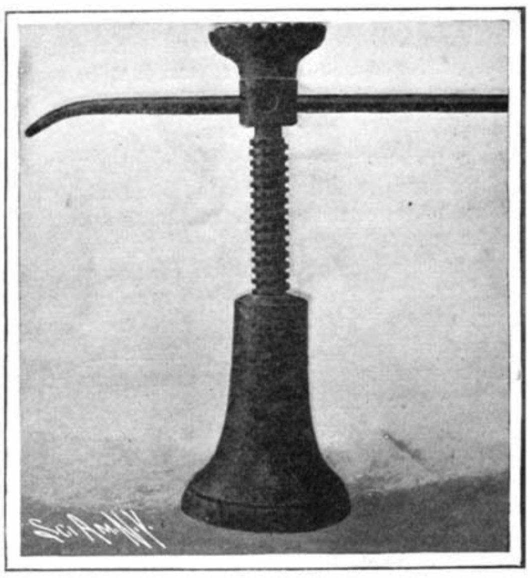
THE UNGENTLE ART OF BURGLARY.

Burglary—specifically safe-breaking—has in the last decade gradually ceased to be an exact science. To-day the safe-breaker no longer requires those beautifully fashioned, delicate yet powerful instruments and



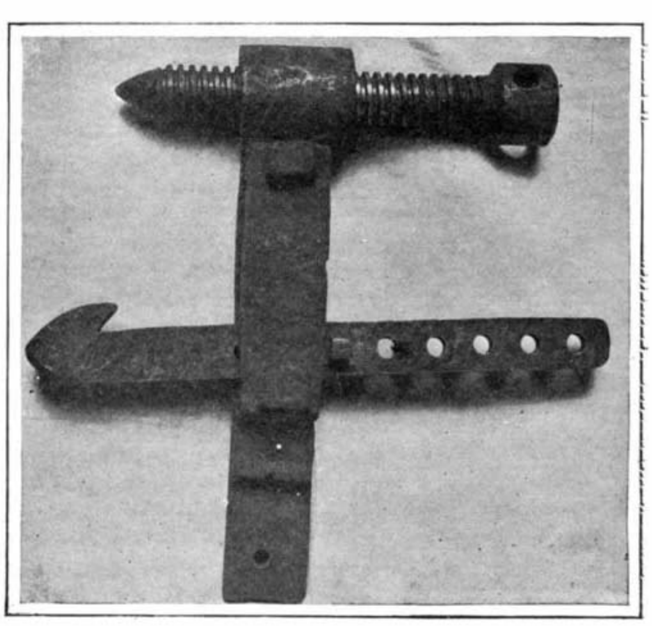
Jack-Screw Used to Lift Safes Into the Proper Position to Blow Them Apart.

tools which were formerly both the admiration and the despair of the safe manufacturer. The modern "yeggman," tramping it casually along a country road with a three-ounce phial of nitro-glycerine, a tiny battery, a few yards of wire, and an ignition-cap in his pocket, is able to open and rob almost any kind of a safe, if not with neatness, certainly with dispatch. No longer is the ambitious "strong-arm" man doomed to hours of exhausting and necessarily noiseless drilling, wedging, spreading, or jacking; for the introduction of nitro-glycerine, "soup" in technical parlance, has not only obviated these onerous labors, but has again enabled the safe-cracking industry to gain a step on the safe-making one. From the earliest days of the safe proper, the contest between the maker and the breaker has been closely analogous to that between the armor-plate manufacturer and the gunsmith, with the safe maker a little in the lead. That is, while no safe can ultimately withstand a persevering and scientifically directed attempt to open it, yet it may be sufficiently strong to resist an attempt limited in time as a burglar's operations usually are.

