

Scientific American,

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY AT NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

C. D. MUNN, S. H. WALES, A. E. BEACH.

The American News Company, Agents, 121 Nassau street, New York. The New York News Company, 8 Spruce street. A. Asher & Co., 29 Unter den Linden, Berlin, are Agents for the German States.

VOL. XXII, No. 18 . . [NEW SERIES.] . . Twenty-fifth Year.

NEW YORK, SATURDAY, APRIL 30, 1870.

Contents:

(Illustrated articles are marked with an asterisk.)

Table listing various articles such as 'Improved Stall for Horses', 'The Eclipse Steam Pump', 'The Trial of the Pyx', etc., with corresponding page numbers.

Special Notice to Advertisers.

The circulation of the SCIENTIFIC AMERICAN has become so large that we are compelled to put it to press one day earlier in the week.

SAFETY VS. ECONOMY IN THE CONSTRUCTION OF STEAM BOILERS.

Two kinds of experiment are now and have been for some time in progress, having for their common object the improvement of steam boilers.

It is, perhaps, a little singular that those who aim at greatest safety, as well as those who aim at maximum economy, should have for the most part adopted tubular construction.

Neither of these systems has proved altogether satisfactory. Unequal contraction and expansion have been a cause of manifold evils in the economy tubular system.

Notwithstanding this, the number of boilers constructed so as to make safety the principal point secured, are multiplying in the market, and are finding ready sale in many instances.

Most of those boilers in which the attainment of maximum safety is made the paramount object, are subject to the great defect of foaming, or priming, as it is called.

Some recent experiments, to which we may refer more particularly at a future time, seem to show that in the ordinary mode of estimating the quality of steam by the hand, and its appearance when discharged into the air, very great errors in judgment are committed.

The experiments referred to have also rendered it almost certain that the proportion of priming within certain limits is exactly as the rate at which the steam is delivered.

below which no boiler will prime, no matter what its form may be. And further, these experiments indicate that boilers deemed safe when delivering wet steam may be unsafe when this delivery is so reduced as to force them to deliver dry steam.

THE STUDY OF IMPRACTICABILITIES.

In this utilitarian age there are to be found many who are impatient of all that seems impracticable. They chafe at all propositions and attempts that do not clearly bear the stamp of practical skill and finished attainments.

The history of all improvement will show that failure has done as much to elevate the world as success. Even in the financial world, men need the instruction drawn from their failures to finally succeed.

As in business, so in art and science. The artist perfects himself by the study of his faults. The scientist makes repeated failures ere he succeeds in originating some great and instructive experimental discovery.

What is an improvement but the removal of impracticable elements. Who shall deny then the educating power of impracticabilities?

There is occasionally a correspondent who criticises the course of the SCIENTIFIC AMERICAN, because in its publication and illustration of new inventions, it does not deny its columns to such occasional ones as are faulty.

It is not enough that an invention has in it elements of impracticability to exclude it from our columns. Its publication proclaims a mechanical want, shows how it has been attempted to supply the want, and may suggest even by its impracticabilities how a practicable device may be constructed.

Probably no one of the readers of this journal has been called upon to study more critically and attentively the various devices illustrated and described in it, than the present writer of the descriptions which accompany the engravings.

NEW MECHANICAL MOVEMENTS.

On page 192, current volume, we published some problems in new mechanical movements, which seem to have attracted considerable attention. We have received many so-called solutions, which, upon examination, have proved incorrect.

We have also received diagrams of supposed new mechanical movements not called for by the problems proposed. Some of these show evidence of having never got further than the paper upon which they are drawn.

For instance, a gentleman from Massachusetts sends us a diagram of a movement by which it is claimed rotary motion can be converted into reciprocating motion, and vice versa.

The device will convert a rotary into a reciprocating motion, but will not perform the converse movement. It has only the functions of the slotted crosshead placed at right angles with the line of direction in which the reciprocation takes place.

Problem second, in the article above referred to, has received but two original solutions, which we give below; we think one of these is a very ingenious one. Others have been proffered but they are old.

Fairbairn's method, above alluded to, is to make the driven

pulley eccentric to its shaft, and use a belt long enough to accommodate itself to the eccentricity with a friction pulley to take up the slack.

Mr. A. K. Smith, of Nebraska, Ohio, sends a solution new to us, but he says not new to himself, as he saw it many years since. The method described by him is to make the driven pulley eccentric and use an elastic belt.

R. B., a modest young machinist, of Buffalo, N. Y., shows that the elastic belt need not be used. With proper proportions an ordinary leather belt may have slack enough to compensate for the eccentricity of the driven pulley.

Mr. L. A., of Brooklyn, N. Y., who does not seek celebrity, and therefore does not wish his name published in full, gives the most ingenious solution of any received. He accomplishes the required result by the use of two ordinary pulleys with shafts in their geometrical centers, but connected by a belt, one half of which is elastic and the other half inelastic.

The inventor of this movement has employed it to produce some very life-like automatic movements in toy figures.

We hope to receive original solutions to the other problems in due time.

METALLIC HYDROGEN.

At a recent meeting of the Lyceum of Natural History, in New York, a paper was read by Dr. Loew, assistant in the College of New York, on the preparation of hydrogen amalgam, that deserves the attention of scientific men everywhere.

The researches of Graham, which we published at the time, went to show that hydrogen could be alloyed with palladium, and that it was also contained in meteoric iron. He condensed the hydrogen in the palladium, and came nearer proving its metallic character than any other person had done.

The question may arise, What practical value can be derived from this discovery? We may not be able to appreciate its importance at this early stage, but heretofore it is easy to perceive that the possession of metallic hydrogen will enable us to make a vast number of compounds artificially.

USES OF FLUOR SPAR.

We are sometimes asked to give the applications of Fluor Spar, and as we cannot answer these questions separately, we propose, for the benefit of all of our readers, to devote some space to an account of the properties and uses of this valuable mineral.

Its name indicates two things—first, that it easily melts or flows; secondly, that as a spar it is frequently found associated with ores in our mines, for the Germans gave the name spar to the minerals which occur with metals.