Α

(5305) T. K. writes: I observe very frequent reference in the SCIENTIFIC AMERICAN to the Fuller battery. I have tried, without success, to get information about this battery or to obtain the cells or parts of them here, as it seems to be quite unknown. I should therefore feel greatly obliged for a working description such as would enable an average amateur to construct the battery. I wish it for use with a bedroom glow lamp of about 6 volts. I use at present 3 cells plunge chromic acid battery, but the lowering and raising of the plates is troublesome, as the battery is only d occasionally for a minute or two at a time. How long does the zinc generally last? Is it free from local action when the circuit is open ? Is chromic acid, bichro matel of potash, or chromate of soda best for such batteries ? A. We advise you to use the plunge battery. as the Fuller will not stand an open circuit. It is described in our SUPPLEMENT, No. 159. The zinc would last a long time, except that the solutions would mi xand local action would occur. Chromic acid or sodium chromate are preferred to the potassium salt.

(5306) W. W. P. writes: I have a double sulphate of nickel bath (about 20 gallons) which from ? A. The lowest pointon the Ohio divide is probaworked with perfection until lately. It now turns dark, and it seems to turn only in spots. I think the bath is of State, at Columbus, can refer you to authorities on strong enough, as it weighs $8\frac{1}{2}$. The nickel scales where the black streaks occur. Please give me some receipt for taking foreign matter out of the solution. Could I overcome the difficulty by evaporating all the water and make | ada between Lake Ontario and Hudson Bay. Chautana new bath with the nickel ? A. By adding with constant stirring a saturated solution of ammonium sulphate to your bath, you can precipitate the double nickel-am monium salt, leaving the supernatant liquid colorless From the precipitate make up a new bath. (Unwin.)

(5307) F. P. writes: I would like to make some bottled soda water and I think I can do it by filling the bottle with water, putting in the proper amount of sodium bicarbonate, and lastly some citric acid in dissolve enough to act on the soda. What proportion of water, soda, and acid is best to use? Is there any way or material that would be better or cheaper that I could use without some special apparatus or tools ? A. You require for three parts of citric acid, about four parts of sodium bicarbonate. For a pint bottle use two drachms citric acid and two and one-half drachms sodium bicarbonate. You may use the same quantity of tartaric acid instead of citric. There is no better way of doing without special apparatus.

(5308) "Beta" says: How many quart size Fuller cells would be required to operate an induction coil giving $\frac{1}{2}$ inch "parks, and about how many hours would they give a stream of sparks continuously on one charge of cells? An average estimate only re quired. A. Four to six cells should answer. They would run it many days before exhaustion, but owing to the mixing of the solutions, it would gradually become polarized.

(5309) C. C. W. writes: Many remedies have been offered in your columns from time to time for the relief or cure of poisoning by oak or ivy, and all prohably have merit. I have found however that a solution of boracic acid, applied frequently, as soon as the symptoms make their appearance, will do wonders, in nearly every case completely breaking up the threatened inflammation. If the trouble has made much progress, the effect of the solution is still very much better than any other preparation that I have ever seen used, rapidly reducing the pain and inflammation. It seems to be fairly entitled to the name of specific. A saturated solution of the acid in hot water should be made, and that diluted with from one-third to one-half volume of water for use.

(5310) M. A. T. says: 1. Near our city is a gas (natural) pipe line thirteen miles in length. The first three miles are laid with six inch pipe, the remaining ten miles with eight inch pipe. The pressure at wells is 100 lb., at entrance to city it is about 25 lb. The line is laid over a hilly country. Do you think it possible to use an air compressor that will give a uniform pressure of 75 lb. at the city? If possible, how large a one and how much power will it take to drive it with ? A. The laying of a new line of eight inch pipe, or even ten inch pipe, will be the most economical way of increasing the pressure at the end of the line. We cannot assign a definite size or cost of a compressor plant without knowing the present flow and proposed increase from pumping, which will require a compressor and boiler plant large enough to handle the total output of the gas well, and although the differential pressure head would not be very great, say 50 pounds per square inch, the volume would require the operation of a very large compressor-possibly from \$6,000 to \$8,000 would cover the cost of the plant, and require from 150 to 200 horse

