



24 gr. Ballistite at 100 yards showed a penetration of 2", leaving a hole $2\frac{1}{2}$ " in diameter.

"But how about the hand grenade?" says the trapshooter who ponders. He gets the manikin and buckshot idea readily, but a small object like a hand grenade hurtling through the air not unlike a clay target seemingly presents no fitting surface for coarse shot and the regulation $7\frac{1}{2}$ chilled load— $1\frac{1}{4}$ oz. with 431 pellets to the charge and at 45 yards in a 30" circle 323 available from a 75C choke or 249 in an improved cylinder, while it would undoubtedly connect with the grenade would hardly do the business desired.

Well, the writer was a bit dubious on this point, too, and to strike a happy medium, secured some shells loaded with $3\frac{1}{2}$ dr. Du Pont and 1 oz. BB shot—50 to the load. The test was made on in-coming targets thrown from a hand trap 45 yards away and the score, charges centered, was 19 x 25 which included two half bricks pulverized. This was done with a single load, which would indicate that a number of shooters with full magazines could connect with every hand grenade coming over. At any rate the practice, if not already

in vogue, could instructively be followed up at our cantonments where the different phases of trench warfare are being taught, and it is possible that the regular buckshot load will give a startling account of itself on the smaller in-coming objects. In fact, dummy or unloaded grenades could be thrown as well as clay targets and results noted on the former. This too would assist in timing the clay target according to the speed of the hand-thrown grenade—a mere matter of adjusting the spring of the hand trap.

It is indeed a great source of pride and satisfaction for the trapshooter to suddenly awaken to the fact that this favorite sport has taken such a remarkable position in the stern work which must spell freedom. Nor can he be other than alive to the realization that he is a dependable, finished marksman of the Home Guard whose duty it is to encourage and coach the new shooter to a like condition of efficiency. There are said to be 400,000 trapshooters in the United States, and if everyone could appreciate his own value as a home defender to the point of securing one recruit, what a formidable army it would be.

Apply Industrial Paints

E. W. Tomlinson

FINISHING materials commonly known as paints are prime essentials in many industries, for it is important that most finished articles be given a protective and beautifying coat of some sort. The many finishes of this general class differ most widely from the materials used but a few years ago.

In the earlier days paint was just paint, and the manufacturers used lead ground in linseed oil almost exclusively for the painting of their manufactured products. They purchased colors in their dry state and ground them and lead together to obtain the different shades of color desired. Lead was always considered the principal base or foundation upon which to build the color, and unless at least a portion of lead was used, the finished product was considered inefficient.

Despite the fact that care was taken in selecting what was considered the best materials there was constant irritation, trouble, and expense. It was difficult to maintain a standard of colors at all times, due to the small mixes made in each instance and the variation in strength of the colors used to obtain the shade desired. The man who mixed these colors knew well how they should be applied, but lacked both practical and technical expe-

rience in the manipulation of colors: the paint when applied to a surface would chalk and rub off after the oil in which it was mixed started to deteriorate. If it did not chalk, it would crack or alligator, and these irritating difficulties were such as to cause the user to shift the problems upon the paint manufacturer.

During this period the paint manufacturer was absorbed in the problem of manufacturing suitable materials for use on wood for building purposes, and as a consequence allowed this great question pertaining to the manufacturing of industrial paints pass without any particular thought for some time.

The user during this period became more dissatisfied with these conditions and decided to put the problem up to the paint manufacturer, who in turn was quick to grasp the situation, as he realized a great possibility that meant much to his future success had been overlooked, and at once set out to eliminate the difficulties.

This was a slow and tedious task as the complications were many from both technical and practical standpoints, due to the fact that most manufactured commodities required a special paint, and in numerous instances manufacturers of a certain article would not use a standard paint owing to difference in opinion



Industrial Paints are Given Severe Tests on Farm Machinery

concerning conditions. The paint manufacturer's shoulders were broad and he could and did stand many a hard bump until he had thoroughly convinced the industrial paint user that while lead was very essential and necessary in the manufacture of paint for industrial products, yet through the use of other pigments in connection with lead, he could produce an article far superior to pure lead and oil.

This accomplished, it gave the user time to think about more troubles and greater possibilities for the paint manufacturer.

