Scientific American.

MUNN & CO., Editors and Proprietors.

PUBLISHED WEEKLY AT

NO. 37 PARK ROW, NEW YORK.

O. D. MUNN. A. E. BEACH.

TERMS.

One copy, one year..... $3 00
One copy, six months..... 1 50
CLUB RATES { Ten copies, one year, each $2 50..... 25 00
Over ten copies, same rate, each..... 2 50

VOL. XXIX., No. 1 . . [NEW SERIES.] *Twenty-eighth Year.*

NEW YORK, SATURDAY, JULY 5, 1873.

Contents.

(Illustrated articles are marked with an asterisk.)

AN IMPOSITION UPON THE PUBLIC.

That meritorious inventions should receive protection by patents is generally conceded. Such has been the practice during nearly the whole of our national existence, and rightly so. The great benefits resulting to the country urge a continuance of a liberal policy towards inventors. On the other hand, we must not be unmindful of the fact that the numerous industries of the nation have a claim for protection against the creation of oppressive and improper monopolies. By this we mean that the grant of patents for old devices which have, for many years, been made, sold, and used by the public upon the faith that a patent neither existed nor could be granted, is both oppressive and wrong. There is neither law nor warrant for depriving the public of vested right, created by lapse of time and *laches* and abandonment on the part of the alleged originator, nor for the placing of the device exclusively in the hands of such alleged originator and his assignees.

But this is virtually what has taken place by the grant of a patent, bearing date April 29, 1873, to Joseph P. Woodbury, of Boston, Mass., for an alleged improvement in planing machines, consisting, in brief, of the use of yielding pressure bars in planing machines. It will be interesting to our readers to learn something of the facts of this extraordinary case, since, as it appears by the records in the Patent Office, this application for the patent was made as early as June 3, 1848, nearly twenty-five years prior to date of issue of the patent. The device was not only in public but common and almost universal use, on planing, tonguing and grooving, molding, and veneer cutting machines, between the time the Patent Office refused to grant the patent and its present date of issue, and this with the knowledge and acquiescence (presumptively) of the said Woodbury himself. In fact, it was a device mainly originated to get around the Woodward patents, so many years in litigation, and held by the courts to be an equivalent of it.

As against the equities of the public in this matter, it is contended that Mr. Woodbury made repeated efforts to obtain a patent after so filing application in the year 1848, and that his case was withdrawn in October, 1852, and the government fee of $20 was then returned to his attorney without the applicant's knowledge. But, granting all this, it still appears that, from October, 1852, until December, 1872, nothing further was done by the inventor towards obtaining a patent. Section 11 of the act of 1839 provided him with an appeal to the District Court of the United States for the District of Columbia; and he did not choose to avail himself of the remedy, in order to test his right as against that of the public. Was there ever a clearer case of intentional abandonment?

The statute under which this case was resurrected is the 35th section of the act of 1870. It, in general terms, permitted the renewal of rejected or withdrawn cases for a period of six months after the date of the passage of said act. But few interested were probably aware of this questionable piece of legislation until after the period and privileges had alike passed away, except the initiated few, who got the bill passed to admit of just such cases as the one under discussion. Congress, in reviving expired patents, invariably provides for the unrestricted use of machines made after expiration of the grant sought to be revived, and in use at the time of seeking the aid of that body for renewal of the patent, by excepting them as being lawfully made and used. By this Woodbury grant, however, existing machines are claimed to be tributary from date of the patent.

We venture to state that Congress had no such intention in the passage of the general statute under color of which this gigantic monopoly has been granted. Such a grant ought not to be sustained against any machines, whether built before or after date of its issue, because of the uninterrupted making and using having been so long vested in the public with the full knowledge and acquiescence of the alleged inventor.