practicable to drive a small boat-large enough to carry leak below the pump valves, the efficiency is lessened, two persons-say ten or twelve feet long by about two although not perceptible to the eye. The best principle feet beam, a speed of five or six miles per hour by hand is the best practice in setting a pump chamber, viz. power screw? According to my calculation, a ten inch close to the water. 00 revolutions minute, would do. Am I near it? Otherwise which would be the haudiest and best power for a small boat like that? Could it be driven by an electric battery? If so, what about cost of such battery ? Boat to be used on narrow and crowded river and occasionally on open bay -Hoboons Bay-in fine weather. A. Although two m n are power nough for a speed as stated in so small a boat, there are mechanical difficulties in its application that will modify its possibilities. A ten inch screw at 200 revolutions with a pitch of thirty inches, of which there can be realized not more than two feet of speed per revolution-a little less than five miles per hour, or with 250 revolutions per minute, will give a speed of nearly six miles. The necessary gear fortransmitting the power from the hands to the screw will somewhat diminish the result in speed. The boat is too small for successful application of electric or other power.

within a reasonable distance, the pond can be made tight with a clay and sand puddle, which, if two parts clay to one part of the sand from the excavation is used, should be fairly tight if made six inches thick all over the bot tom and sides, well compacted by ramming, then covering with six inches of the fine top loam. If required for gathering ice, it should have a top dressing of coarse sand or gravel to prevent the water from becoming muddy by wind agitation. If no clay can be had, hydraulic cement should be used in the place of the clay, and which may be mixed with the sand dry by raking into the bottom and sides and wetting by sprinkling, then a top dressing of loam and gravel as before.

(5313) T. H. writes: Can you give the point of lowest elevation on the dividing ridge between Lake Erie and Ohio valley-from Chautauqua Lake to To ledo ? If you have not the data at hand, perhaps some of your readers have. Where shall I hunt to find the difference in the levels of Lake Ontario and Hudson Bay There is water running out of Chautauqua Lake at all easons, more, apparently, in a dry season than enters on the surface. Where is this water supposed to come bly along the line of the Wabash Canal. The Secretary the elevation. Lake Ontario is 234 feet above the level of the sea. Hudson Bay is supposed to be at sea level. There is no reliable survey across the highlands of Canqua Lake lies in a watershed of gravelly soil, through which the water percolates to the lake in springs beneath its surface

(5314) P. R. L. writes: It is stated in "Experimental Science" that an induction coil may be used in charging a Leyden jar. I do not understand how a condenser may be charged by an alternating current. Please explain the process and principle. A. To charge a Leyden jar or battery, by means of in crystals and corking it quickly before the acid can an induction coil, connect the outer coating of the jar with one pole of the coil and the inner coating with the other pole, making the connection through a pair of of this most singular people. pointed discharge rods having their points separated to such a distance as will permit only the direct currentthat of opening-to pass. This current, which is of higher potential, is alone used for charging.

> (5315) O. S. asks: 1. Will you give me directions how to mend rubber, so that it will hold warm water? A. The only way to mend rubber so that it will withstand hot water is to apply a patch consisting of a layer of vulcanized rubber, then vulcanizing the whole. 2. Which is the best for field magnets of motor 767, cast iron or malleable iron, the armature being soft annealed malleable iron ? A. Use soft gray cast iron. 3. How many layers wire would you wind on the fields, and how close should the armature run to the fields? A. Wind magnet wire on the field magnet until the depth of the winding is equal to the depth of the winding on the magnet core. The armature should always remain as near the field magnets as possible, without touching.

> (5316) J. S. F. asks: Has the United States passed a law and fixed a penalty for mufflating foreign coins ? A. There is no law against the use or abuse of foreign coins in the United States.

