts. It is technical in its treatment of the various subjects discussed, thoroughly scientific, and from what we have been able to gather, fully trustworthy.

SUBJECT LIST OF WORKS ON THE MINERAL INDUSTRIES AND ALLIED SCIENCES IN THE LIBRARY OF THE PATENT OFFICE. London: Published at the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W. C. 1903. Pp. 302.

THE GEOLOGICAL STRUCTURE OF MONZONI AND FASSA. By Maria M. Ogilvie Gordon. Edinburgh: Turnbull & Spears. London: Simpkin, Marshall, Hamilton, Kent & Co., Ltd. 1902-03. 14 photographs, 33 figures, 4 geological sections (black and white), 8 geological sections (colored), 1 table of stratigraphical succession, 1 colored geological map, and 1 reference contour and fault map. Pp. x, 179.

## INDEX OF INVENTIONS

For which Letters Patent of the United States were Issued for the Week Ending December 8, 1903,

## AND EACH BEARING THAT DATE

[See note at end of list about copies of these patents.]

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AL IN	Castings, producing carbon steel, J. C. Davis Cattle delivering means, H. Bargeboer	746,03 745,99	39
CE. Of-	Chair and couch, convertible, F. S. Bown Cheese cutter, A. H. Hill	746,28 746,44 746,08	16 16
gs, 03.	Carpet fabric, woven, T. Daffin Cartridge decapping tool, H. M. Olney Cash register, T. E. Davis. Caster, J. W. Lawrence Casting machine, R. Baggaley. 746,237, Casting machine, metal, R. Baggaley. Castings producing carbon steel, J. C. Davis Cattle delivering means, H. Bargeboer Chain links, making, D. Carroll. Chair and couch, convertible, F. S. Bown. Cheese cutter, A. H. Hill. Chuck, plate, J. W. Carleton. Churn, G. Geer Chute, spiral barrel, G. W. Allen. Circuit closing device, Thompson & Midg-ley Clasp, H. R. Baker Claw bar, F. D. Holbrook. Clock, gographical, G. Jeager Clotes ine holder, W. P. Sampson. Coal furnace, soft, C. S. Hood. Coat, W. E. Smith Cock, gas regulating, A. M. Gummer. Coffee pot, C. A. Robertson. Collar fastener, A. Reed Collar, fold, W. Hess, Jr. Collar statener, A. Reed Collar, J. C. & R. A. Doring Composition material, G. H. Moore Computing and recording machine, F. S. Baldwin Conduit joint mold box, E. L. Du Bois.	746,62 745,98	29 35
NI vie	ley Clasp, H. R. Baker Claw bar, F. D. Holbrook	746,60 745,99 746,08	04 00 33
& lll,	Closet seat cover, W. D. Lauer	746,11 746,17 746,08	11 11 11 11 11 11 11 11 11 11 11 11 11
03.   0g-     8	Coat, W. E. Smith	746,18 746,50 746,16	5
ole ol-	Coin receptacle, H. J. Valentine Coke drawer, D. Ferguson Collar fastener, A. Reed	746,20 746,05 746,57	5 5 5
ce	Collar, fold, W. Hess, Jr.  Collar stretching and measuring apparatus, J. C. & R. A. Doring	746,07 746,04	8
= S	Computing and recording machine, F. S. Baldwin Conduit joint mold box, E. L. Du Bois Conduit section dowel pin, Field & Doo-	745,99 746,05	)1 51
	Conduit section dowel pin, Field & Doo- little	746,62 746,44	28 10
	Conduit section dowel pin, Field & Doo- little Container joint, W. L. Austin Converter, R. Baggaley Conveyor, W. T. James Cooling board, C. E. Windom Cooling board, A. H. Emigh Copper matte, converting, R. Baggaley Copper, refining, R. Baggaley	746,28 746,08 746,22	88
Ì	Copper matte, converting, R. Baggaley Copper, refining, R. Baggaley Cord shortening device, J. H. Seaman	746,31 746,24 746,24 746,17	19 16 8