Congress may, under certain circumstances, with propriety appropriate from the public funds a sum of money to an inventor, if it appears that he is raised by his invention to the dignity of a public benefactor; but it scarcely would, while guarding the worthy and diligent inventor, take from the community that which has unquestionably vested in it by reason of lapse of time and other causes. Such was not the intention of that clause of the constitution giving Congress power to enact laws to promote the progress of the useful arts; and such is against the spirit and fair interpretation of the laws already enacted in pursuance thereof.

The patent is but *prima facie* evidence of an existing right, and the whole matter will no doubt be thoroughly ventilated in the courts should any attempt be made to enforce it by legal proceedings.

SCREW THREADS---ENGLISH AND AMERICAN PROPORTIONS.

A correspondent recently asked for the standard proportions of the Whitworth screw thread. They are given below, as communicated by Mr. Whitworth, to the Institution of Civil Engineers, in 1841. We have also added the standard American proportions, which were published some years ago, and may be acceptable to some of our readers. They were communicated to the Franklin Institute, by a committee appointed for that purpose, in 1864:

PROPORTIONS OF THE WHITWORTH THREAD.

Diameter in inches,	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1
Threads per inch,	24	20	18	16	14	12	11	10	9	8
Diameter in inches,	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4	1 7/8	2	2 1/4	2 1/2
Threads per inch,	7	7	6	6	5	5	4 1/2	4 1/2	4	4
Diameter in inches,	2 3/4	3	3 1/4	3 1/2	3 3/4	4	4 1/4	4 1/2	4 3/4	5
Threads per inch,	3 1/2	3 1/2	3 1/2	3 1/2	3	3	2 7/8	2 7/8	2 3/4	2 3/4
Diameter in inches,	5 1/4	5 1/2	5 3/4	6						
Threads per inch,	2 5/8	2 5/8	2 1/2	2 1/2						

Angle of threads = 55°. Depth of threads = pitch of screws. One sixth of the depth is rounded off at top and bottom. Number of threads to the inch in square threads = ½ number of those in angular threads.

STANDARD AMERICAN PROPORTIONS.

Diameter in inches,	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1
Threads per inch,	20	18	16	14	13	12	11	10	9	8
Diameter in inches,	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4	1 7/8	2	2 1/4	2 1/2
Threads per inch,	7	7	6	6	5 1/2	5	5	4 1/2	4 1/2	4
Diameter in inches,	2 3/4	3	3 1/4	3 1/2	3 3/4	4	4 1/4	4 1/2	4 3/4	5
Threads per inch,	4	3 1/2	3 1/2	3 1/2	3	3	2 7/8	2 3/4	2 5/8	2 1/2
Diameter in inches,	5 1/4	5 1/2	5 3/4	6						
Threads per inch,	2 1/2	2 3/8	2 3/8	2 1/4						

Angle of threads = 60°. Flat surface at top and bottom = 1/8 of the pitch. For rough bolts, the distance betwen parallel sides of bolt head and nut = 1½ diameters of bolt + ⅛ of an inch. Thickness of head = ½ distance between parallel sides. Thickness of nut = diameter of bolt.

In finished bolts, thickness of head = thickness of nut. Distance between parallel sides of a bolt head and nut, and thickness of nut, are 1/16 of an inch less for finished work than for rough.

FIRE LADDERS.

Considerable attention has of late been directed to the subject of mechanical or folding ladders, and it is proposed to supply the fire department of this city with them. Of course the very best invention in this line is what is wanted; but if we may judge from the existing productions, there is still opportunity for ingenious people to work out new ideas. We are inclined to think that a steam machine of this kind, or a carbonic acid gas machine, might be devised and made to operate advantageously. At present the sliding ladders are all of them worked by hand power, by ropes and winches; and the aim has been, by diminishing weight, to render them easily operated; but this involves lack of stability. To be of real service, they must be made firm enough to resist danger of capsizing from ordinary causes, such, for example, as a blow of wind. In London they have been found defective in this respect.

