# THE GASOLINE ENGINE.

The necessity for a motor independent of the unreliable wind, the inaccessible water, the unavailable skill and the expensive and dangerous steam, particularly for small units and in isolated situations was the mother of the invention of the gasoline engine, an instrument for harnessing the explosive force of gasoline to useful work, and while the best type of this machine and the problem both now appear remarkable for their simplicity, the road to the present high state of perfection in the machine has not been reached without great cost and painstaking effort, and has occupied the combined talents of hundreds of mechanicians fertile of brain, and cunning of hand, for a long period. The evolution of the machine from an imperfect an dcomplex aggregation of parts, acting more or less out of harmony with each other, to its present simple and harmonious proporcions and efficient and reliable action is truly wonderful, and these machines of the best class stand today unrivaled as the ideal power, especially in small or moderate sized units, where an independent, safe, reliable, efficient, easily controlled, low-priced power is wanted.

For the benefit of those totally unfamiliar with the machine the following somewhat elementary description is given. The general construction greatly resembles that of a steam engine, a piston in the cylinder receiving impulses due to expulsions of a specifically proportioned mixture of air and gasoline on one side of the piston only. A governor of the same general type as that used in a steam engine, but whose motion controls the number, instead of the intensities of these impulses, and which is the reverse of the action of the governor of a steam engine, but is accomplished in the same general manner, by the same general means, and produces the same results, namely, controlling the speed of the machine. The intervals between the impulses in a gasoline engine being longer in time than those in a steam engine, it becomes necessary to use heavier fly-wheels to secure greater storage of power to carry the engine over these intervals without serious loss of speed.

The firing of the charge of gasoline and air and the resultant internal explosion from which the power is derived, is accomplished in the best type of engines in the following manner: A charge of air equal to the cubic capacity of the cylinder is drawn in, also and at the same time a small charge of gasoline, say from one to three small drops. This small quantity of gasoline, mixed with so large a proportion of air, immediately vaporizes; this mixture entrapped in the end of the cylinder is compressed by the approaching piston, and an explosive density of this vapor is obtained, which is fired by an electric spark within the cylinder, furnished by a small battery without, contact of the electodes being secured by the governor of the engine, and their number limited also by the governor. The whole action being subject to a certain speed of engine, for which the governor has been previously set.

While it is well known that gasoline is highly inflammable, and even explosive, it is a fact that one of the most delicate offices of a gasoline engine is to bring about the proper conditions to produce these explosions, and they are all within the engine, and these explosive conditions cannot be secured around the engine except by the grossest carelessness in handling the gasoline, which usually is and always should be, stored in a closed iron tank. The amount of gasoline in transit to the engine at any time is extremely small, aggregating ordinarily about one pint per one hour for the labor of one horse power. Further than this, to make the engine do its duty properly, the internal explosion must be of the utmost attainable violence or strength; too much gasoline failing to explode, too little also failing to explode. From this, it follows, that explosions of the highest strength, being the normal working condition, there can be no unusual explosion, as the bursting of a steam pipe, or of such violence as to do any injury to the engine or an attendant. All gasoline engines are provided with means for drawing their supply of gasoline automatically from some source of supply stored in an iron tank, as above indicated, placed in any suitable location.

All gas or gasoline engines require to be started by hand or by some power other than their own, in order to bring about certain internal conditions capable of producing an explosion, which conditions are a certain mixture of air and gasoline, and a certain density of this mixture, secured by compression, which compression alone will hold the particles of gasoline close enough together to secure that rapidity of combustion called explosion. After having attained one explosion, and a start of the engine (if routine conditions are right, the engine will then take care of itself and continue in operation

The combustion or explosion of gasoline within the cylinder generates a large amount of heat, not yet harnessed to useful work, which if not absorbed in some way, would soon heat the walls of the cylinder to so high a temperature that the charges within would be fired not synchronously with, and against the direction of the piston's motion, doing no further injury, however, than causing the engine to stop. To provide for this condition, which is common to all gas or gasoline engines (with the exception noted below), their cylinders are built with double walls, the water from a small tank or other source of supply is allowed to circulate between these walls absorbing the surplus heat and keeping the temperature down to that of boiling water or below, well below the igniting temperature of gas. When a tank is used for this purpose, the circulation takes place just the same as with a blacksmith's tuyere iron, and there is a slight loss of water due to vaporization of the heated water, which requires an occasional small addition. The exception to the above cooling method was observed in a gasoline engine on an automobile, in which the cylinder was kept cool by the rapid circulation of the air, due to the movement of the machine.