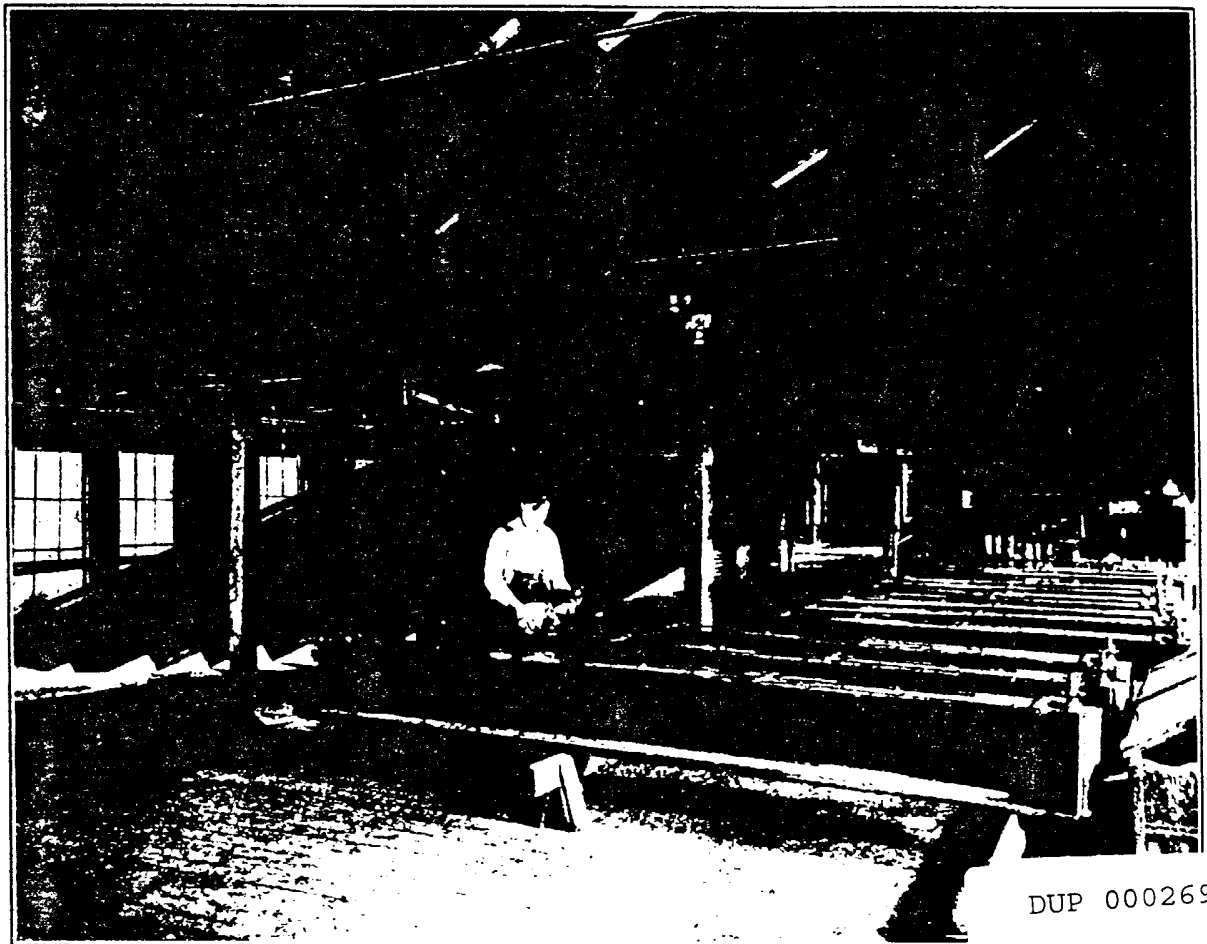
The paint had been applied with brush, which was a slow and necessarily expensive process due to the labor involved. Something must be done to speed up the application of the paint and to cut down the labor overhead expense. Again the paint manufacturer was consulted; he in turn realized that this meant, in part at least, the undoing of what he had worked so hard to accomplish, for the reason that the paint he was furnishing was manufactured to apply by brush. "We must speed up our painting department, get this work out faster and with less expense," the user said. "We will give you a paint into which you can dip your articles," said the paint manufacturer.