During a recent trial in this city, another defect in stability was brought out. The ladders tried were those of the Uda pattern. It operated quite successfully in the facility with which it could be run up to a hight, bearing a man with hose pipe, mounted on the summit. But when the water was let suddenly on, the ladder began to straighten perpendicularly and was on the point of toppling over backward, when chief engineer Bates, of Boston, rushed forward and with a pocket knife opened the hose pipe, thus instantly reducing the water pressure and saving the fireman's life. It is evident that stability, under the force exerted by sudden application of a head of water to the hose pipe, is another quality that the coming fire ladder must possess.

The subject is an important one, and whoever can devise a first rate implement will render an important service to his fellow men.

PROGRESS OF WOMAN'S RIGHTS.

Miss Anna Nichols, of Massachusetts, has recently been appointed an assistant examiner in the Patent Office. The lady has for some time very creditably fulfilled the duties of clerk; and on the occasion of some vacancies in the examinerships, she was one of several ladies who competed for places. All of the candidates were subjected to a general scientific examination as to their capabilities for the position, and four ladies passed the ordeal with much credit. The Commissioner, however, concluded to appoint only one of them for the present, as a sort of experiment.

There are few duties connected with the operation of the Patent Office but may be efficiently performed by intelligent women. It is all indoor work, mostly of a fixed, clerical nature, for which petticoats are admirably adapted; and if the Commissioner would make a more general use of them, he would set free a large number of pantaloons to be usefully employed in developing the more direct outdoor industries of the country, for which men are, by nature, so especially prepared.

At Canandaigua, in this State, Miss Susan B. Anthony, who insisted that she had as good a right to vote as any other man, and who did vote at the last election, has been tried and, we regret to say, found guilty, and fined for violating the law. Judge Hunt decided that, although women were entitled to the general rights of citizens, there were certain special privileges which the law of New York, as it stands, did not give them, one of which was the privilege of voting. The law must, in the opinion of Judge Hunt, be changed before our feminine fellow citizens can enjoy themselves at the ballot box.

In the meantime, the Commissioner of Patents having wisely decided in favor of the eligibility of women as patent examiners, we shall hope to see his decision sustained and ratified by the appointment of Miss Anthony as his successor when he shall retire—and that day, we understand, is not far distant. The lady in question is a female steamboat, so far as untiring energy and useful capacity are concerned. She is, undoubtedly, competent to manage a dozen or two of sleepy institutions like the Patent Office. We nominate, for Commissioner of Patents, Miss Susan B. Anthony, of New York, and Miss Anna Nichols for Assistant Commissioner.

A PATENT CONGRESS.

It will be remembered that, when the prospectus for the present exposition at Vienna was announced, the Austrian government appealed to the United States, requesting that a full display of the new and ingenious productions of this country might be supplied.

We took occasion to point out the hindrances to a compliance with the Austrian request, and showed that, owing to the illiberal nature of the Austrian patent laws, American inventors could not obtain proper protection for their new improvements in that empire; and that unless better security could be immediately assured to our citizens, they would be likely to take but little share or interest in the exposition.

The result has fully justified our interpretation of the feelings of American inventors and manufacturers. The exhibit from this country, though good in quality, is scanty as compared with what it undoubtedly would have been, had the Austrian government been a little more compliant in respect to inventive protection. Instead of granting protection to Americans, all that the Austrians could be induced to do was to agree to favoring the assembling of an International Congress for the purpose of talking over the subject of patent laws in general, and the propriety of promoting the enacting of uniform patent laws in all European states.

This Congress is to meet in Vienna during the present summer, and the President has recently appointed, as a special delegate from this country, the Hon. J. M. Thacher, now Assistant Commissioner of Patents. This appointment is an excellent one. Mr. Thacher is a gentleman of ability, and his extended official experience will enable him to present the clearest explanations of the working of our patent system, and the needs of our inventors in respect to patents in foreign countries.

The Department of State, in officially notifying us of the appointment of Mr. Thacher, requests our views upon the points accompanying the following letter:

{ DEPARTMENT OF STATE,
{ WASHINGTON, June 17, 1873.