ts.	Copper, refining, R. Baggaley. Cord shortening device, J. H. Seaman. Corn busker feeder, C. W. Brierton Corn busking device, W. L. Switzer Corn busking machine, J., H. & H. Koelling	746,00 746,64	17
405 352			
232 547 107	Crane arm, E. O. & C. W. Rood Crate, knockdown, Symes & Boyd Crate, shipping, G. E. Hallaron	746,16 746,19 746,07	8 9 5
338 539	Coupling for air or other ducts, S. L. Mc-Adams	746,26 746,52 746,63	9
380 359 117	Cuurent controlling derice automotic D		- 1
251 104 047	R. Owens	746,14 746,27 746,09 746,27	10 10 17
294 747   164	Cutter. See Cheese cutter.  Dampener, spring, E. Denegre  Dash brace, vehicle, N. B. Stone  Dial plate, J. F. Stevens  Die and reamer, combined, A. O'Brien  Dining room service, continuous, H. I.  Washburn	746,04 746,19 746,60	13 12 10
419 : 018 390 :	Die and reamer, combined, A. O'Brien Dining room service, continuous, H. I. Washburn	746,13 746,61	5
490 221	Disinfecting apparatus, L. Vandam Display rack or stand, S. Erb Door alarm. A. R. Strahan	746,41 746,31 746,19	13 15 16
198 584 335	Door hanger, W. B. Smith, reissue  Double boiler, A. J. Wentzel  Draft equalizer, H. R. Tomson	12,18 746,21 746,64	3
211 034 012 067	Drill pressure device, E. H. Ackerman Drilling apparatus, Upton & Gilman Drilling machine W. A. Kegelmacher, Ir.	746,56 746,43 746,20	16 12 14
090 263 365	Driver's seat, adjustable, T. M. Ramsay Educational appliance, H. O. Dunn Egg_cutter_guide and regulating device, G.	746,15 746,30	54
279 412 052	Dining room service, continuous, H. I.  Washburn  Jish drainer, M. G. Reeves  Disinfecting apparatus, L. Vandam  Display rack or stand, S. Erb.  Door alarm, A. R. Strahan  Door hanger, W. B. Smith, reissue.  Double boiler, A. J. Wentzel.  Draft equalizer, H. R. Tomson  Dredge, R. R. Osgood.  Drilli pressure device, E. H. Ackerman.  Drilling apparatus, Upton & Gilman.  Drilling machine, W. A. Kagelmacher, Jr.  Driver's seat, adjustable, T. M. Ramsay.  Educational appliance, H. O. Dunn  Egg cutter guide and regulating device, G.  J. Haslam  Electric battery, S. Yai  Electric battery, M. R. Hutchison  Electric conductor, C. M. Clark  Electric intruer tripod box, J. E. Ercambrack  Flectric lighting system J. F. MeFlever	746,50 746,22 746,51 746,46	15 17 14 13
354 262	Electric fixture tripod box, J. E. Ercam- brack Electric lighting system, J. F. McElroy Electric motors, controlling, M. Waddell,	746,31 746,36	16
169 606	Electric motors, controlling, M. Waddell, reissue  Electric motors, means for controlling, M. Waddell, reissue	12,17	19
998 511 485	reissue Electric motors, means for controlling, M. Waddell, reissue Electric switch, A. Rivenburg Electrical connection, F. J. Russell. Electrical distribution system, J. H. Hallberg	746,57 746,58	30
031 156 589	Electrical regulation system, M. Mosko-	746,07 746,48 746,55	3
103 313 374	Electrical wire support, B. Cullen Elevator bucket, S. E. Flock Embroidery silk frame, M. V. Westbrook	746,46 746,48 746,21	9
551 576 986	witz Electrical wire support, B. Cullen Elevator bucket, S. E. Flock Embroidery silk frame, M. V. Westbrook. Emery wheel dressers, hand device for holding, W. H. Gilbert Engine electric igniter, gas, G. J. Rathbun	746,06 746,37	
32 <b>)</b> 188	Engine exhaust box or silencer, explosion.		- 1