The use of nitro-glycerine, however, has dealt this time element, so favorable to the enforced honesty of the burglar and the continued security of some citizen's valuables, a knock-out blow. With the exception of such vaults of larger size, guarded by time-locks and electric alarms, usually the property of the more powerful banks and trust companies, and possibly the new globular type of strong-box, no safe *is* safe from the peripatetic yeggman—in daylight the harmless vagrant, and at night the terror of the country bank official and that picturesque but inefficient guardian of the peace, the country constable. The simplicity of the yeggman's methods is as great as that of the old-fashioned safe that so often is his "meat," but even safes of modern design and large size fall or, rather, meekly open before his ruthless and explosive attack. Even if the crack surrounding the door of the safe be so small as barely to allow the insertion of a sheet of paper, it is sufficient to permit the entrance of the "soup," a thin yellow, slightly viscous liquid flowing as easily as ink. Sometimes this is facilitated by a few blows of a muffled hammer on a steel wedge to widen the opening. After this, the nitro-glycerine is introduced, either by means of a funnel or by forming a sort of cup of putty around the opening, located at the top of the door. The ignition-cap is then placed in position and is connected with the pocket battery by means of wires which are brought in contact to make a spark—and the safe door starts on an aerial journey checked by the judicious use of a blanket. The yeggman, however, is often an inartistic, untidy workman, for it frequently happens that when the door suddenly parts company with the safe it takes the front of the building with it, and consequently the selection of the valuables desired from the contents of the strong-box is often so hurried that it is only partially successful. The bombardment of the surrounding territory with portions of the Farmers' National Bank seldom fails to rouse from slumber even the soundly-sleeping tillers of the soil. One form of safe, however, spherical in shape with a spherical door, appears capable of successfully resisting a nitro-glycerine attempt of this kind, as it is absolutely air-tight, and with the consequent absence of an appreciable opening between the safe and the door the insertion of the explosive is almost impossible.

The modern safe is practically proof against the burglar who works without the aid of explosives, for the above-mentioned time element is an almost insurmountable difficulty. Burglars, like lovers, laugh at locksmiths; they also sometimes laugh at time. In a recent store robbery in New York city, the gentlemen lacking a proper appreciation of *meum* and *tuum* approached the scene of their labors with a dray, opened the front door of the emporium, and carried off the safe bodily, to be opened later at their leisure.

The instruments shown in the accompanying engravings are among those in a collection at the New York police headquarters. Some of the implements are out of date, and have been since the early days of safe-making; others are still in use, and will probably continue to be used as long as the industry flourishes. Among the latter we may include the jimmy, an implement found in the hands of even the most dilettante of burglars. The jimmy *per se* is nothing more or less than a powerful crowbar for opening windows, prying apart locks, moving safes, etc. It is to the burglar's ungentle art what the brush is to the painter's more polite vocation. With the aid of a two-foot jimmy it is comparatively easy to move even a four or five-ton safe into a more favorable position for operating on it. Sectional jimmies, generally the property of men of rank and experience in the profession, usually consist of one or two straight bars threaded at each end, a union to join them, a number of heads of the different shapes demanded by the exigencies of the circumstances, to be screwed onto the bars, and often a number of auxiliaries for various purposes. By means of one of these, for instance, the jimmy may be converted into a powerful spreader, so called, for forcing apart plates and the like. For this purpose two straight bars, an end of each turned into a right and a left-hand screw thread, respectively, are joined by a central piece tapped to correspond with the ends of the two bars. This piece is also provided with means for turning it to force the two bars and the points of their application irresistibly apart. As shown in another photograph, the larger sections of the jimmy are sometimes carried in two leather or cloth tubes or bags, joined by a strap and suspended around the burglar's neck and buttoned inside his waistcoat. Experts claim that this is a most efficient and little troublesome method unless the number of acquaintances of the gentleman necessitates frequent bowing. But at 3 A. M. even a burglar's friends are not omnipresent, and no one bows to a policeman. The small lifting jack is of the ordinary kind, and differs little from those used in more legitimate industries, with the exception that its construction is unusually light and compact, yet powerful.