Messrs. Munn & Co., New York city.

SIRS:—An International Patent Congress is about to be held in Vienna, at which it is proposed that the United States be represented. In order that the interests of American inventors and manufacturers may be properly represented thereat, information is desired on the subjects of inquiry subjoined hereto.

Will you have the goodness to answer the several inquiries, or such of them as you may think proper to reply to, and return your answer to Hon. J. M. Thacher, Acting Commissioner of Patents, Patent Office, Washington?

As it is understood that the Congress will convene early in August next, it is very desirable that your answer may be received by Mr. Thacher before the first of July. I have the honor to be, Very respectfully yours,

HAMILTON FISH.

SUBJECTS OF INQUIRY.

1. Is the protection of inventions by patents just and expedient, and, if so, on what grounds?
2. To whom and for what should patents be granted?
3. Should the grant depend on preliminary official examination?
4. What limitations are proper, if any, as to manufacture of the patented article, or payment of additional fees?
5. Should a distinction be made between home and foreign applicants, and, if so, what?
6. What has been the influence of patents on manufacturing interests in this country? Examples.
7. If a manufacturer, how is your special branch affected by patents?

Statistical, as well as general information is desired, and also suggestions in relation to any other matter connected therewith.

REMARKS BY THE EDITOR.—Each of these questions would form the subject of an elaborate essay, which at present we cannot undertake. We shall leave their extended discussion to our various readers. The Secretary of State is desirous of drawing out as general an expression of views as possible.

We suggest to those who take part in the discussion that they send us copies of their remarks, with the understanding that such portion thereof as the editor approves may be published in the SCIENTIFIC AMERICAN.

We will now give as briefly as possible some of our views, suggested by the enquiries above offered:

1. A patent is a private monopoly, which is a species of tyranny, an infringement of equal rights, and therefore untenable on the ground of justice. The invention by an individual of a new device by which his fellow men are benefitted does not entitle him, by any process of natural right or natural justice, to be a monopolist over his fellows, in respect to such article. On the contrary, every man in every community is bound by the strongest natural obligations freely to contribute his best powers of mind and body to promote the common welfare. Patents are therefore granted upon the ground of expediency, not of justice.

2. For the purpose of encouraging or quickening the growth of the useful arts, and spreading among the people a practical knowledge thereof, so that all who desire may find employment and profit from the new forms of industry, articles or processes thus brought out, it has been found expedient to grant patents for a limited period. Patents should therefore be issued for every new and useful article, process, device or manufacture, and, obviously, should be granted only to the original and first discoverer.

3. The grant of a patent is simply the issue by the government of a stamped receipt or piece of paper certifying that the holder has deposited a proper description of his invention, which, if new and useful, entitles him to a special monopoly thereof during the term of the patent.

To give occular importance to these documents, the ancient governmental custom was to write them on skins, attach great seals and ribbons thereto, and otherwise make an official fuss over the same. In England the skin and the big seal are still employed. The inventor, on filing his specification, receives the skin of a sheep, on which is printed a long rigmarole about "Victoria by the grace of God, Queen," etc. The document is signed by His Highness This, and My Lord That, and stamped with an immense seal of wax, one pound in weight, put up, for security, in a round tin box.

In this country we have, within a few years, abandoned the use of skins, high sounding words and other paraphernalia in connection with the issue of patents, but we contrive to make fuss over them in other ways.

The Commissioner of Patents must go through the formalities of an official examination as to the novelty of the invention, which consumes a deal of time and subjects the applicant to great inconvenience, delay and expense. This examination is of no real use, because, after all, it is the Court that decides whether the invention is new and useful.

The process of official preliminary examination at the Patent Office is attended with a variety of troubles, expenses and difficulties.

(a.) It involves the employment on the part of the government of a large number of officials, for whose support, and the materials they consume, the inventors, who are mostly poor persons, are heavily taxed.

