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NEW COMPOUND LOCOMOTIVE.

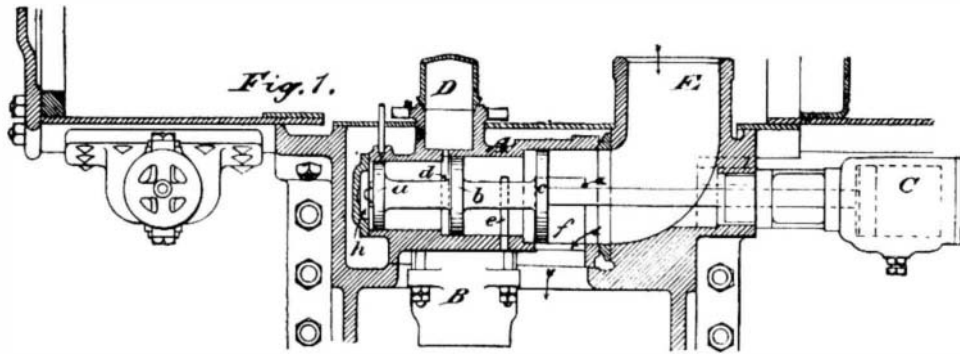
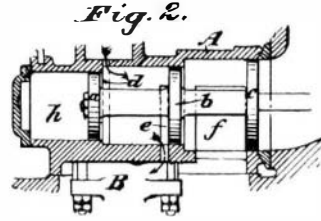
Without doubt, one of the most important engineering questions of the day is that of the economical use of steam. This has been a great problem since the days of Watt, and while from his time on gradual improvement had been made in the construction of steam engines and in the methods of generating and utilizing steam, the greatest strides have been made within a few years by compounding the engines and using the steam expansively to the greatest possible extent.

In marine engineering, where the condenser could be applied to great advantage, very high duty has been realized, and in the more recent ocean steamers the improvements as regards power are fully as great as the improvement in those details of naval architecture relating to speed. It has been found that non-condensing compound engines could be constructed with great advantage, and many stationary engines of this type are now in use for various purposes, notably for use in connection with dynamos for electric lighting. Quite recently, the same principle has been applied by the Rhode Island Locomotive Works to a passenger locomotive. Our engraving represents this engine during the experimental stage, showing the engineers taking indicator diagrams from the cylinders. With the exception of the high and low