Leak-proof tanks were installed and the user at once approved the system which enabled him to more

than triple his output with at least 40% decrease in labor. The dip tank was his friend and here to stay as a permanent fixture. The paint would stand more reduction when used for dip than when brushed, and as a consequence would cover more surface per gallon and cut down his ready-for-use cost. It was not possible to obtain quite as heavy a coat of paint on the surface as when brushed but the paint manufacturer increased the capacity or hiding power to such an extent that it gave the dipped articles sufficient and proper covering.

At the time the first tanks were installed, it necessitated much stirring of the paint by hand with paddles to keep the mixture uniform throughout. This was especially true after the paint was allowed to stand unused for any length of time. The paint manufacturer at once originated a dipping tank which contained an agitator run by power. This internal revolving device kept the paint in suspension and the paint in uniform condition. He also manufactured the industrial paints lighter in gravity which prevented settling of the pigments and practically eliminated the difficulties in this phase of the work.

The speed with which articles could be coated by the dip process almost staggered the users and they realized that it was necessary to install some equipment



DUP 000269

A. Portion of the Finishing Room of a Large Plant—Here the Heavy Parts are Given a Coat of a Carefully Prepared Paint



Elevator Parts Drying After a Dip in a Tank of Paint

by which they could transfer the articles more rapidly from the erection rooms to the dip tanks, and in turn relieve the congestion after material was dipped. This was accomplished by installing overhead track or trolley systems. Articles after being erected are placed upon this device, suspended, and run to the dipping tanks, lowered into the paint and again raised to the track by hoists and transferred to drying rooms. If the articles were to be striped, this is done while they still were suspended, but thoroughly dry. They were then transferred to varnish tanks and received their finishing coat. Several implement manufacturing plants have so perfected this system that after articles are erected and placed upon the track system, they do not again touch the floor until they are placed in cars for shipment. One of the largest gas engine manufacturers in the United States places their smaller engines upon this track system after being erected, and are then transferred to the different painting departments.

In this process the filler coat is applied by air spray, and after it is dry and sanded, the other coatings are applied in the same manner, and the engines transferred to the shipping department where they are crated and shipped. The electrical-driven truck is

another device which is being used for transferring articles to and from these dip tanks and other painting devices.

Even with all of these improvements the paint manufacturer's troubles were not at an end, for no sooner were these systems perfected than they were called upon to solve a still more difficult problem. There were numerous articles which still had to be coated by brush. One reason for this was that by the dipping process, the paint might injure mechanical parts. Also, numerous articles are not painted until erected, and in many instances received two or more different colors in finishing. This was quite a problem to the paint manufacturer, but after some time it was solved by the introduction of the air brush or spray machine that deposits the paint on objects in the form of a fine spray or mist. There are several types of these machines on the market today that are giving the best of satisfaction. This spray system is being used for painting gas engines, auto parts, freight cars, tractors, varnishing furniture, aeroplanes, boats and hundreds of other articles.

As new industries were established the paint manufacturer was called on to meet many additional requirements of paint.

However, with the many improvements in the methods of the application of paint, some users were still not satisfied owing to special requirements which made it imperative to speed up the drying and hardening of the paints and enamels. To accomplish these special conditions baking ovens were installed and in these the dipped or sprayed articles were placed where they were baked at a temperature varying from 125 to 400 degrees Fahrenheit, depending upon the color and nature of the product and of the paint used. The articles were allowed to remain in these ovens from one to four hours and then removed.

Enamels receiving this treatment are made especially for this purpose and are entirely different from the so-called air-drying enamels. The baking process produces a hard durable finish, the lustre of which can be varied as desired. These baking ovens are made of steel and are lined with asbestos in order to retain the heat and maintain the desired temperature. They are heated by gas, electricity or steam. Automobile manufacturers installed drying rooms to speed up the drying of the different coatings applied. Passenger coaches after being painted, go into similar rooms to hasten the drying.

For steel coaches and many other steel and metal products it has been necessary to develop finishes to imitate rare and expensive woods. So successfully has the research and experimental work been conducted that it is now practically impossible to detect, by the eye alone, the difference between the finished steel and the natural wood. Several different coats and materials are required, and the art of application requires the most exacting care. The office building requires the same elaborate finishes in decorating the metal doors and trim, and in many cases for finishing the steel cabinets and furniture.

One may not be surprised to see, in the near future, articles painted upon some movable device, similar to the modern movable stairs seen in some of the modern department stores. Once the articles are placed upon this device, they will receive their coatings of paint and will come out dry and finished products in so far as the paint is concerned.