548 215	A. Krebs Engines, circulating apparatus for internal combustion, G. J. Murdock Exhibitor, curtain, Haviland & Sicklesteel	746,35	68
172 320 520	Exhibitor, curtain, Haviland & Sickle- steel Explosion engine, W. C. Weatherholt Eyeglass fitting, J. C. Schmidt Eyeglass frame, A. S. Van Denburgh Eyeglasses, L. Kleb Eyeglasses, G. H. Mayer Fan, H. M. Kissling Fatty substance and making same, O. Lie- breich	746,17 746,60 746,34	5 8 1
317 428 217	Eyeglasses, G. H. Mayer	746,54 746,52	3
450 099 098 607	Feed water heater, W. M. Wright Feed water heater and purifier, T. V. El-	746,63 746,22 746,47	6
386 407	Fooding and hand outting machanism F	746,37 746,50	9
569 995 540	S. Rich Fence, C. T. Hammack Fence weaving machine, E. G. Overholt Fence, wire, J. S. Barnes Fender. See Vehicle fender. Fiber cleaning machine vegetable. T. Fini-	746,13 746,44	9
540 225 459	Fiber cleaning machine, vegetable, T. Finigan Fifth wheel antirattler, F. E. Wilcox Filter. A. N. Clark	746,05 746,21 746,29	.8
327 564	Theplace, D. C. Simons	746,55 746,18 746,34	2 5
326 195 531	Fish spear, A. J. Campbell  Fishing reel with adjustable head, A. F. &  W. Meisselbach, Jr.	746,45 746,54	5
385 602	Floor and strengthening member therefor, P. M. Bruner  Fluid pressure, developing and utilizing, J. C. Fraley  Fluids resulting the supply of F. Wind.	746,00 746,31	
613 025 079		746,48	8
458 <sup> </sup>	hausen, Jr.	1 20,22	' ت

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1	Flushing apparatus, R. F. Gillin	746,324	Musical instrument, self-playing, L. B.	
8	Flushing apparatus, R. F. Gillin Folding chair, H. G. M. Howard Form, garment, A. K. Maxwell Fruit sizing machine, A. C. Burk	746,085 746,350	Dorman Necktie fastener, H. E. Curtis Necktie bolder, L. F. L. Pynchon	746,472 746,035
9	Fruit sizing machine, A. C. Burk Fuel blocks or briquets, manufacturing, O.	746,011	Necktie holder, L. F. L. Pynchon Needle threader, W. A. Johnston	746,578 746.091
9	Neugebauer	746,366	Needle threader, W. A. Johnston Nicotin trap and smoke cooling appliance for tobacco pipes, W. A. Ede-Clendin-	
5	A. Lohmann	746,118	nen	746.308
2	Fuel into combustion chambers, apparatus for injecting pulverized, C. H. Gif-		Nozzle directing device, E. J. Lasher Nut lock, J. A. Christ	746,026
2	Furnace, T. V. Elliott	746,493 746,310	Nut lock, W. Cronk	746,296 746,363
1	for injecting pulverized, C. H. Gifford V. Furnace, T. V. Elliott Furnace feeder, W. T. Barker Fuse or cut out, electric, L. W. Downes. Game apparatus, J. A. McKenzie Game, card, H. E. Gavitt Garment fastener, M. F. Eisner. Gas burner and heater, regenerating, J. W. McKnight	746,265 746,050	Nut lock, W. Cronk Nut lock, F. L. McGaban Oar lock, E. Montreuil Oil burner, McFarlane & Pushaw Oil burner, W. R. Smith Oils, machine for testing the lubricating	746,642 746,562
0 2	Game apparatus, J. A. McKenzie	746,364 746,492	Oil burner, W. R. Smith	746,596
8	Garment fastener, M. F. Eisner	746,478	power of, H. V. Blake Open air furnace, A. Boyer Optometer, A. J. Shellman	745,997
3	McKnight Gas burner mantles, Lippitt & Whitcomb. Gas burner regulator, W. G. Midgley. Gas engine, L. H. Nash	746,129 746,536	Optometer, A. J. ShellmanOres, recovering values from silicious, R.	746,394
9	Gas burner regulator, W. G. Midgley	746,546	Baggaley	746,260