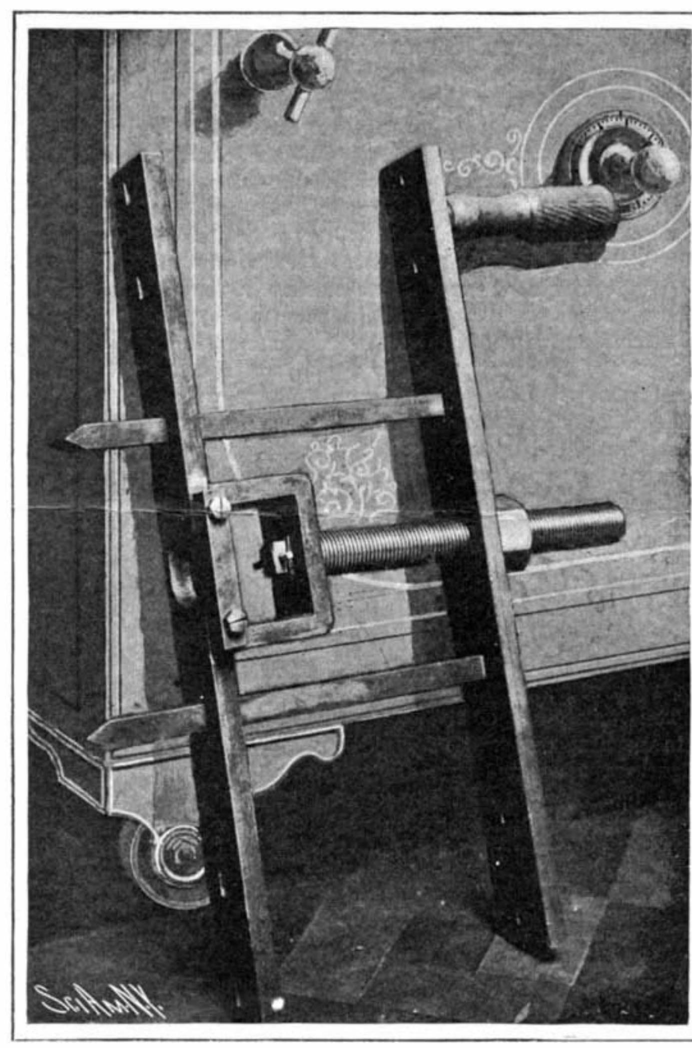
Drag for Tearing Off Locks and Plates.

The set of skeleton keys needs but little explanation. They are used for opening ordinary locks wherein tumblers are employed, and are of course useless as far as safety or combination locks are concerned. Where a lock contains a number of tumblers, it may be necessary to use a number of keys, but even in simpler cases the success of the operation depends to a great extent upon the skill of the artisan.

The funnel and syringe illustrated in another photograph are merely used to force the explosive into the drilled hole or the widened door-crack. The plunger of the syringe is covered with cotton, and other precautions are of course necessary to insert the explosive safely in this manner, as a premature explosion, instead of opening the safe, would probably perform that operation upon the safe-breaker.

The bludgeons or black-jacks shown in the engraving have all been wielded by strong-arm gentry of ruffianly proclivities, and have figured in famous crimes whose gruesome details it is unnecessary to recount here. But one glance at the photographs is necessary to convince the observer that these implements fully equaled the expectations of their makers, especially in the case of the excellent design involving the use of the helical spring.

The two remaining instruments have practically become obsolete through the advance in the art of safe making. The "drag" was used for tearing off locks, plates, and the like, the hook being caught under the object to be removed, while the point of the screw and the other end of the cross-piece were held against some other part of the safe. Few of the older safes could resist the powerful pressure brought to bear in this manner. The contrivance shown for cutting out a combination lock is comparatively simple. It is merely secured to the knob by means of the hole located between the two cutters, and the cutting is performed by turning the contrivance around the knob as a pivot, by means of the handle shown at the extremity of the upper bar. The cutters are advanced after each revo-



Contrivance for Cutting Out the Combination Lock of a Safe.

The hole between the cutters is placed over the knob and the tool is turned by means of the handle.

lution, by a turn of the nut on the threaded bar between them. Verily, the way of the transgressor must have been hard if he were forced to carry this ponderous implement any distance. The same brains and labor turned to honest ways would in the long run give a greater yield—a trite remark, but like many of its kind, only too true.