(b.) It involves the employment of examiners to revise and correct the mistakes of assistant examiners; and of appeal boards, to revise and correct the mistakes of the examiners.

(c.) It involves the time and energies of the Commissioner of Patents, in the hearing of appeals from the appeal board, to revise and correct the decisions of such board.

(d.) It involves the time and labors of the District Court in hearing appeals from the decisions of the Commissioner of Patents, for the purpose of revising and correcting the decisions of the Commissioner.

(e.) It involves the employment, and support by the inventors, of an army of lawyers and agents, for the purpose of explaining law points to the Patent Office officials, pointing out to them the mistakes they have made in their examinations and decisions, obtaining the correction of such mistakes, putting in amendments to suit the whims of examiners, preparing, arguing and attending to appeals, etc.

(f.) In many cases, the applicant for a patent, unable by writing to explain away the objections brought by the Patent Office examiner, is obliged to travel in person from some distant part of the country to Washington, and then employ the help of a solicitor to assist the official in seeing and rectifying the official mistake.

(g.) Inventors are thus obliged to employ and support two distinct corps of helpers, in order to obtain a certificate for a patent, which, when obtained, is of uncertain value, because the Patent Office may subsequently grant another patent for the same thing to another party, or the Court, on trial of the patent, may decide that the invention lacks novelty, and that the Patent Office made a mistake in its official preliminary examination.

If any body doubts the worthlessness of Patent Office official examinations, let them read such decisions as that of Judge Blatchford in the refrigerator patent case, reported in the SCIENTIFIC AMERICAN of June 28, 1873. In that case, the Patent Office not only examined, but re-examined, and re-examined its re-examination, and decided each time that the device was new, putting the parties concerned to the greatest trouble and expense through a series of years, only to have it pointed out by the court, in the clearest manner, that the official Patent Office examinations were nothing but blunders.

For every case of this sort actually brought into court there are hundreds that are never made public because the worthlessness of the Patent Office examination is detected by the lawyer before the suit has progressed, and proceedings are not begun or, if commenced, are at once stopped.

(h.) In other cases, where the inventor is entitled to a patent, he is rejected by reason of the stupidity and incapacity of the official examiner; and on account of poverty, unable to pay the expenses of further prosecution, the applicant is compelled to abandon his attempt to procure a patent.

In view of the foregoing considerations, we think that the grant of the patent should not depend on the preliminary official examination.

The Patent Office should be simply an office for the registration and issue of patents. The official examination should be simply clerical, the only requirements being that the specifications and drawings are executed in accordance with prescribed rules. This done, and the fees paid, a certificate of patent should be promptly issued to every applicant.

Let those who are foolish enough to pay fees for a patent on an old invention do so. The number will be small, and they will harm none but themselves.

The abolition of the official examination would simplify the business of issuing patents, greatly reduce the cost of obtaining them to those for whom alone they are intended, and would necessarily result in giving renewed development to useful improvements of every kind.

The official examination was formerly essential in the grant of a patent, for then only one copy of the patent existed, and all additional copies had to be made by the hands of scribes, just as the Bible was formerly copied and circulated. But the matter is now entirely changed and presents itself in a different aspect. The publication of the drawings and specifications of all patents, in the cheap, popular, and admirable style in which they are now issued by our government, renders the work of official preliminary examination at the Patent Office superfluous. The inventor may now readily supply himself, or get access to every patent ever issued, and so become his own examiner. His eye is always quicker to detect resemblances or differences than any official examiner can be, and he understands better than the official what ought or ought not to be claimed.

4. The idea generally prevails in Europe, and also to some extent in this country, that by the grant of a patent the government gives away to the inventor a valuable privilege, for which the receiver should pay high fees in money, or place himself under obligations to do certain other things, well nigh impossible. This, we think, is a false idea and should be discarded.