Making Nitroglycerin

THE mental attitude produced by the mere mention of nitroglycerin is one that is inclined to obscure the real origin of the compound. While it is exceedingly sensitive and violent in its action, it is derived from quite simple and well-known chemicals. The prime basis is nothing more than glycerin—the same simple glycerin that is purchased from the drug store and used for a variety of medicinal purposes about the home.

This light, oily material is obtained most largely as a by-product in the manufacture of soap, and is therefore better known among the civilized people than among the unwashed savage tribes. It is obtained from the spent lye water by careful systems of separation, and is then refined or purified in keeping with the use for which it is intended.

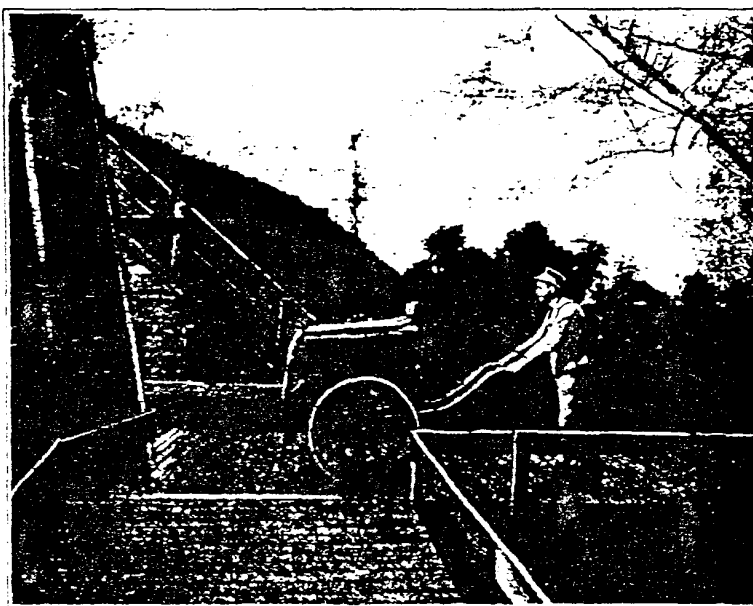
The conversion of this simple material into one of the strongest explosives is brought about by the ac-

tion of nitric and sulphuric acids in somewhat the same way as cotton is converted into gun cotton. The nitric acid is the one that really does the work, but the sulphuric acid is needed to collect the water that is formed when the nitric acid attacks the glycerin, thereby preventing the weakening of the acid and the attending slowing down or stopping the action.

In actual operation on manufacturing plants the processes are exceedingly simple in plan but require the most painstaking care to details in order to avoid possibilities of danger.

Definite amounts of the two acids, both of which have been described in articles already published in this magazine, are weighed and mixed. This mixture is varied to suit the different variations that are to be developed in the finished glycerin.

The nitrating is done in large, comparatively shallow steel tanks that are lined with cold brine coils and supplied with



Rubber-tired Cart Entering the Barricades Around a Neutralizing House for Another Load of Nitroglycerin

DU PONT AMERICAN INDUSTRIES

For the convenience of buyers considering the purchase of any Du Pont product, and desiring specific information, this coupon is printed. Upon receipt, it will be forwarded immediately to the proper office for attention.

Fill in, Cut Out and Mail This Coupon

(Du Pont Magazine, July, '18)

Sales Promotion Division
E. I. du Pont de Nemours & Co.
Wilmington, Delaware

Date

EXPLOSIVES

- ☐ Blasting Powder
- ☐ Blasting Supplies
- ☐ Charcoal
- ☐ Clay Mining
- ☐ Farm Explosives
- ☐ Industrial Dynamites
- ☐ Land Clearing
- ☐ Permissible Explosives
- ☐ Refined Nitrate of Soda
- ☐ Road Building
- ☐ Saltpetre
- ☐ Tree Planting
- ☐ Wood Pulp