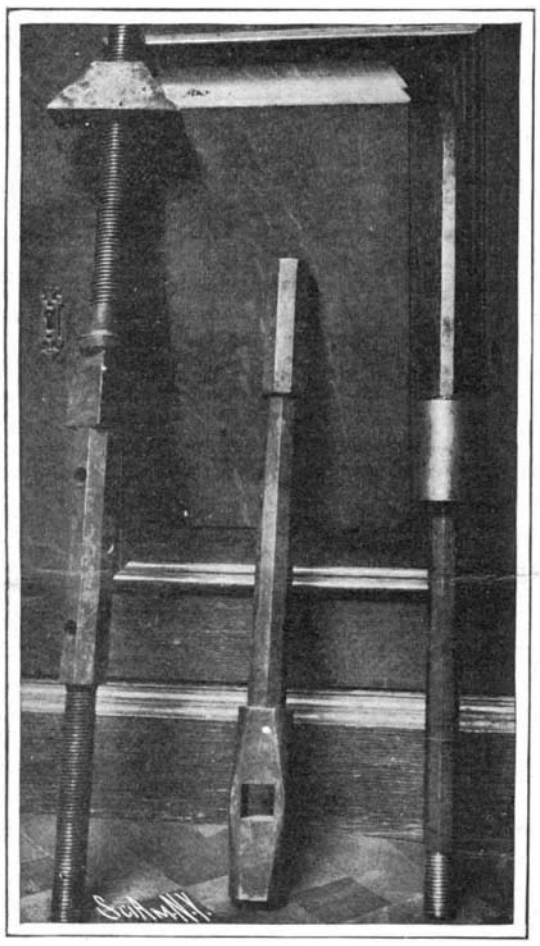
The Effect upon Fishes of Superaerated Water.

BY M. C. MARSH, UNITED STATES BUREAU OF FISHERIES.

Under normal conditions fishes live in water which contains no more dissolved air than may be absorbed spontaneously at atmospheric pressure and the prevailing temperature. As the nitrogen and oxygen of the atmosphere are not very soluble in water, the maximum amount dissolved at 0 deg. C. and 760 millimeters Hg is not large, being 19.53 cubic centimeters per liter of the former gas and 10.18 cubic centimeters per liter of the latter. When these amounts are exceeded, or when the corresponding content for any particular temperature and pressure is exceeded, the water is supersaturated, and while it remains in this condition it may cause remarkable symptoms upon fishes which often result fatally. An investigation of the subject has been conducted by Prof. F. P. Gorham and the author for the United States Bureau of Fisheries, and results obtained are here briefly summarized.

At the station of the United States Bureau of Fisheries at Wood's Hole, Mass., an instance of sea water with an excess of air occurred. This was due primarily to a leaky suction pipe which allowed air to enter it and pass with the water to the steam pump which lifted the water to storage tanks about 18 feet high. Having passed through the pump, this mixture of water and air became subjected to a hydrostatic pressure of about 8 pounds which forced the air into solution. From the storage tanks the water flowed to aquaria and being again at atmospheric pressure was in a condition of supersaturation with air. Air constantly escaped from it, both by separation in bubbles upon the sides of the aquaria and by escape at the surface. The constant flow, nevertheless, maintained the supersaturation. The fishes showed a variety of symptoms. There was first a precipitation of very minute bubbles upon their bodies and fins, completely covering them. After a longer time blisters of gas formed in the skin, chiefly of the fins, and sometimes became so large as to buoy the fish so that it could scarcely keep below the surface. With some species the eyeball was partially extruded from the head, causing the symptom known among fish-culturists as pop-eye. This exophthalmia was caused by an accumulation of gas behind the eye.

Death resulted after a longer or shorter time. The external gas did no serious harm, but death was due

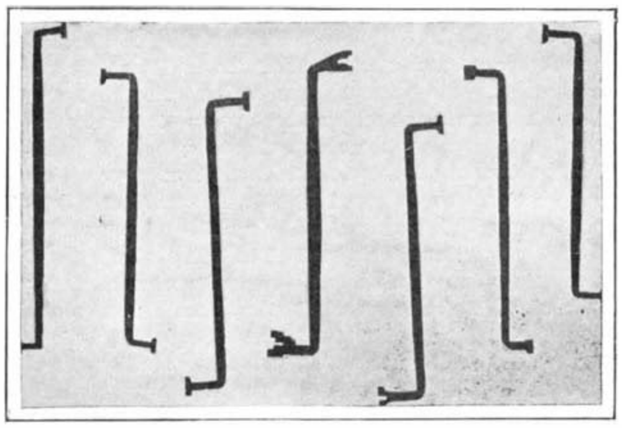


Sectional Jimmies Are Generally the Property of Burglars of Distinction.

to free gas within the blood vessels—to gas embolism. Often the vessels of the gill-filaments were filled with gas, and the ventral aorta and bulbus of the heart distended with it and quite empty of blood. This gas was about 97 per cent nitrogen.

