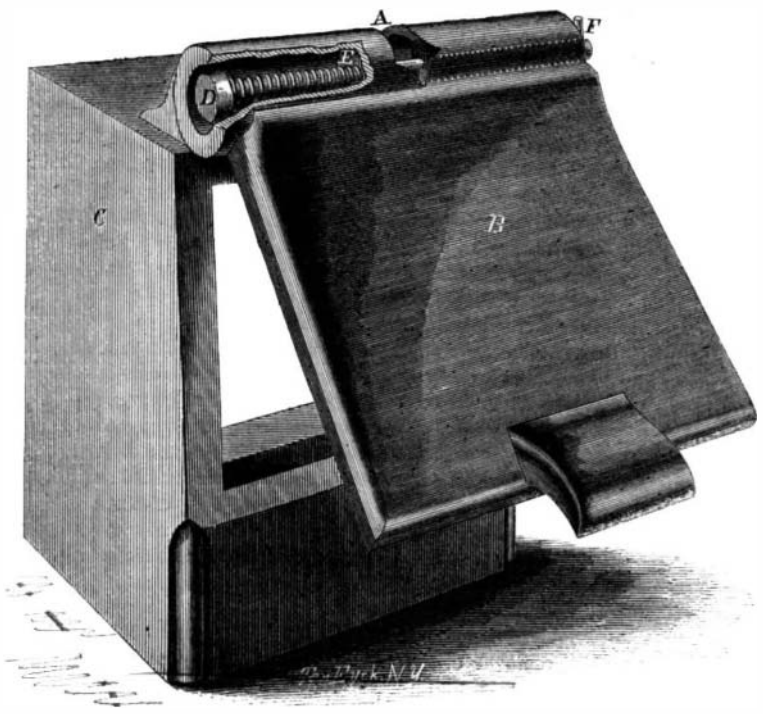
Improved Axle Box.

The common axle boxes in use on railways are very inconvenient things, as regards the covers. On most of them a screw wrench must be used before they can be oiled. These screws are continually jarring out, or breaking off, so that the covers are lost on the road, and have to be renewed very often. In the box here shown no screws are employed, the casting being solid and the cover kept down by a cam-shaped hinged joint, A. This joint is halved in the center, one wing being on the cover, B, and the other on the box, C. A bolt, D, having a spring, E, slipped over it, fits the projection on the box, and by means of a pin, F, in the opposite end, draws the cover up to the box and holds it fast in either position, open or closed. The cover is shown partly raised in the engraving, and the lug on the box is broken out to expose the springs. This is a very useful improvement, as it is durable, efficient and free from the objections which attach to screws. A patent is ordered to issue on it through the Scientific American Patent Agency, by S. T. Shelley, of Louisville, Ky.; for further information address him at that place.



SHELLEY'S AXLE BOX.

THE RUHMKORFF COIL.

On the 23d of February 1852, the Emperor of the French offered a prize of 50,000 francs to be bestowed, after five years, to the author of the most important discovery concerning the applications of electricity, and a commission, composed of thirteen of the most eminent men of science in France, was appointed to award the prize. In 1857, the commission reported that they had not judged any discovery sufficiently eminent to receive the large reward, and prayed that the time might be extended for five years more. The last number of *L'Invention* contains a long report of the Commission, signed by M. Dumas, the President, awarding the prize to M. Ruhmkorff, the inventor of Ruhmkorff's coil.

The report says, "M. Ruhmkorff was a workman for some of our best constructors of instruments of precision, and finally chief, in his turn, of a house, the celebrity of which increases and extends each year. His education was made little by little, by reflection, by the study of a few books meditated without ceasing, and by the lessons of a few professors, heard, as it were, by stealth, at very rare hours of leisure. Modest in his life, of a perseverance which nothing could distract, of an abnegation which merits the most illustrious testimonials of esteem, M. Ruhmkorff will remain as a type worthy to serve as a model to those numerous intelligent workmen who people the workshops of precision of the capital."