If there is any obligation conferred by either side, it is on the part of the inventor, who, for the paltry reward of a temporary patent, places the government in possession of his new invention, from which, in due time, by the spread of the improvement and the creation of new industries among the people, the government is strengthened, its taxable resources increased, and the wealth of the nation augmented.

The object of granting patents is to encourage men to study, experiment and find out new arts.

The *introduction* or manufacture of a newly discovered thing is a different kind of labor from that of invention.

The one is the exercise of mind upon matter.

The other is simply the manipulation of matter into known forms.

Hence the patent should not be issued with any limitations as to manufacture, nor should new fees be demanded.

It should be clearly understood that the patent, when issued, is the exclusive property of the inventor, throughout its entire term, issued to him in reward for his discovery. It should be subject to no official interference, liable to no taxes. This is the only straightforward, equitable and satisfactory method. The attempt to make manufacturers out of inventors as they do in Canada, Austria, and other countries, by nullifying the patent if the inventor fails to manufacture under his patent within a specified time, is an utter failure. The only result is to defraud the original inventor out of the money he paid to procure the patent, besides robbing him of all his rights under the patent.

5. No distinction should be made between home and foreign applicants for patents. What we need, as a people, for the promotion of industry and the supply of constant employment for our teeming population, is the greatest possible variety of new and useful arts and industries. Let us have these arts and industries, no matter where their authors live, gladly granting the cheap price of a patent certificate for their procurement.

6. The influence of patents on manufacturing interests in this country has been beneficial in the highest degree.

In addition to the ordinary productions made by the common appliances, the fabrication of patented articles by means of these appliances has vastly contributed to the wealth and prosperity of our manufacturing interests. Think of the enormous number of men, with engines, wheels, lathes, hammers, and ordinary tools of every kind, now constantly employed in the fabrication of patented articles. Add to this the extraordinary number of patented tools that have been given to our manufacturing interests by means of patents, whereby human labor has been rendered more powerful, more effective, and more economical, and the sum total of benefit thus derived will be marvelous.

7. We only manufacture the SCIENTIFIC AMERICAN, which has now been published twenty-eight years. It has been so favorably affected by patents, and by the increased desire for scientific information which the studying out of improvements produces, that its regular issue has risen from one hundred and fifty copies per week to almost fifty thousand copies per week.

OLD PROBABILITIES, the modern clerk of the weather, is about to establish a station on Pike's Peak. We shall be likely to know what is going on in the upper regions, for the Peak is 11,497 feet above the level of the sea.

SCIENTIFIC AND PRACTICAL INFORMATION.

NEW CHLORIDES OF PROPYLENE.

M. Reboul states that, in addition to the ordinary chloride of propylene, $CH^3—CH—Cl—CH^2Cl$, and methyl-chloracetol, $CH^3—CCl^2—CH^3$, already known, there are two others, namely: Normal chloride of propylene, $CH^2—Cl—CH^2—CH^2Cl$, and chloro-propylol, $CH^3—CH^2—CH\,Cl^2$.

PERILS OF SURGEONS WHILE OPERATING.

The *Bordeaux Medical* states that Dr. Marc Girard, an eminent surgeon of that city, has lately died from a prick of a pin. He was operating upon the shoulder of a patient for a wound in which mortification had set in, and in placing the last sutures he accidentally scratched his finger. The effects appeared trivial, and the hurt soon apparently healed, but shortly after again inflamed, the poison extending through the body, and a lingering death was the result. M. Declat states positively that there is no necessity for any ill effects as above being caused by inoculation of the blood of either a diseased patient or the cadaver, when so simple and sure an agent as carbolic acid will promptly and almost infallibly arrest them.

STEEL LOCOMOTIVE BOILER.