9	Gas generator, acetylene, O. Parker Gas generator, acetylene, L. P. Powell		Oven renector attachment, w. C. Trow-	
2	Gas, manufacturing, C. F. Brush Gas or liquid supply pipes, cut off apparatus	746,452		746,203 746,409
8	for, F. W. A. Wiesebrock	746,425	Oxyhydrocarbon burner, C. W. Turner Padlock, permutation, C. O. Tooker Paper bag machine, L. P. Eisenbeis	746,202 746,309
0 6	for, F. W. A. Wiesebrock Gas producer charger, G. Sieurin Gases, apparatus for arresting impurities from furnace, R. Baggaley	746,591	Paper, etc., machine for perforating, J. B. Allen	
4 5	Gases, apparatus for precipitating injuri-		Pencils penholders etc rack for I	746,585
9	ous fumes from smelter, R. Baggaley, 746.236.746.256.	746,257	Adair Percolator, coffee G R Fyfe	746,231 746,063
2 7	Gases, apparatus for removing impurities from furnace, R. Baggaley	746,261	Perforating machine, A. M. Bovier Photographic developing machine, B. J.	746,274
6	Gases, apparatus for the treatment of fur- nace. R. Baggaley	746.255	Photographic negative cleaner, H. C. White	746,632
9	nace, R. Baggaley	746 259	Photographic plate and film, isochromatic,	
5	Baggaley Gear wheel, F. Saxon Gearing, L. S. Clarke Gearing, power transmission, G. E. White- side	746,583	L. Smith Photographic printing frame, M. W. Arm-	
40	Gearing, power transmission, G. E. White-	740,021	strong	746,234
3	Generator or motor suspension, waddell &			
7	Brooks	746,610	means for attaching, G. Tippett Pickling vat weight, C. G. Deible Pipe bracket, steam, A. J. Beaton Pipe cutting tool, F. A. Headson	746,648 746,041
14	Globe or mantle protector, J. L. Cavanaugh	746,498 746,460	Pipe bracket, steam, A. J. Beaton	746,269 746,076
5	Go-cart, F. E. Southard	746.190	Pipe die and reamer, combined, A. O'Brien Pipe trimming tool. I. Emond	746,136 746,312
5 5			Pipes, means for coiling, C. L. Schalitz Pistol, match shooting, I. Marchall	746,387 746.549
5 5	Grain cleaning, scouring, and cooling device, F. W. Hess Grinding mill, J. C. Bowsher Guano distributer, J. S. Byrd	746,508	Pipe cutting tool, F. A. Headson	746,285 746,286
8	Grinding mill, J. C. Bowsher	746,275 746,282	Planimeter, F. R. Williams	746,427
8	Handle fastener, R. S., H. P. & E. C. Hoyt	746,086	Sigfridgen	746 500
1	Hangar Saa Door hangar		Plate finishing machine, E. D. Tucker Plow, J. D. Campbell Plow attachment, W. H. Betts Plow handle, S. Bredahl Plumb, mason's, Moran & Grant	746,015
i	Harness breast bow, C. Severns Harrow riding attachment, A. W. Perry. Harrow, rotary, T. S. Wagoner. Harvester reel, W. H. Lightcap	746,146 746 209	Plow handle, S. Bredahl	746,003
8	Harvester reel, W. H. Lightcap	746,534	Plumb, mason's, Moran & Grant Pneumatic actuating device, G. S. Williams. Pneumatic dispatch apparatus, B. C. Bat-	746,220
8			Cheller	746.267
8 3	Phillips  Hat and coat rack, bedstead, W. J. Dick. Hat brim curling machine, D. Clerico	746,293	Pneumatic tubes, sending device for, B. C. Batcheller	746,266
9			Pot.   See Coffee not	
8	Hay press, J. B. Hall Hay press, W. F. Nanney Hay sling lock, F. B. Strickler	746,132 746,197	F. I. Du Pont	746,375
5 7	Heating and evaporating apparatus, continuous motion, H. D. Perky	746,145	Powder, apparatus for molding smokeless, F. I. Du Pont Power, means for transmitting and equalizing variable, L. E. Gaylord Preserving jar, J. M. Grau	746,323 746,496