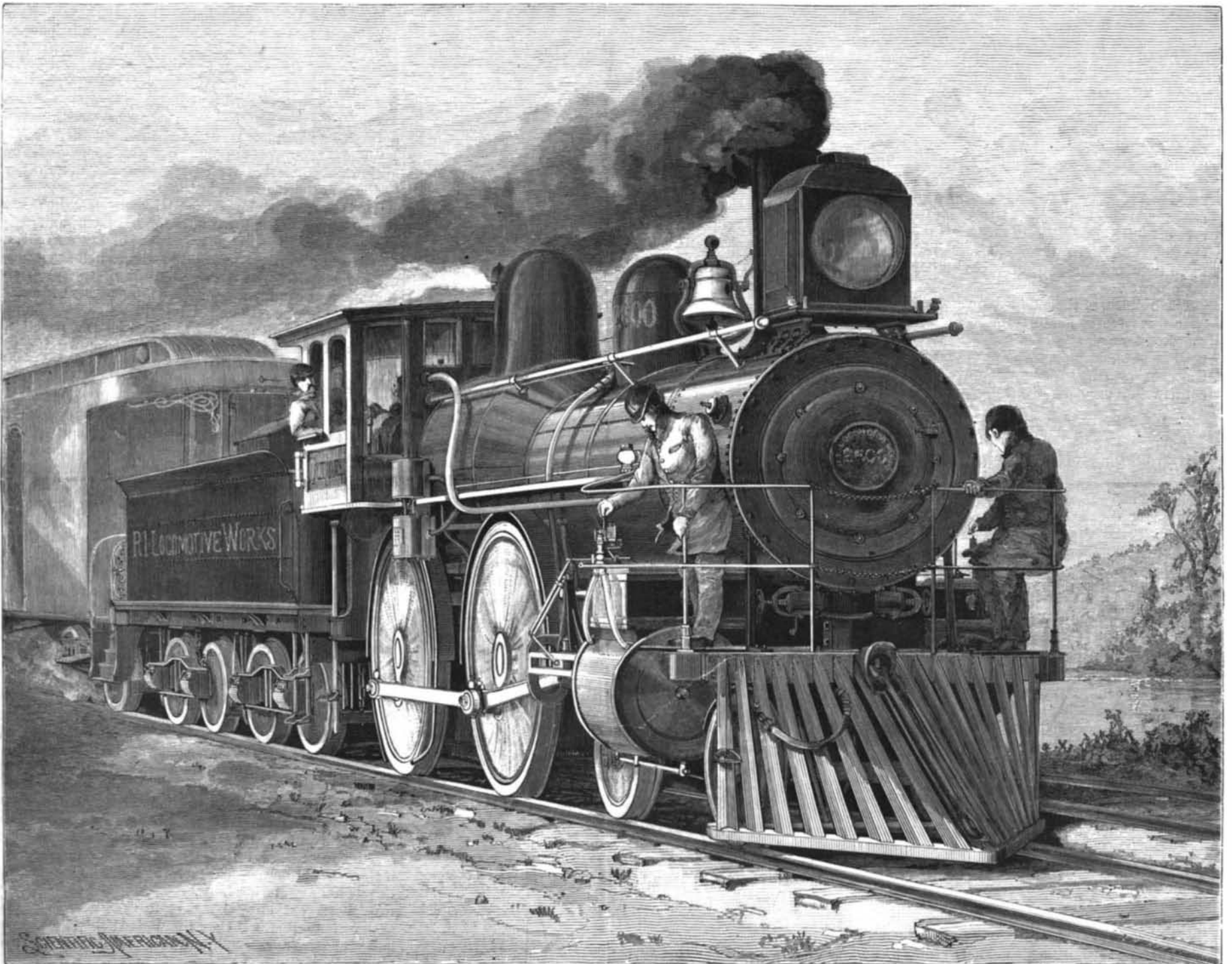
pressure cylinders, and the mechanism peculiar to them, the locomotive is of the regular type made by the works before mentioned. The high pressure cylinder is 18 inches in diameter, with a stroke of 24 inches. The low pressure cylinder is 28 inches in diameter, with the same stroke. The driving wheels are 78 inches in diameter; the barrel of the boiler is 52 inches in dia-

meter, and the thickness of the steel plates of which the boiler is made is $\frac{5}{8}$ inch. The normal steam pressure is 180 pounds per square inch. Steam is admitted to the high pressure cylinder in the usual way by a link and valve motion, and exhausted into an intermediate receiver, E, from which it is admitted to the low pressure cylinder by means of the intercepting valve shown in Figs. 1 and 2. This valve is constructed on the differential principle, and being entirely automatic in its action, it does not in any manner increase the work of the engineer.

The intercepting valve being in any position (that shown in Fig. 1, for example) and the throttle valve being opened, steam passes directly from the boiler to the high pressure cylinder in the usual manner. It also passes through the pipe, D, into the intercepting valve, A, causing the piston to move into the position shown in Fig. 2. In this position, the receiver, E, is closed to the low pressure cylinder by the piston, c, and steam from the ports, d and e, and through the reducing valve, B, into the low pressure steam chest, the pressure being reduced by the valve, B, from boiler pressure in the ratio of the high and low pressure cylinder areas. The piston, a b c, is so proportioned that it will automatically change to the compound position when a pre-



THE INTERCEPTING VALVE.



COMPOUND LOCOMOTIVE MADE BY THE RHODE ISLAND LOCOMOTIVE WORKS.

determined pressure has been reached in the receiver, E, by exhausts from the high pressure cylinder, as shown in Fig. 1. The engine thus starts with steam in both cylinders, and automatically changes at a certain receiver pressure, so as to work on the compound principle.