> (5317) J. B. R. asks: Is there always a draught up a tall chimney, and does this draught vary at times very much ? If there are times when no draught at all is felt, please give conditions. If there is always a draught up a chimney, as some authorities say (even though fire is not present), why is this not perpetual motion, and, if the chimney is largeenough and sufficient chimneys were built together, could not power be produced? A. The draught of cold chimneys up or down depends entirely upon a small difference of temperature between the outside and inside, or the effect of the wind blowing across the top, which generally produces an up draught. Its power is very feeble, and cannot be considered perpetual motion, because it is due to natural

(5318) J. W. S. writes: Do you think there is anything in the very common notion among practical mechanics that pumps raising water to a considerable height must be down close to the water to do their best work ? I have changed a deep well pump from near the water to 26 feet up from the water without any apparent loss, and it seems to me that if the piston is suffi eiently tight to raise the water up to the reservoir from the piston, that the water must follow up to the limit of atmospheric pressure for elevation, at which the pump is placed; however, the contrary opinion is widespread, and I would be much obliged for your judgment in the matter. A. The general opinion in regard to the position of pumps above the water surface for best work is founded upon long experience with all kinds of pumps, good, bad and indifferent. A perfect pump will work well up to 30 feet, with the only drawback of liber-(5311) X. Y. Z., Melbourne, asks: Is it ating air constantly from the water. With the least air

(5319) T. D. D. writes: I have been a Brug steady subscriber for your valuable paper for over 45 years, and wish you would make careful answer to the Buc] Buil following questions : What would, in your best judgment, be the per cent. of saving to the track and road-Bur bed and rolling stock of any through line of railroad if Bur an endless rail could be used ? If 90 foot ralls were used, allowing the weight of three cars at once, or an engine and two cars, would not the ralls be less liable to creep when there was no open space or joint, thus avoiding the pounding of the wheels at the ends of the rails ? A. Continuous rails would be a most valuable consideration in railway economy and the comfort of the traveling public, but there is a physical har to a continuous a Cari Cari Cars rail; the expansion and contraction of such a rail by changes of temperature would destroy the track. To make any computation of the saving of such rail in the g Carp Case Cash Cash Cash Cash Chai Chai Chui Chui Clga Clga face of its impossibility, would be futile. A 90 foot rail is a more reasonable condition, but will not avoid variation a pond hold water where the banks and bottom are al- in length by changes in temperature, and consequent most clear sand where we wish to make the pond ? The creeping. It would, no doubt, save two-thirds of the soil is about eighteen inches deep, then comes sand, and damage due to pounding and batterment of the rais ends. to get the depth we want will have to go nearly two feet On the other hand, the difficulties of transportation of

NEW BOOKS AND PUBLICATIONS

Clo Clo

SHORTHAND INSTRUCTION AND PRAC-TICE. By Julius Ensign Rockwell. Bureau of Education, Circular of Information, No. 1. 1893. 8vo. Pp. 205, tables.

The shorthand alphabets which date from the year 1602 on, are very interesting. The bulk of the work is taken Co up with statistics of instruction in shorthand in various institutions for the scholastic year ending June 30, 1890. Co

CHAPTER ON CHOLERA FOR LAY READERS : HISTORY, SYMPTOMS, PREVENTION, AND TREATMENT OF THE DISEASE. By Walter Vought, Ph.B., M.D., Medical Director and Physician in Charge of the Fire Island Quarantine Station, Port of New York. Illustrated with colored plates and wood engravings. Philadelphia : The F. A. Davis Co. 1893. 12mo. 110 pages. Price 75 cents.

This timely little work is offered to the public in the hope that it will enable the reader to obtain a clear and complehensive idea of a disease which at present, there s every reason to believe, will appear this summer in our own country. The diagnosis of the disease, its treatment and its prev ntion are all described with a view to being read by laymen. The preventive doctrines are based on common sense, and, if followed, would without doubt tend to keep the person free from the dreaded diseas during an epidemic.

E SHAKERS. By C. E. Robinson. East Canterbury, N. H. 1893. 8vo. Pp. 134. Illustrated. No index. THE SHAKERS.

The full title of the work is "A Concise History of the United Society of Bellevers called Shakers." There is always more or less interest exhibited in communistic societies, and the aim of the present work has been to collect facts in relation to the Shakers, and state them so clearly that the world may know the true life and habits

THE COMPASS. Edited by William Cox. Vol. II. 1892-93. New York : Keuffel & Esser Co. 1893. 8vo, cloth. Pp. 192. Illustrated. Price \$1.75. Ele Ele

The subscription price of the journal is \$1.00 a year. The Compass is devoted to surveying, mechanical drawing and mathematics. New instruments, formulas, etc. are described. The journal is handsomely printed in blue ink and is well illustrated. The Compass is very carefully edited, much more so, in fact, than many jour nals of larger size.