PAINTS

- ☐ Antoxide Iron Paint
- ☐ Auto Finish
- ☐ Auto Paints and Enamels
- ☐ Barn Paint
- ☐ Bridgeport Standard Paint
- ☐ Bridgeport Wood Finishes
- ☐ Colors in Oil
- ☐ Concrete Paint
- ☐ Decorative Stains
- ☐ Dulite for Mills
- ☐ Enamels
- ☐ Ferro-Keep (Metal Paint)
- ☐ Floor Paints
- ☐ Floor Varnishes
- ☐ Flowkote Enamel
- ☐ Industrial Paints
- ☐ Japans
- ☐ Marine Paints
- ☐ Railway Paints
- ☐ Red Lead
- ☐ Sanitary Wall Finish
- ☐ Shellac
- ☐ Shingle Stain
- ☐ Smokestack Paint
- ☐ Town and Country Paint
- ☐ Varnishes
- ☐ Vitrolac Stain Finish
- ☐ Vitrolac Varnish
- ☐ Wagon and Carriage Paint
- ☐ Wheeler's Wood Filler
- ☐ Wire Screen Paint

SPORTING POWDERS

- ☐ Black Sporting Powder
- ☐ Hand Trap
- ☐ Hunting
- ☐ Pistol Smokeless Powder
- ☐ Resort Shooting
- ☐ Rifle Smokeless Powder
- ☐ Shooting in Colleges
- ☐ Shooting on Boats
- ☐ Smokeless Powder
- ☐ Trapshooting
- ☐ Pyroxylin Solutions
- ☐ Rubber Makers White
- ☐ Salt Cake
- ☐ Shingle Oil
- ☐ Solvents
- ☐ Split Leather Solutions
- ☐ Waterproof Cement
- ☐ White Lead
- ☐ Wood Lacquer
- ☐ Wood Oil

CHEMICALS

- ☐ Acids
- ☐ Alums
- ☐ Barium Chloride
- ☐ Belt Cement
- ☐ Benzol Products
- ☐ Blanc Fixe
- ☐ Bronze Powder
- ☐ Bronzing Liquids
- ☐ Carpolene (Wood Preservative)
- ☐ Carpo (Metal Paint)
- ☐ Coke
- ☐ Creosote
- ☐ Dead Oil
- ☐ Distilled Water
- ☐ Dry Colors
- ☐ Ether
- ☐ Heavy Chemicals
- ☐ Household Cement
- ☐ Leather Renovators
- ☐ Leather Substitute Solutions
- ☐ Litharge
- ☐ Lithopone
- ☐ Mantle Dips
- ☐ Metal Lacquer
- ☐ Nitre Cake
- ☐ Parlodion
- ☐ Patent Leather Solutions
- ☐ Pegamoid Aluminum Paint
- ☐ Pitch
- ☐ Pontar
- ☐ Pontoklene
- ☐ Pulp Colors
- ☐ Py-ra-lin Enamel

PY-RA-LIN

- ☐ Brushes
- ☐ Challenge Cleanable Collars
- ☐ Colored Sheeting
- ☐ Combs
- ☐ Desk Sets
- ☐ Manicure Sets
- ☐ Mirrors
- ☐ Novelty Sheeting
- ☐ Py-ra-lin Pipe Bits
- ☐ Py-ra-lin Rods and Tubes
- ☐ Py-ra-lin Specialties
- ☐ Py-ra-lin Toilet Goods
- ☐ Toilet Sets
- ☐ Transparent Sheeting

COATED TEXTILES

- ☐ Auto Truck Special Fabrikoid
- ☐ Book-Finish Fabrikoid
- ☐ Buggy Aprons
- ☐ Craftsman Fabrikoid
- ☐ Fabrikoid for Baggage
- ☐ Fabrikoid for Home Uses
- ☐ Fabrikoid for Railway Upholstery and Vestibule Curtains
- ☐ Fabrikoid for Upholstering
- ☐ Fabrikoid Sheeting
- ☐ Fairfield Rubber Coated Cloth
- ☐ Hat Sweat Material
- ☐ Marine Special (U. S. Standard) Fabrikoid
- ☐ Motor Fabrikoid
- ☐ Raynite Fabrikoid Auto Top Material
- ☐ Rug Anchor
- ☐ Shoe Fabrikoid

Name..... Position.....

Your Address (If Personal).....

Name of Concern (If Company).....

Address of Company.....

BUSINESS: ☐ Manufacturer; ☐ Producer; ☐ Jobber; ☐ Dealer;
☐ Consumer. (Check which)

What Du Pont products do you sell?.....

If a user, for what purpose does the product checked, or that which you now use, interest you?.....

Specific Questions Should Be Asked In An Accompanying Letter

DU PONT

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