The engine may be changed from the compound system to the simple system at any time at the will of the engineer, by opening a valve connecting the receiver with the exhaust pipe, and allowing the exhausts from the high pressure cylinder to be ejected through the exhaust nozzles in the usual manner.

The apparatus is so constructed that the operation of the exhaust valve permits steam at the receiver pressure to enter into the space, h, to insure the movement of the piston to the position shown in Fig. 2, before the receiver is emptied through the exhaust. This prevents a lapse of continuous action in the low pressure cylinder during the change from the compound to the simple system while running. It is obvious that under bad conditions of starting the engine may be operated as a simple one, at the will of the engineer, by opening the exhaust valve before starting. Whenever this valve is closed, the piston, a b c, will automatically take the compound position shown in Fig. 1.

It is also obvious that an engine of this kind makes but two exhausts into the air, when running as a compound, for each revolution of the drive wheels, instead of four, as usual.

This engine is the second of the kind, the first having been placed on the Brooklyn Union Elevated road more than a year ago, since which time it has been working satisfactorily and with great economy of fuel and oil, besides running with much less noise and without throwing cinders and sparks. Since the large engine here shown was built, the Rhode Island Locomotive Works have changed two more of the simple engines of the Brooklyn Elevated road into compound engines, and have built one new compound engine for the Kings County Elevated road. They have also built a large ten-wheeled compound engine for the Jamaica Railway Co., to run on the island of Jamaica, and six very heavy freight engines of the four-cylinder type of compound, for the Mexican Central Railway of Mexico.

The large engine which we illustrate was designed for making fast time on trains with few stops. It has been used on the New York, Providence & Boston Railroad between Providence and New London, in general service on heavy and fast trains. By a comparison with simple engines of practically the same dimensions every way, it has been found that in point of cleanliness, that is, freedom from cinders and black smoke, the compound engine is in marked contrast to the simple engine. In fact, it has been found that this engine needs no netting at the front end. It will thus be seen that this engine settles the question of the cinder and smoke nuisance. Although the bearings or journals are of ordinary size, none of them on this engine have ever exhibited any signs of heating, thus showing that the stress on the reciprocating and revolving parts is more regular than in the simple engine exerting the same power.

The builders of the engine place the saving of fuel on a conservative estimate from 15 to 25 per cent of that required for a simple engine. This is certainly a surprising gain, and one which would seem to indicate that we are to see in the near future a revolution in the construction of locomotives.

Compression of the Carotid for Convulsions.

Dr. Leopold Roheim, of Budapest, publishes in the Gyogyaszat a case of eclampsia which he had, after the failure of all ordinary remedies, successfully treated by compression of the carotid. The case, which is quoted by the Pester Medicinisch-Chirurgische Presse, was that of a robust man of fifty-six, who had been suffering for years from cancer of the bladder, with occasional hæmaturia. The man had been attacked by a most violent eclamptic paroxysm, which was mainly confined to the left side. Dr. Roheim prescribed in vain musk, valerianate of zinc, bromide of potassium, asafœtida, hypodermic injections of morphia, enemata of hydrate of chloral, and frictions with mustard, and at last employed compression of the carotid. After constant compression for some time of the right carotid the convulsions were suddenly arrested, the patient recovered normal respiration, and very soon felt quite well. Two or three slighter attacks followed, which were soon arrested by properly instructed attendants. The effect of the compression was so remarkable that Dr. Roheim earnestly recommends this treatment. He compressed the carotid with the index and second fingers between the larynx and sterno-cleido-mastoid muscle backward toward the spine, just as Trousseau and Bland had recommended. He was equally successful in the case of a girl nine years old. He considers the rationale of the treatment to be that by compressing the carotid and at the same time necessarily the sympathetic nerve fibers, which closely follow the course of the artery, the excitability of the brain is allayed.—Lancet.

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Contents.

Table listing various articles such as Alloy, a new manganine, Iron-aluminum alloys, etc., with corresponding page numbers.

TABLE OF CONTENTS OF SCIENTIFIC AMERICAN SUPPLEMENT No. 842.

For the Week Ending February 20, 1892.