6	Heating and evaporating apparatus, continuous motion, H. D. Perky Heating element, electric, J. F. McElroy. Heddle bar or support clamping device, Stimpson & Short	746,128	Pressure regulator, S. L. McAdams. Printing, A. Hoz	746,560
٥	Stimpson & Short	746,401	Printing macuines, pneumatic laying of	130,001
6	J. Perkins	746,144 746,398	apparatus for cylinder, W. M. Rock- stroh	746,651
9 5	Hinge, S. J. Hogan	746,509	Printing press, C. H. Cochrane Printing press shoo-fly, J. J. Mosher Printing wall paper, hand press for, E. A.	746,464 746,124
4	Hinge, gate, J. D. Parkinson	746,142	Printing wall paper, hand press for, E. A. Popcke	746,152
9	Hip reducer and hose supporter, combined,	740,212	Popcke Propeller, E. Bruncker Pump actuating device for steam engines, air, G. B. Petsche.	746,007
3	Hitching device, F. Obiols	746,135	Pump, air, T. N. Case	746,373 746,019
2	Hook and eye, C. E. Penman	746,372	Pump, air, T. N. Case Pump engine, steam, J. A. Reed Pump, interchangeable cylinder, G. A.	
0	Horse overshoe, G. Batty	746,268	Kiohn	746,344 746,482
7 3	J. Perkins J. Perkins Hinge, J. Soss Hinge, J. Soss Hinge, S. J. Hogan Hinge, convertible, A. F. Enquist Hinge, gate, J. D. Parkinson. Hinge, gate, J. D. Parkinson. Hinge, spring, E. Bommer Hip reducer and hose supporter, combined, M. E. G. Darrah Hitching device, F. Obiols Hook and eye, C. E. Penman Horse controlling device, J. V. Higgins. Horse overshoe, G. Batty Horseshoes, making composition, G. J. Peacock Hose and making same, armored, E. T. Greenfield Hose coupling, armored, E. T. Greenfield. Hose coupling, armored, E. T. Greenfield Hose supporter, A. H. Cohn Hot air furnace, P. M. Bruner Hot air heater, C. F. Brand Hydrant, automatic, T. F. Murphy Hydrocarbon burner, C. H. Knobbs Hydrocarbon burner, liquid, D. J. Canchester	746,143	Kiohn  Pump, rotary, H. O. Evans.  Pump, submerged force, Davis & Henshaw. Pumping engine, G. A. Krohn  Puzzle, E. B. Kirk	746,038
3	Greenfield	746,630 746,497	Puzzle, E. B. Kirk	746,105
$\begin{bmatrix} 2 \\ 0 \end{bmatrix}$	Hose supporter, A. H. Cohn	746,030 746,00 <b>5</b>	Puzzle, E. B. Kirk Puzzle, N. B. Stone Quill-tip finish, J. J. Robinson. Quilling machine, R. Atherton Rail chair and joint, McCann & Brassel. Rail cover, third, H. C. Morgan. Rail joint, C. G. Ford Rail joint, W. A. Moffat Rail joint, W. A. Moffat Rail joint, F. W. Welharm Rail joint, G. A. Weber Railway block signal, automatic, P. A. Sawyer	746,578
7	Hot air heater, C. F. Brand	746,002 746,125	Rail chair and joint, McCann & Brassel	746,127
5 9	Hydrocarbon burner, C. H. Knobbs	746,525	Rail cover, third, H. C. Morgan	746,556 746,567
3	chester	746,283	Rail joint, C. G. Ford	746,487 746,550
6	Ice conserver, H. S. Van Fleet	746,414	Rail joint, F. W. Welharm	746,620 746,650
3	Hydropneumatic engine, L. Kessler	746,645	Railway block signal, automatic, P. A. Sawyer	746,582
6	Indicator, W. E. Adams	746,570	Railway, electric, R. Hubner	746,512 746,022
4	rell	746,523	Railway pleasure, G. S. Crane	746,467 746,430
4	rell Insect trap, H. Andrews Insulator, S. Bower Insulator hanger or bracket, G. H. Mc- Featons	745,999	Sawyer Railway, electric, R. Hubner Railway frog, W. A. Chapman Railway pleasure, G. S. Crane Railway rail, H. B. Yost Railway rail ends, device for increasing the vertical and lateral stiffness at the innerture of I M Criswold	.,200