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INDEX OF INVENTIONS For which Letters Patent of the

United States were Granted

August 22, 1893,

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(See note at end of list about copies of these patents.)

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Extractor. See Butter extractor. Feacet. F. M. Mott. Feed cutter. J. Butler. Field coller. J. B. Wetkman. Fifth wheel, T. L. Bosart. Fifth wheel, T. L. Bosart. Fifth wheel, T. L. Swan. Filter, water, Stafford & Field. Filter, water, W. R. Hanks. Flooring or celling lack, W. M. Hollman. Flooring or celling lack, W. M. Hollman. Flooring or celling lack, W. M. Hollman. Flue stopper, E. H. Adams. Flue thimble, J. H. Watt. Form. Clote. R. H. Wade. Form. Clote. R. H. Wade. Fornace door, C. W. Heneau. Frunace. See Heating furnace. Furnace for welding, etc., R. J. & C. J. Buck. Gazment profector, R. E. Fitler. Gas and electric fight fixture, combined, J. A. O'Nell. Gas Inter for heating stoves or grates, P. I. Miller.	AUS, 2685 503, 6965 503, 631 503, 6331 503, 6331 503, 643 503, 643 503, 643 503, 643 503, 697 503, 697 503, 697 503, 704 503, 705 503, 705 50
Extractor. See Butter extractor. Faucet. F. M. Mott. Fence, J. B. Whitarre. Field roller, J. Butler. Field roller, J. Bweekman. Fitth wheel, T. L. Bosart. Fitth wheel, T. L. Bosart. Fitth wheel, T. L. Bosart. Fith wheel, T. L. Bosart. File, Letter, Stafford & Field. File, Letter, Stafford & Field. File, Booring wood tile, A. Salvatico. Flue stopper, E. H. Adams. Flue thimble, J. H. Watt. Form, clothe, R. H. Watt. Foring, or celling lack, W. M. Holliman. Flue thimble, J. H. Watt. Fornicothe, J. H. Watt. Fornicothe, R. H. Wate. Fornace door, C. W. Heneau. Furnace. See Heating furnace. Furnace for welding, etc., R. J. & C. J. Buck. Gauge. See Saw table gauge. Garment profector, R. E. Fitler. Gas and electric light fitture. combined, J. A. Miller. Miller. Gauge and tuling G. A. Wateon.	AUS, 585 503, 696 503, 631 501, 623 501, 623 501, 623 501, 623 501, 623 501, 623 501, 623 503, 647 503, 647 503, 704 503, 705 503, 912 503, 705 503, 7
Extractor. See Butter extractor. Feacet, F. M. Mott. Feed cutter, J. Butler. Field roller, J. B. Weckman. Fifth wheel, T. L. Bosart. Fifth wheel, T. L. Bosart. Fifth wheel, T. L. Bosart. File, letter, Stafford & Field. File, letter, Stafford & Field. File, letter, Stafford & Field. File, bitors, D. Lebmann. Flooring or ceiling jack, W. M. Hollman. Flooring, wood tile. A. Salvatico. File etopper, E. H. Adams. Flue thinble, J. H. Watt. Fortunc-teller, J. Carey. Fringe or triuming holder, J. M. Schlesinger. Frunce, See Heating furnace. Furnace door, C. W. Heneau. Furnace for weiding, etc., R. J. & C. J. Buck. Gauge. See Saw table gauge. Game apparatus, F. R. Horeboom. Garment protector, B. E. Filer. Gas burner for heating stoves or grates, P. I. Miller. Gase, method of and apparatus for produce Ing. and utilizing, G. A. Watson.	103,086 503,686 503,631 503,631 503,631 503,643 503,915 503,915 503,915 503,915 503,915 503,915 503,925 503,915 503
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Brinstor. See Butter etractor. Feacet, F. M. Mott. Feed cutter, J. Butler. Field culter, J. Butler. Field culter, J. Butler. Field roller, J. B. Weekman. Fifth wheel, T. L. Bosar. Fifth wheel, T. L. Bosar. Fifth wheel, T. L. Bosar. File, letter, Stafford & Field. File, letter, Stafford & Field. File, letter, Stafford & Field. File, letter, Stafford & Field. File, boring, wood tile. A. Salvatico. File etopper, E. H. Adams. Fooring or celling lack, W. M. Holiman. Fooring or celling lack. W. M. Holiman. Fooring or celling lack. Fortuncteller, J. Carey. Fringe or trimming bolder, J. M. Schlesinger. Furnace for Welding, eto., R. J. & C. J. Buck. Gauge. See Saw table gauge. Gameat paparatus, F. R. Horeboom. Garment refector, S. E. Fieler. Gas phoraet. S. E. Fieler. Gas for heating purposes. apparatus for