The gasoline engine is rapidly coming to the front as a desirable motor, and is invading the field of the steam engine even in medium and large powers. There are hundreds of situations on our farms where a good gasoline engine would greatly promote the comfort and profit of its owner. The gasoline engine is coming to be very popular as a pumping plant for irrigation. In favorable situations it furnishes cheaper water than a canal.

In regard to the skill required for their operation, which has been a bete noir with prospective buyers, it is a fact that they can be operated more satisfactorily by unskilled than by skilled help, for the reason that the perfect success (if the engine is a good one) is due entirely to faithful attention to certain routine matters, knowledge of which is easily acquired, and is always furnished by reputable sellers. The unskilled help is afraid to violate the prescribed routine of attention, hence succeed, while skilled help would have ideas of their own, imaginary "short cuts," and would be likely to tamper with adjustments for imaginary cause, to the detriment of the engine and their own discomfiture, and while all machinery of all kinds is likely to be benefited by careful attention, a well built gasoline engine is capable of being operated continuously and safely with no other attention than lubrication.—Louisiana Planter & Sugar Manufacturer.


THESE PRONOUNCED

# CHRISTMAS MONEY-SAVERS

WILL PILOT THE THRONGS AUERBACH-WARD THIS WEEK!

**These sterling values should appeal to all who contemplate remembering friends and relatives with Xmas Presents. Here's a page of suggestions including the ornamental, the useful and in some cases the sentimental. All tastes are catered to. The prices are guaranteed to be the lowest and qualties highest, so come to the "Old Reliable" and get your Xmas Presents from the largest stock for the least money possible.**

ESTABLISHED 1864 F. Auerbach & Bro. ONE PRICE TO ALL NEVER UNDERSOLD

## It's a Sale Planned For Thousands. Monday Morning from 9 to 12.

We'll sell not a few, but hundreds of pieces of EXQUISITE FLANNELETTES, a collection in which all the charm of the season's designing seems to have been assembled. Suitable for Waists, Wrappers, Kimonas, etc., worth 12½c and some 15c. 12 yards to each Customer (per yard) at..... 8c

You know, the best patterns go first.

## Tailor-Made SKIRTS

For the Cost of Materials. SPECIAL FOR MONDAY.

100 Women's and Misses' walking skirts, made of wool Melton cloth, tailor stitched bottom, colors Oxford gray, brown and navy blue (all sizes), regular $3.00 value. Monday special..... 1.73

## RIBBONS!

You'll need them for a thousand and one things, sometimes in presents; always in tying them up. Baby ribbons in all colors, 50 yards for 45c.

No. 1 velvet ribbons in all colors, worth 85c, this week, per bolt ..... 49c

No. 2 velvet ribbons in all colors, worth 90c bolt, for per bolt..... 69c

Money-Savers in Ladies' Ready-Made

## SUITS

The near approach of Christmas finds startling price reductions on all our Tailor made suits. The beauty and genuine worth of our garments bespeak the liberal patronage of Christmas buyers. This item for illustration—hundreds of others just as remarkable.

BROKEN LINES WOMEN'S SUITS—

**$13.95**

We say broken sizes, and yet in the lot we have all sizes in various styles. They come in cheviots, Venetian, serges and Zibelines, etc., in black, tan, gray and blue. Jackets are silk and satin lined. The styles include the long skirted blouse effects. Worth up to $35.00. While they last..... $13.95

## Great Sale of Fans!

FANS MAKE MOST ATTRACTIVE CHRISTMAS PRESENTS FOR YOUNG OR OLD, THE MATCHLESS VALUES OF THIS GREAT OFFERING MAKE IT THE MOST IMPORTANT EVENT OF THIS KIND WE EVER CONDUCTED.

WHITE GAUZE FANS, with silver decorated sticks, trimmed with silver spangles or hand painted flower designs, up to 45c values, sale price ..... 25c

WHITE AND COLORED SILK GAUZE FANS, with silver decorated sticks, this lot includes fans profusely decorated with silver spangles, fans with spangles and lace edges, also hand-painted with flower design with wide lace edge, up to $1.00 values at ..... 69c

WHITE SILK GAUZE FANS, with silver decorated hardwood stick and a large number with fine ivory sticks, these are most elaborately decorated and worth up to $2.00 each, on sale now at ..... $1.00

All our higher priced Silk Gauze Fans, with handsome carved ivory sticks, beautiful pearl sticks, as well as our great line of REAL LACE FANS are included in this sale and offered at great price Reductions, not a single one has escaped the price cutting. Make your selection early.