Price 10 cents. For sale by all newsdealers.

Detailed table of contents for the supplement, listing articles like I. AGRICULTURE—Agricultural Use of Thomas Slag, II. BIOGRAPHY—Jacques-Louis Lagrange, etc., with page numbers.

RELATED INVENTORS.

By the terms of the existing law the official fees for a patent are fixed at \$35, payable in two installments; the first, \$15, on filing the application for the patent; the second, \$20, after the application has been officially examined and favorably passed upon or "allowed."

The applicant has six months time, after the allowance, within which to pay the final fee of \$20. If not paid, the application is forfeited, and the only way then to obtain the patent is to file a new application and pay a new government fee.

Many inventors are poor, and are obliged to search for financial aid. As a rule, they are not good business men. They often postpone the final payment as late as they can, sometimes even up to the last hour. If living at a distance, the mail may be delayed and not reach Washington until after the business hour of the Patent Office; or the telegram may fail to arrive in time.

When the money comes to hand, after the official closing hour of the office, it has heretofore been customary for the applicant's agent to place the funds in a sealed envelope and hand it, at the door of the Patent Office, into the custody of the watchman in charge; who in turn passes it over the next morning to the official receiving clerk.

These payments, although made after office hours, are still made within the six months time allowed, and have been accepted, heretofore, as a technical compliance with the law.

Two cases of payments in this manner were lately brought to notice of Commissioner of Patents Simonds, in one of which the \$20 fee was delivered to the watchman five minutes before midnight and the other four hours prior to midnight. The Commissioner refused to recognize the legality of the proceeding and the matter was sent to the Secretary of the Interior, and by him reported to the Attorney-General's office for an opinion. Assistant Attorney-General Shields decides adversely to the inventor, on the following grounds:

Section 4885 of the Revised Statutes provides as follows:

"Every patent shall bear date as of a day not later than six months from the time at which it was passed and allowed and notice thereof was sent to the applicant or his agent, and if the final fee is not paid within that period the patent shall be withheld."

Section 4985 provides as follows:

"Patent fees may be paid to the Commissioner of Patents, or to the Treasurer, or any of the assistant treasurers of the United States, or to any of the designated depositaries, national banks, or receivers of public money designated by the Secretary of the Treasury for that purpose, and such officer shall give the depositor a receipt or certificate of deposit therefor."

"The law, however, points out the specific officers authorized to receive such payments, and none other has any authority to act in the premises."

"It is in effect claimed that payment may be made to any officer or employe of the government, and this in the face of the specific provisions of law as to the places and persons, where and to whom such payments are to be made. The mere statement of the proposition without comment or argument is sufficient to show that it cannot be seriously entertained."

"It is further alleged that it has been the practice, well understood by those interested in the matter, to accept fees handed to the watchman at the door of the interior department building, as these fees were, after office hours or upon holidays, and to credit them as paid on the day they were handed to such watchman. There is no authority for such a practice, and if it has been allowed, the sooner it is discontinued the better. The policy of allowing any employe not under bonds to become a receiver of money is a dangerous one and should not be countenanced, even though it be not forbidden by the law."

"As a legal proposition, the decision of the Commissioner that this payment was not one under the law is, in my opinion, entirely sound."

"The law," says the Attorney-General, "points out the specific officers authorized to receive such payments, and none other has any authority to act in the premises."

This cannot mean that the receiving officer must personally stand at the counter and take money; but he may provide clerks and assistants to do it for him.

Furthermore the patent law expressly authorizes the Commissioner of Patents to make, subject to approval of the Secretary of the Interior, such lawful rules for doing business with the Patent Office as he thinks proper.

It is, therefore, within the sphere of the Commissioner to make a special arrangement to accommodate related inventors and save them from loss of standing on the records, and from the forfeits and extra costs, if they should happen to reach the Patent Office after the customary closing hour.

In his recent annual report to Congress, Commissioner Simonds stated that the Patent Office receipts last year were over one hundred and thirty-one thousand dollars above the expenses; and that a little over four millions of dollars were now standing in the