The water itself, when the dissolved air was determined, was found to contain an excess of both oxygen and nitrogen. By controlling the amount of air which entered the suction different degrees of excess could be produced. On one occasion the water at 10.5 deg. C. contained 18.79 cubic centimeters of nitrogen per liter, an excess of about 6.4 cubic centimeters; and 8.41 cubic centimeters of oxygen, an excess of 2 cubic centimeters per liter. This water was fatal to hake within 8 to 20 hours, and it is probable that no fish could long survive in it. When the excess was not so great, a longer time was required to kill. A supersaturation of about 2 cubic centimeters of nitrogen per liter of water is sufficient to cause symptoms upon some species, but with less than this fishes may live perhaps indefinitely though there is probably some functional disturbance.

The gas which is chiefly or entirely responsible for the symptoms and fatalities is nitrogen alone. Natural waters are not infrequently air-supersaturated with nitrogen at their origin, and this condition is usually accompanied by a deficiency of oxygen. Substantially the same results may be brought about by such water as by that described above. In either case the water may be corrected by thoroughly exposing it to the air, which removes the excess of the one gas and supplies the deficiency of the other. The exposure must be very intimate, however, and requires that the water be broken up into slender streams, as by passing through a bottom with many small perforations; or by dividing

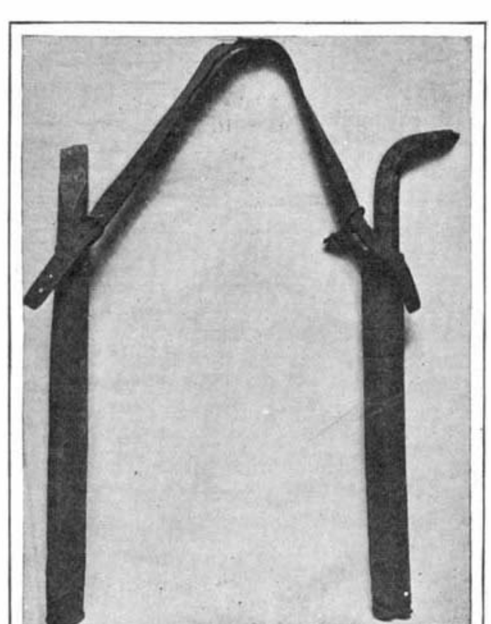


Complete Set of Skeleton Keys. Of Use Only in Picking Locks with Tumblers.

into thin sheets. Two and one-half gallons of supersaturated sea water in a cylindrical open vessel required more than two days to discharge spontaneously its excess of air. The presence of the free gas within the blood vessels is to be explained as a precipitation from the blood due to a rise in temperature. The high osmotic pressure of the air dissolved in the water forces unusual amounts of air into solution in the blood by way of the gills. After leaving the gills the blood is warmed slightly by the oxidation processes, and the difference in temperature between the water and the blood in the heart amounts in some cases to several degrees Fahrenheit. Thus the blood slowly releases some of its dissolved air—more strictly its dissolved nitrogen—which accumulates until a stasis of the circulation occurs, and consequently the death of the fish. A marked analogy exists between this affection and the caisson disease in man. In the latter the body sustains an actual increase of pressure which is subsequently removed and the symptoms follow. This change of pressure has no counterpart among fishes, save that the origin of the supersaturation is referable to an increase of pressure. Fishes may suffer the disease without necessarily undergoing any change whatever in the hydrostatic pressure which they sustain. The analogy lies in the supersaturation of the blood which occurs in both man and fishes. In deaths among caisson workers free gas is often found in the blood vessels. A rapid decompression of course favors the precipitation of gas and the precautions for avoiding harmful results include a gradual reduction of the pressure to normal.

An increase of pressure may be used to prevent the gas symptoms among fishes. If water supersaturated with air is subjected to a sufficient increase of pressure the supersaturation no longer exists, though the actual amount of dissolved air may not be changed. In such water the saturation point of the blood and other fluids of the fish, as well as of the water itself, is raised and while the increase of pressure remains the fish will suffer no harm from superaeration.