product. Gasen, method of and apparatus for produc- ing, and utilizing g. A. Watson. Gasen. See Swinging gate. Gasen, weithing in a sparatus for proceiling Gate. See Swinging gate. Gasen, method of and apparatus for propeiling Gate. See Swinging gate. Gasen, method of and apparatus for propeiling Gate. See Swinging gate. Gasen, method of and apparatus for propeiling Gate. See Swinging gate. Gasen, method of and apparatus for propeiling Gate. See Swinging gate. Gasen, method of and apparatus for propeiling Gate. See Swinging gate. Gate methor. See Electric generator. Gias blowing tube. A. Human Gias blowing tube. A. Human Governor, Steem Benther, E. Coursady. Grain methor W Howard.	48, 568 662, 664, 664 662, 664, 664 663, 674 163, 651 163, 651 163, 651 163, 654 163, 654 163, 755 163, 75
Brinactor. See Butter extractor. Feacet. F. M. Mott. Feed cutter, J. Butler. Field culler, J. B. Weekman. Fifth wheel, T. L. Bosat. Fifth wheel, T. L. Bosat. Fifth wheel, T. L. Bosat. Fifth wheel, T. L. Bosat. File, letter, Staford & Field. Filer, water, W. R. Hanks. Flooring or cellurglack, W. M. Hollman. Flooring or cellurglack, W. M. Hollman. Flooring or cellurglack, W. M. Hollman. Flue stopper, E. H. dams. Flue thimble, J. H. Watt. Form. clothe, R. H. Watt. Form. clothe, R. H. Watt. Form. clothe, R. H. Watt. Form. Clothe, R. H. Watt. Furnace door, C. W. Heneau. Furnace door, C. W. Heneau. Furnace door, C. W. Heneau. Garment protector, B. E. Filer. Gas and electric light fixture, combined, J. A. O'Neill Gases, method of and apparatus for produc- ing, and utilizing, G. A. Wateon. Gases, method of and apparatus for producing, and joint, firegrant. Garber B. H. Forbes. Gate. See Swing gate. Generator. See Electric generator. Globes, making lens, C. J. Bockius. Governor, steam engine, C. J. B. Blackesley Grain meter, W. Howard. Grain blother, Grabam & Birkett. Grain meter, W. Howard. Grain blother, Grabam & Birkett. Grain blother, Grabam & Birkett. Grain meter, W. Howard.	45,050 602,051 602,051 602,051 602,051 602,051 602,051 603,051 603,052 603,
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Brinstoir. See Butter ctractor. Feacet, F. M. Mott. Feed cutter, J. Butler. Field coller, J. B. Weekman. Fifth wheel, T. L. Bosar. Fifth wheel, T. L. Bosar. File, letter, Stafford & Field. File, letter, Stafford & Field. File, letter, Stafford & Field. File, letter, Stafford & Field. File, better, Stafford & Field. File, better, Stafford & Field. File, better, Stafford & Field. File, better, Stafford & Field. File of this wood tile. A. Salvatico. File thinble, J. H. Watt. Fortunc-teller, J. Carey. Fringe or trimming bolder, J. M. Schlesinger. Furnace for weiding, etc., R. J. & C. J. Buck. Gauge. See Saw table gauge. Gameat paparatus, F. R. Horeboom. Garment refector, S. E. Fieler. Gas burner for heating stores or grates, P. I. Miller. Gas for heating purposes, apparatus for produc- Ing, and utilizing, G. A. Watson. Governor. See Electric generator. Gians during gate. Generator. See Electric generator. Gians during store. Gates, method of and apparatus for propeiling pro ucct. W. H. Porbes. Governor, See Bletterle generator. Gians burner for heating stores or grates, F. G. Governor, See Bletterle generator. Gians burner for heating stores or grates. Governor, See Bletterle generator. Gians burner for heating stores or grates. Governor, See Bletterle generator. Gians burner for heating stores or grates. Governor, See Bletterle generator. Gians burner for heating stores. Grate bar, interiocking and polishing machine, J. H. Wil- liamson, Carey. Hamme, P. Barker. Hamme, P. Barker. Hamme, Nackamith's C. Walvernet.	48, 568 662, 664 662, 664 662, 664 662, 674 163, 651 163, 651 163, 651 163, 654 163, 654 163, 654 163, 755 163, 75
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(5312) J. T. D. asks: How can we make in eand. A. If clay can be had in the neighborhood or 90 foot rails is a serious bar to their use.