Engineering of recent date contains the following items regarding a new steel locomotive boiler, made at the Crewe works of the London and Northwestern Railway, from the designs of Mr. F. W. Webb. It is of the ordinary type and the barrel is made telescopic, the mean inside diameter being 3 feet 11 inches and the plates $\frac{13}{32}$ inch thick. The most noticeable peculiarity is the system of fire box construction, which consists of forming the front, back, and sides of one plate. A portion is cut out of the front and the plate is flanged back to receive the tube plate. The ends of the plate are made in a jump joint under the tube plate and secured by a welt on the outside. The plate forming the top of the fire box is flanged down on three sides, and is riveted to the side and back of the box and to the tube plate. In order to insure a good joint around the tube plate, a copper calking strip is introduced between the flanges, so that the joint can at any time be repaired from the inside of the fire box. A $\frac{5}{16}$ inch plate is used for the body of the box, and a strong plate, $\frac{3}{4}$ inch thick, for the tubes. The dome is formed of one piece flanged at the bottom. The cover is made from a flat steel plate $\frac{7}{8}$ inch thick, and is stamped under a steam hammer into the required shape, the stamping being done by two blows of the hammer. There are 178 tubes of steel, $1\frac{7}{8}$ inches outside diameter. The tensile strength of the plates employed does not exceed 32 tuns to the square inch, and they will stretch 25 per cent before breaking. The boiler was subject to a test, by hydraulic pressure, of 200 lbs. per square inch before leaving the works.

CLEANING GUNS WITH PETROLEUM.

Greasing a weapon with fats and oils does not entirely protect it from rust; the so-called drying oils get gummy and resinous, while the non-drying oils become rancid; and by exposure to the action of the atmosphere, acids are formed, and these attack the iron. These are some of the reasons why petroleum is to be preferred for this purpose. Petroleum, is as great an enemy to water as are the fatty oils; and hence, when a gun barrel is covered with a thin film of petroleum it keeps the water away from the metal which forms the barrel; the water which rests upon this film of petroleum evaporates, but the oil does not, and hence no rust can be formed. It is very essential, however, that the petroleum or kerosene employed be perfectly pure, for impure oil, such as is often met with in commerce, attacks the metal. Care must also be taken not to allow it to come in contact with the polished stock, as it is able to dissolve the varnish.

The gun is cleaned as follows: Each rifleman carries a tin flask of pure kerosene and a round brush, of stiff hogs' bristles, which fits the barrel of the gun. The brush is screwed to the ramrod. The gunner also carries some dry hemp or tow. When about to clean a gun, some tow is wrapped about the rod and enough petroleum poured upon it to thoroughly moisten it; it is then pushed in a rotary manner through the barrel and back a dozen times, and the hemp taken out and unrolled, and the upper and lower ends of the barrel rubbed with the clean part, after which it is thrown away. This removes the coarser portion of the dirt. The brush is then moistened thoroughly with petroleum and twisted into the barrel, running it back and forth at least a dozen times, thus loosening the dirt that is more firmly attached to it. The first operation is now repeated, except that the hemp or tow on the rod is left dry, and the rubbing with this must be continued in all directions as long as it comes out soiled. The use of wire brushes is objectionable for cleaning guns, as the numerous little steel points cut into the tube. Only soft tow, hemp, woolen rags, or the like, should be used, as the petroleum dissolves off the dirt sufficiently.

PURIFICATION OF LUBRICATING OIL THAT HAS BEEN USED.

We find the following details of a practical method for regenerating lubricating oils given in an Austrian paper: A wooden tub holding 63 quarts has a faucet inserted close to the bottom and another about 4 inches farther up the side. In this apparatus is placed 7 quarts of boiling water, in which are then dissolved $4\frac{1}{2}$ ozs. chromate of potash, $3\frac{1}{2}$ ozs. carbonate of soda, $3\frac{1}{4}$ ozs. chloride of calcium, and 9 ozs. common salt. When all these are in solution, 45 quarts of the oil to be purified is let in and well stirred for 5 or 10 minutes; after which it is left to rest for a week in a warm place, at the expiratton of which time the clear pure oil can be drawn off through the upper stop cock without disturbing the impurities and cleansing fluid at the bottom.