The attention of inventors may be usefully directed to the importance of the early patenting of their inventions in Japan, says the Journal of the Society of Arts. Imitations in Japan of foreign inven-



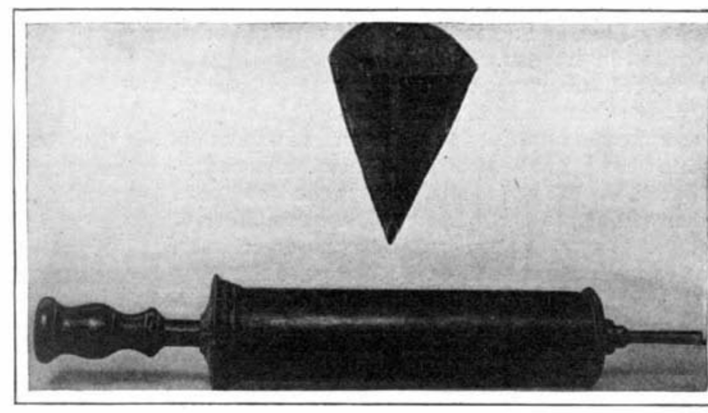
A Burglar Carries His Jimmies and Tools Around His Neck Strapped Inside of His Coat.

THE UNGENTLE ART OF BURGLARY.

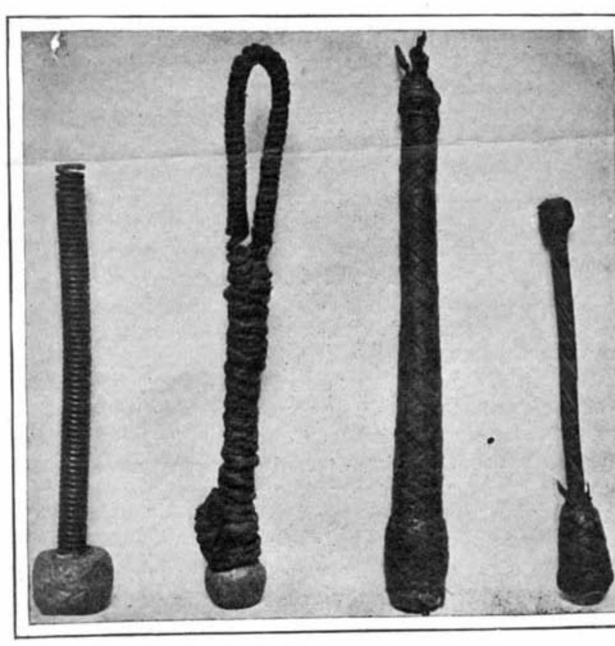
tions not protected there by patent are not uncommon. Inventions hitherto regarded as having no direct bearing on the trade of the Far East may turn out to have much to do with it, and unless inventors patent their inventions quickly they may find it too late when they become alive to the necessity of patenting. The Japanese Patent Bureau places in its library the official Patent Gazette of the foreign country containing the description of an original invention, after which such invention is unpatentable, and comes under the clause "publicly known," as covered by Article 2 of the Japanese patent law.

Long Fasts of Spiders.

Moses and Dr. Tanner seem to be man's models in the ability to dispense with food. The limits reached by them, however, are greatly surpassed by certain animals. Some facts as to spiders' powers of fasting are given in L'Illustration (Paris), September 23. An eminent naturalist, M. J. H. Fabre, recently studying the habits of the *Lycosa narbonensis*, noticed that that spider carries its little ones upon its back during seven



Syringe and Funnel for the Insertion of Explosive.



Bludgeons Which Have Equaled the Expectations of Their Owners.

months, and that during this time the young spiders consume absolutely no food. He concluded from this observation that it is the solar heat and light that for them directly take the place of nourishment. In other words, "the motor heat in these young animals, instead of being released from the food, might be utilized directly as the sun, source of all life, radiates it."

A Berlin electric company has lately brought out a novel apparatus for testing insulated cables by means of X-rays. Up to the present time it has been impossible to verify the insulating qualities of the cables and their conductibility except by measurements which are carried out with electrical instruments, and the process is often a long or difficult one. With the new instrument the cable may be examined at once and the experimenter may be said to actually see the insulation of the cable, by means of the rays. The cable is made to pass over two pulleys which are fixed at the upper part of the instrument. An X-ray apparatus projects the shadow of the cable upon a fluorescent screen as it passes along. The impurities and air-bubbles in the insulating layer are clearly visible on the screen. In practice the apparatus is made portable, so as to be used in a cable factory. A large case mounted upon wheels contains all the apparatus, with the two sheaves for the cable on the top. Underneath the cable is the X-ray tube and above it the fluorescent screen. The cable is unrolled slowly and is examined as it passes across the apparatus.