## Perfumes, Toilet Water, Soaps and Handkerchief Extracts.

THE FINEST AND BEST KNOWN BRANDS, ALL POPULAR ODORS ARE HERE TO CHOOSE FROM, AND ALL AT PRICES TO INSURE GREAT SAVINGS NOT ONLY THE BEST KNOWN BRANDS OF DOMESTIC MANUFACTURE, BUT ALSO PINAUDS FINEST FRENCH AND MARIA FERINI 9-11 GERMAN PERFUMES AND EXTRACTS ARE HERE IN GREAT VARIETY, THEY MAKE MOST EXCELLENT HOLIDAY GIFTS.

PINARD'S finest toilet Soaps in Sandal Wood, Violet, Royal Lilacs, French Carnation Pink, Queen Lily, New Mown Hay, etc., regular 40c and 50c values, on sale, at, a bar ..... 25c

Or fancy box of 3 bars for ..... 75c

COLGATE'S Handkerchief Extracts, any odor.

½ oz. Bottles, regular price 35c, on sale at ..... 25c

1 oz. Bottles, regular price 65c, on sale at ..... 39c

2 oz. Bottles, regular price 90c, on sale at ..... 60c

3½ oz. Bottles, regular price, $1.50, on sale at .... $1.00

PINARD'S finest quality quadruple extract, 1 oz. bottles, regular selling price, $1.50 on sale at ..... $1.00

KIRK'S WINTER BOUQUET, finely scented Toilet Soap, 3 bars in fancy box, regular price per box 35c, on sale at..... 18c

MARIA'S FERINA, 9-11 finest German Cologne, standard 75c bottle on sale at ..... 50c

Standard $1.25 size bottle on sale at ..... 85c

MONEY-SAVERS IN

## FURS

You could not possibly go wrong in making a present of a nice set of Furs for Xmas. If you are a judge of furs, you'll buy them here. If you are not a good judge of furs you ought to buy them here, because we only handle the best and you can rely upon the quality.

Cluster Scarf, French martin, with six tails, special..... $1.98

Wool seal scarf, three tails on each end, sold at $6.00, special ..... $3.85

Single sable fox scarf, very large, with two brush tails, worth $13.50, special..... $8.95

Double Isabella or sable fox scarf, with two large brush tails, sold at $18.75, special..... $12.50

Misses fur sets, white Thibet fur, special..... $1.25

Misses' fur sets, white angora fur, special..... $2.00

Misses' fur sets, nutria beaver, special..... $3.50

Misses' fur sets, shirred cooney, good size muff, special..... $4.50

ESTABLISHED 1864 F. Auerbach & Bro. ONE PRICE TO ALL NEVER UNDERSOLD

## Money-Savers on Handkerchief Linens.

Holiday gift choosers never met with a similar good fortune.

FULL YARD WIDE.

The 60c quality, this week per yard..... 37½c

The 75c quality, this week, per yard..... 55c

The 85c quality, this week, per yard..... 65c

The $1.50 quality, this week, per yard..... 1.20

The $2.00 quality, this week, per yard..... 1.60

## Blouse Sweaters For Holiday Gifts.

Blouse Sweaters that were $3.00 are now marked..... $1.95

Blouse Sweaters that were $4.00 are now marked..... 2.75

Blouse Sweaters that were $5.00 are now marked..... 3.50

Blouse Sweaters that were $6.50 are now marked..... 4.35

## STATIONERY.

Delightfully pretty Christmas Boxes and the finest of pound paper, you cannot fail to find what suits your fancy for a pretty present in this line:

OUR HOLIDAY SPECIAL.

100 beautifully decorated Boxes of fine paper and envelopes, newest, shapes of fine linen paper, up to 75c grades, on sale at, per box..... 25c

## For Christmas

SHOPPING THIS STORE

offers opportunities not found in ordinary Stores. Here you frequently secure two presents for the amount you thought one would cost. The economy of our Prices is more pronounced during the Holiday Season than any other time.

ESTABLISHED 1864

# F. Auerbach & Bro.

ONE PRICE TO ALL NEVER UNDERSOLD

## Ordering By Mail

It is now time that our out-of-town patrons were placing their Christmas orders. We advise early attention to this. Any order through this Dept. will be filled the day of its receipt, and we guarantee that the Goods will reach you promptly and Satisfactorily.