e. See venicle prake.	Lactyl-paraphenetidid and making it. F. Gero-	
k mould, J. B. Mowry 503,667	mont	503,743
h, E. L. Wohlgemuth 503,821	Lamp burner, C. A. Taplin	503 755
h bristle fastener, C. M. Kimball 503,785	Lamp chimney, E. Hammond	503,720
h drying attachment, scrubbing, McGuire &	Lamp, electric arc. W. W. Millard	503,799
eemer 503,668	Lamp, incandescent electric, Cary & Nickerson	503.650
le, F. Calif	Lamp, incandescent electric, W. E. Nickerson.	,
dings, entrance for refuse conduits in, M. L.	503.669 to 503.671.	503,770
yder	Lantern, A. Zimmermann	603,780
er. See Gas burner. Lamp burner.	Lapping machine. Ainsworth & Haydock	503.890
ing garbage, etc., apparatus for, Garretson	Lasting pinchers, B. A. Norwood	503.672
Tainter	Lasts for boots or shoes, machine for manufactur-	
ing and faucet, barrel, G. H. Mer ick 503.767	ing, W. H. Austin	505.893
er extractor, centrifugal, O. Anderson,	Laundry outfit, combination, A. Armstrong	603.711
on setti g machine, G. W. Altman	Letter, sign, C. Schwartz	563,620
e haul mechanism, J. H. Hahn, Jr 503.308	Life-saving vehicle, W. B. Beal.	503.572
C. A. Patten	Lifter. See Kettle lifter.	
oupling, A. A. Brower 503,646	Light. See Electric search light.	
oupling, E. B. Hyre 503,855	Lightning arrester, W. L. Emmet.	503,788
oupling, C. S. Park 503,615	Lock, A. Burbee	503,648
oupling, W, E. Steffey 508,754	Lock, W. J. Neidi	503,706
freight. E E. Pratt 503,874	Lock and latch, A. Burbee	503,649
neating and ventilating ap aratus, W. How-	Loom shuttle motion, H. Wyman	503,924
rd 508.745	Loom shuttle, self-threading, S. M. Hamblin	503,851
oof, J. C. Wands 503,896	Loom temple, D. Durkin	568,908
ea ts, end panel for, H. Cochran 503,653	Looms, take-up mechanism for circular, A. De	
buffer and vestibule connection for passen-	Laski	603.873
er, H. C. Buhoup 503,647	Lubricator. See Pulley lubricator.	
et eweeper, S. H. Raymond	Lubricator, E. D. Bangs.	603,925
. See Tobacco case.	Marbling enameled articles, G. Gnuchtel	503,661
indicator and register, A. C. Hansen	Measure register, grain, B. F. Haley	503,719
register and till, A. L. Crawford 508,579	Measuring apparatus for alternate currents, elec-	
, sylindrical, C. E. Bratt 603,575	tric, S. Evershed	503,589
ng or wall. H. Lehmann 508,721	Measuring vessel, W. H. Bastin	608,671
n, sproeket, S. H. Peroy	Mechanical motor, Grass & Hardie	508,598
m, J. H. H. Duncan	Meter. See Electric meter. Grain meter.	
r wrapper cutter, Hesse & Sternberg 518,711	Milk cooler, F.J. derz	506,869
rette machine, J. B. Duke	Mill. See Windmill.	
ACTION I I MONTAGINE SCHOOL		