5	Featers	746,362		
5 7	Insulator hanger or bracket, G. H. Mc-Featers  Internal combustion engine, E. Korting  Iron bars, cross jointed, K. Zucker  Jewel setter, W. F. Boast  Joint and pipe support, J. N. Brennan  Journal lubricating device, R. Baggaley.  Justifying mechanism, F. B. Converse, Jr.  Label making and printing machine F.	746,230	Railway structure, S. F. Seely	746,644 746,304
4 3	Jewel setter, W. F. Boast	746,518 746,444	Razor handle, E. A. Langdon	746,348
6	Joint and pipe support, J. N. Brennan Journal lubricating device, R. Baggaley	746,277 746,243	Receptacle closure, J. E. Gavin	746,491
1	Justifying mechanism, F. B. Converse, Jr Label making and printing machine, F.	746,295	Refuse destroying apparatus, G. Watson	746,421
0	Waite Lacing attachment, shoe, A. A. De Loach. Lacing, shoe, J. McMahon. Lamp, T. S. Leese Lamp chimney or bottle carrier, E. P. Henigan Lamp, electric arc, Stogsdill & Schatz.	746,209 746,042	Railway switch, J. P. Pulsifer. Railway tie, A. S. Dreibelbis. Razor handle, E. A. Langdon. Razor strop, Jackson & Sharp. Receptacle closure, J. E. Gavin. Receptacle, non-refillable, H. W. Avery. Refuse destroying apparatus, G. Watson. Rein holder, J. R. Carroll. Rein holder and guide, combined, J. I. Stamper Roller and barrow, combined, G. W. Larison	740 500
9 7	Lacing, shoe, J. McMahon Lamp, T. S. Leese	746,563 746,637	Roller and harrow, combined, G. W. Lari-	740 500
Ò	Lamp chimney or bottle carrier, E. P. Henigan	746,077	Roller, harrow, and cultivator, combined,	740.000
3	Lamp, electric arc, Stogsdill & Schatz Lamps, revolving canopy attachment for	746,601	Rolling mill, universal, R. D. York	746,228
8	Lamps, revolving canopy attachment for, M. J. Murdoch Land roller, R. S. Buch	746.453	Roller, harrow, and cultivator, combined, O. A. Gallatin Rolling mill, universal, R. D. York. Rotary engine, L. J. J. B. Le Rond. Rotary engine, G. Guyer Rotary engine, A. Guindon, reissue. Rotary meter, W. H. Larrabee	746,501
9 6	Latch spindle bearing, F. W. Schneider Leather board or similar material, machine for manufacturing, A. H. Thompson	746,176	Rotary meter, W. H. Larrabee	12,183 746,634
4			Rotary steam engine, Tuqua & Buehler	746,489
8	erspoon Ledger or similar book, bank, J. H. Rand. Leg, artificial, J. Johnston. Linotype machine, J. K. Van Valkenburg. Loading apparatus, R. Baggaley.	746,150 746,157	Ruler parallel, Glaholm, & Kent Sad iron, B. Holz, Jr	746,494 746,510
7	Leg, artificial, J. Johnston Linotype machine. J. K. Van Valkenburg	746,336 746,415	Saw handle, G. W. McMillian Saw handle, T. Laughlin	746,635
7	Loading apparatus, R. BaggaleyLock. J. Schell	746,253 746,174	Saw making machine, A. H. Cruse Saws in cutting down trees, contrivance for	746,297
8	Lock box E L Krag	746 106	actuating hand, R. C. Stillfried Scale, C. F. Christopher	746,191 746,461
6	Locomotive track sanding apparatus, alarm valve for, C. Longstreth Log_car toggle chain release, Ashcroft &	746,537	Ruler parallel, Glaholm, & Kent	746,138 746,454
5	Lubbers Ashciott &	746,438	Scart-pin, G. W. Dover	746,049 746,302
8	Lubbers Loom filling stop motion, W. A. Fowler. Loom, needle, B. Saner Loom shuttle box motion, F. Hofmann Loom shuttle lubricating dayies D. Mo-	746,581	Negling and stambing machine envelop.	