## LEATHER GOODS.

Every kind of money carrier in all grades and at all prices.

They are of the finest manufacture in the most modern styles of Wrist, Carriage and Auto Bags, at prices to suit every purse.

OUR THIS WEEK'S SPECIAL WRIST BAGS.

Of excellent quality Walrus in Black, Gray, Brown or White, containing Mirror Coin Purse and Smelling Salt Bottle, regular 75c grades on sale at..... 50

## A Startling Holiday PORTIERE SALE.

Reversable Figured Damask Portieres that sell regularlarly at $2.75, this week a pair $1.88

$3.50 Fancy Striped Damask Portieres, reduced to per pair ..... $2.39

Bagdad Portieres, value $5.00, marked down to per pair ..... $3.60

Solid Colored Rep. Portieres with Verona Borders and Armure Brocade Curtains; that sell regularly at $6.50, go this week per pair ..... $4.40

$7.50 Ottoman and Side Bordered Effect Brocade Damask Portieres, on sale this week per pair..... $5.20

Highly Mercerized Portieres; good value at $9.00 this week ..... $6.30

$11.00 Damask Curtains; very effective; on sale at..... $8.20

Silk Brocade and Real Tapestry Curtains that sell regular at $16.50, this week a pair..... 12.95

$20 Embossed Plush and Real Persian Tapestry Portieres; go this week per pair ..... 14.80

Genuine Embroidered Tapestry Portieres; some stores ask $50.00, for ..... Our price this week a pair ..... $26.90

## CIRCULAR SHAWLS.

Make most acceptable Christmas presents we are showing a line unsurpassed for high value or low price, two great leaders for this week, large size circular shawl in Pink, Blue, White, Red or White with colored border, $1.25 grade at ..... 75c

Circular shawl in extra fine $2.25 grade in White or White with colored edge, on sale at ..... $1.50

Money-Savers in Ladies' Coats

In order that all may have a chance to get a nice coat for Christmas, we will offer the following:

Special inducements, on the pick of the season's best styles you save enough to buy a nice Xmas present.

A GREAT LOT OF ODD KERSEY AND BEAVER CLOTH, BOX COATS OF FINE QUALITY, 27 INCHES LONG, trimmed with straps of Kersey, tailor stitched, full pouch sleeves, extra good satin lining, have sold at $12.50, $10.00 and $7.50. While they last ..... $4.88

## In Our Silk and Dress Goods Section.

We offer the following seasonable specials for this week, any of which would prove a sensible, appropriate and practical Xmas gift.

FANCY COLORED SILKS.

One hundred pieces of Fancy Silks, light and dark shades, suitable for waists, gowns, or trimmings. Value up to $1.25. ON SALE AT (per yard)..... 66c

Two hundred pieces of Plain and fancy Silks, including stripes, plaids, brocades, dark colors, evening shades, all colors suitable for waists, street gowns, evening dresses, shopping bags, fancy work, etc. Worth up to $2.00. ON SALE AT (per yard)..... 98c

Up to $2.50 IMPORTED COLORED WOOLENS.

Including Novelty Dress fabrics of Zibelines, Scotch Tweeds, French Venetian, Fancy Basket weaves, Fancy Crashes, Homespuns, Hairline Zibelines, Priestley's Cravenette and many other of this season's stylish Dress Goods, 54 to 56 inches wide. ON SALE AT (per yard)..... 1.37½

BLACK ZIBELINES—The most fashionable cloth for this season's wear. All standard makes—Priestley's, Lupin's, etc. We offer five qualities at a reduction of one-third less than regular at (per yard)—

**$1.37, $1.49, $1.69, $1.89, $1.98**

DRESSES FOR 1904.

**17½c** If ideas are wanted visit the department of Butterick Patterns in our store. We can show you paper patterns for every necessary garment. The January patterns, just received, are full of "1830" effects. ..... **17½c**

## Reduced Prices For Blankets And Comforts.

A Comfort-Giving, Pleasure-Giving Xmas Present.