As we have recently promised to a correspondent an explanation of the Ruhmkorff coil, we will give it in this connection. If two wires are placed parallel and near each other, and a current of electricity from a galvanic battery is passed through one of them, at the instant when the current commences there is a momentary current through the other wire in the same direction. This secondary or induced current immediately ceases, although the primary current is continued. But if the primary current is broken, another wave passes through the parallel wire but in the opposite direction.

If the wire for the primary current is wound in the form of a helix, and a finer wire, properly insulated, is wound in a second helix around the first, the force of the induced current is greatly increased.

All of these facts were discovered by others than Ruhmkorff; his invention consists in a device for breaking and renewing the primary current automatically, so that the machine would give a succession of induced waves through the outer helix without any manipulation. His plan is exceedingly simple. He cuts the primary wire and attaches to one of the cut ends a hammer of soft iron, which rests upon an anvil connected with the other cut end. Thus the circuit is closed, but can be broken by raising the hammer. He now places in the axis of the helix a bundle of soft iron wires, with their ends just over the hammer. When a current of electricity is sent through the helix, it makes the wires magnetic, and the hammer is attracted upward; breaking the current. On the breaking of the current, the wires cease to be magnetic, and the hammer falls; again closing the circuit. When the machine is properly constructed the current is thus automatically broken and closed several hundred times in a minute.

The induced current of the Ruhmkorff coil combines the large quantity of galvanic with the high intensity of frictional electricity, and in this consists its value for many scientific and industrial purposes.

SQUIRE'S FRUIT JAR.

During the last summer articles on preserving fruit

were published in the Scientific American which pointed out defects in the present jars, and hinted at improvements which would make them much better The jar here illustrated is, we are assured by th inventor, one result of our suggestions, and othe readers may take the hint thus thrown out, and ac upon it with advantage to themselves.

This jar provides against any cavity or space above the fruit. It is well known to all practical persons that heat expands the bulk of the fruit so that when cold the contents shrink and leave a space above which is detrimental. Mold accumulates on the top of the fruit and destroys its commercial value as well as the flavor. To provide against this defect the jar must be filled, as the fruit shrinks, with sirup, so that when at a moderate temperature no cavity will exist.

The method of doing this will be understood by perusing the description. The fruit is first scalded, or not, as desirable, and put in the jar; after which the cap, A, is pushed down to its place. There is a rubber gasket between the cap and the jar, so contrived that the fruit does not come in contact with it, which makes an air tight joint between the two glass surfaces. The fruit in the jar is then brought to the boiling point by being placed in a common boiler heated gradually. The fixed air remaining in the jar is expelled through the small hole, B; and the clamp, C, which works on a strong glass stud, D, is shifted round until the holes are covered; the clamp has a rubber ring, E, slipped over it, which keeps the surfaces below it air tight, and its ends work in a scroll groove in the neck of the jar. The jar is then removed, and as the contents fall by shrinking, additional sirup is poured in through one of the orifices, the air within escaping by the other. In this way the jars are filled to the very top, and no mold accumulates.

Another good feature in this jar is the application of the points, E, to the bottom. All persons who have canned fruit must have noticed a propensity in the jars to upset when the water surrounding them boils. This is occasioned by the confined air under the bottoms which, in seeking to escape, oversets the jar unless care be taken to prevent it. The jars are also frequently broken at the bottom from being taken out and set on colder surfaces, the difference in temperature cracking the glass quickly. Both of these defects are obviated in this jar, for the space beneath allows the air to escape, and the slight surface presented by the points permits the vessel to be set any where with impunity; they also strengthen the bottom.

The combination of these several features should make a most excellent fruit jar, and we predict for it a large sale when its virtues become known. It was patented through the Scientific American Patent Agency, on Oct. 18th, 1864, by John J. Squire, of Windsor Locks, Conn. For further information address him at that place.

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The Hecker and Waterman Experiments.

It will be remembered that to complete the programme laid out by Mr. Waterman at the commencement of his experiments, one series of 4 experiments of 30 hours each was yet wanting. There has been a delay in repairing the engine before completing this series, but we learn from Mr. Waterman that the engine is now in order, and that the experiments will soon be finished.