3	Boom shuttle lubilcating device, D. Mc-		J. E. Lester	746,114
5	Taggart J. Arrance	745.987	J. M. HicksScaling vessels, means for, J. M. Hicks	746,332
6	Mail bag, C. H. Burton	746,233	Seat. See Driver's seat.	
9	Marking machine, S. I. Prescott	746,376	Seeding machine, disk drill, J. S. Rowell Separator, R. W. Jessup	746,089
3	Marking machine, S. I. Prescott	746,321 746,241	Sewing machine blindstitching attachment, E. Donaldson	746,303
j   1	Meter. See Rotary meter.	140,010	Shade hanger, adjustable, Forsberg & Rogan	
ı	Meter coupling, F. Sheridan	746,181 746.328	Shade roller holder, window, G. L. Smith Shaft, flexible, H. P. Brown	746,396 746,451
6	Milk compound and producing same, synthetic, W. A. Hall	746.502	Rogan  Shade roller holder, window, G. L. Smith Shaft, flexible, H. P. Brown  Shampoo bowl stand, M & H. Romans. Shears holder, S. H. Shank Shoe fastening, J. W. P. Bunning Shoe holder, R. W. Showdon  Shoe holder and stretcher, H. C. Pomeroy. Shoe holder and stretcher, H. C. Pomeroy.	746,167 746,392
2	Milk cooler, hydraulic, Z. C. Womble	746,623	Shoe fastening, J. W. P. Bunning Shoe holder, R. W. Snowdon	746,280 746.187
2		746,016	Shoe holder and stretcher, H. C. Pomeroy Shoe lining marking machine, Dix &	746,151
5 5	Mines, etc., safety mechanism for winding apparatus for, J. Berry		Quinn	746,470
4	Molder's flask, Clapp & Sague.  Monkey wrench, T. J. Robertson.  Mower, lawn, W. Duckett.  Mowing machine attachment, T. B. Fagan,	746,382	Sign, H. L. Casperson	746,020
9	Mowing machine attachment, T. B. Fagan,	19,100	Silo, W. B. Cannon	746,017
8	Mud guard and luggage carrier, combined,	740.055	Slag-heated boiler, R. Baggaley 746,239,	746,240
8	Muffler and chest protector, combination,	740,603	Snutter, folling, P. Edner Sign, H. L. Casperson. Signaling device, electrical, H. C. Giles. Silo, W. B. Cannon. Slag boiler, R. Baggaley Slag-heated boiler, R. Baggaley746,239, Slate-ruling device, school, J. E. Dundore. Slip and shrinkage gage, A. J. Wold Smelting furnace, copper, R. Baggaley Smoke consumer, H. Wilkins	746,622
2	School & Schafer	746,586 746,587	Smoke consumer, H. Wilkins	146,258 <b>746,426</b>