Large double bed size comforts, filled with best white cotton batting, and covered with silkoline on both sides, tacked with bright colored yarns, worth fully $2.25. Reduced for this week to each ..... $1.50

Extra size cotton filled comforts, covered with finest French satin in handsome designs, worth every cent of $3.50, reduced for this week to, each..... $2.25

Very finest quality 11-4 size, all wool scarlet blanket, extra heavy and measuring 6x7 feet, you could not buy them at the factory for less than $7.50. Reduced for this week to a pair ..... $5.20

The largest size, the heaviest and finest quality white California lambs' wool, bed blankets, steam shrunk, with fancy borders, worth fully $13.50, reduced for this week to per pair..... $9.85

## Great Handkerchief Values!

For women and children exceptional qualities at exceptionally low prices. You may puzzle your brain a long time over the gift problem and not reach a happier conclusion than to buy handkerchiefs and nowhere can you be so economically served as here. Wonderful specials at each—

25c, 35c & 50c

## Great Flannel and Eiderdown Values.

Exceptional qualities at exceptionally low prices.

Choice of plain or Ripple Effect all wool Eiderdowns, full yard wide, exceptionally rich qualities in cream, pink, light blue, old rose, lavender, brown, gray or red, value 60c and 75c, this week a yard ..... 38c

Double width, 50 inches wide, fancy mohair finished, the handsomest patterns for bath robes and slumber robes—

Regular $1.25, on sale this week, per yard ..... 62½c

Value $1.50, reduced for this week to per yard..... 79c

Four of the handsomest designs in White Embroidered Skirting Flannels, yard wide, hemstitched, cut edge and scalloped edge designs, usually sold at $1.75, on sale this week per yard..... $1.20

## A SILK UMBRELLA SPECIAL.

Just in time for the holidays, a close roll silk or extra quality Gloria umbrella with silk case and tassel, 26 inches in size for ladies, or 28 inches for gentlemen, the handles comprise an assortment of natural wool or fancy novelties, a dressy serviceable holiday gift for man or woman, up to $4.50 values, on sale at ..... $2.69

## Boys' Clothing and Gent's Furnishing Section.

Offers some wonderful bargains for this week, also some timely suggestions for useful Xmas gifts.

GENT'S SILK HANDKERCHIEFS—An elegant assortment to select from in plain white and fancy colored borders, extra good quality. HOLIDAY SALE PRICE..... 50c

GENTS' SUSPENDERS—The president make, silk embroidered, come in fancy single boxes. These make a very useful Xmas gift. SALE PRICE..... $1.00

GENTS' SILK MUFFLES—In plain black or white, extra good size, SALE PRICE..... $1.00

GENTS' SILK MUFFLES—In various colors and patterns. These are our better grades, values $1.50 and $1.75. SPECIAL HOLIDAY SALE PRICE ..... $1.25

GENTS' KID GLOVES—All our $2.00 values of Gents' fine dress kid Gloves for this week only, HOLIDAY SALE PRICE ..... $1.75

BOYS' SWEATERS—Sizes 24 to 34, warranted all wool, in fancy stripes and colors, put up in single boxes, a very useful Xmas present for the boy. HOLIDAY SALE PRICE $1.15

USEFUL HOLIDAY GIFTS!

Money Saved By Buying Them in

## OUR SHOE DEPT.

OUR SHOES FOR LADIES, MISSES, BOYS AND CHILDREN ARE USEFUL, GOOD AND CHEAP. OUR SLIPPERS FOR MEN, LADIES, BOYS AND CHILDREN ARE USEFUL, GOOD AND CHEAP. INFANTS' SOFT SOLE SHOES FOR THE LITTLE ONES. LEGGINS FOR LADIES, BOYS AND CHILDREN.

GREAT SALE OF RUBBERS NEXT WEEK.

CHILDREN'S STORM RUBBERS, sizes 6 to 11, cut ..... 30c

MISSES' STORM RUBBERS, sizes 11½ to 2, cut to..... 35c

LADIES' STORM OR LOW CUT RUBBERS, all sizes, cut to..... 40c

LADIES' STORM OR LOW CUT RUBBERS, finest quality made (French heels included) cut to..... 45c

CHILDREN'S BUCKLE ARTICS, sizes 6 to 11..... 50c

MISSES' BUCKLE ARTICS, sizes 11½ to 2..... 55c

LADIES' BUCKLE ARTICS, all sizes..... 60c

Buy Rubbers Next Week And Save Money.

# PUTNAM

W

STILL LEADS

New Putnam W Horse Shoe Nails. The strongest and most uniform on the market. Satisfaction guaranteed.

Beware of imitations—and the efforts of competitors—to palm off inferior nails, by the use of the word PUTNAM.

Sold by the trade generally and only under our own brand and trade mark.

A quarter pound package mailed free on application.

PUTNAM NAIL COMPANY. PAT. 1886.

PUTNAM NAIL COMPANY

NEPONSET

Boston, Massachusetts