The Centenary
of the
Friction Match

with an account of its
inventor, John Walker,
of Stockton-on-Tees

by MILLER CHRISTY

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THERE are few, if any, domestic contrivances in everyday use which are smaller and less impressive than the common household "match." The pin and the needle are both smaller still, but each is of bright shining metal and is, therefore, markedly attractive, even showy. But, of the modest every-day match—a small splinter of wood, with a blob of some chemical composition on one end—what can one say, except that, though neat in appearance, it is certainly not striking—apart from its properties.

Yet the match has one great redeeming feature which entitles it to rank above many far more pretentious contrivances. If it is somewhat insignificant in appearance when looked at individually, it has, when viewed collectively, the very great merit of being used, and useful, beyond any other domestic contrivance. Anyone who is familiar with the fantastically-cumbrous, time-wasting, and inconvenient contrivances used for "making fire" before its invention is forced to recognise it as one of the most generally-useful, most highly-beneficent, and most absolutely-perfected of all human inventions. Much the same may be said, of course, for the electric telegraph, the telephone, the steam-engine, the motor-car, and other modern inventions; but, though these are much larger, much more in the public eye, and much more impressive in every way than the humble match, of none of them can one say, as one can of it, that, throughout the civilised world, practically everyone carries one or more on his person, practically at all times, and is accustomed to make use of it every day and constantly throughout the day.

The origin and history of any such invention must necessarily be of interest and worthy of careful record; and, when the Centenary of its Invention comes round, it is fitting that due notice should be taken of it. It is important, therefore, to note that the Centenary of the Match has now been reached; and the object of this article is to record its origin and to relate the circumstances of its invention, just one hundred years ago. First, however, it is necessary to define what is meant by the term "match."

MEANING OF THE WORD "MATCH."

Matches of various sorts have been in use for thousands of years, but none of these sorts has been of the kind now commonly meant by the term. Originally, the word "match" did not signify, as now, anything which ignited—that is to say, actually *produced fire*—when rubbed on any rough surface. All it meant, until a century ago, was something which, when once set alight, served to *preserve fire*, by smouldering slowly without blazing, and could, therefore, be used conveniently to convey fire from one combustible substance to another. For instance, the piece of loosely-twisted hempen rope, steeped in nitre, which the soldier of the Seventeenth Century carried to discharge his "matchlock" or arquebus, by "touching" the powder in its "pan" with its glowing end, was called "slow-match." It burned at the rate of about five inches in an hour.

Then there were "dipping-matches," headed with a mixture of chlorate of

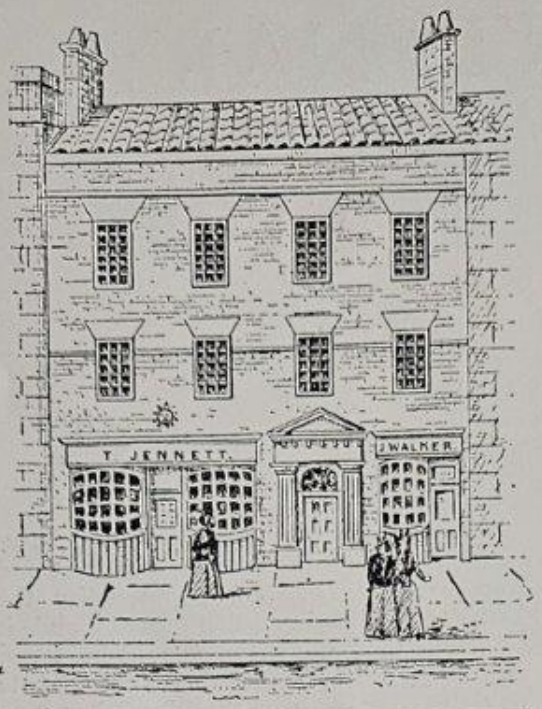


Fig. 1. John Walker's Shop at Stockton.

potash and sulphide of antimony, which ignited when dipped into a tiny bottle of sulphuric acid. Such matches and a small bottle of acid formed the regular equipment of the dangerous and inconvenient "instantaneous light-box" (so called by way of contrast with the still more tedious and troublesome tinder-box), which preceeded the friction-match. To this day, the French word *mêche* signifies, not what we now call a "match," which is *un allumette* (literally, "a little light"), but the wick of a candle or lamp or a piece of "slow-match."

But the earliest and by far the most familiar type of match was the "sulphur-match," a small pointed splinter of wood, a piece of straw, or a fragment of brown paper, in each case provided with a point which had been dipped in melted sulphur. Such a "match" was always to be found in the tinder-box of our grand-parents. By no possibility could it be "struck" like our modern match. It was used solely to get fire from the glowing tinder, which would not blaze, and convey it to the candle-wick, which would blaze actively.

Such matches have been in use since time immemorial. They were formerly the most familiar objects sold by street hawkers, whose persistent crying of them was a nuisance in large towns and cities. A Roman poet who wrote two thousand years ago complained that he had had to retire to his country house to escape the annoyance caused him by the cries of the street match-sellers.

THE FRICTION-MATCH.

In the present day, when we speak of a "match," we mean, not any of the foregoing kinds, but a new kind—the modern "friction-match," to give it its correct title—which actually *produces* fire when "struck." We should speak more correctly if we talked of *"rubbing a light,"* instead of *"striking a light"* with it, for no *striking* action whatever is involved. The incorrect term we now use has come down from the days of the old-fashioned tinder-box, when fire, in the form of sparks, was actually *struck* from the steel with the flint and caught in tinder. The one essential feature which distinguishes the modern "match" from all earlier matches is that *friction* is necessary to get fire with it.

It's Origin.

As to the origin of the friction-match, several European countries have laid claim to the honour of having been its birthplace. That honour has been claimed by France, by Austria, by Hungary, and by Germany, among other countries. All these have urged their claims with vehemence, and all have proved them to their own satisfaction. Yet the fact remains that a practicable, though far from perfected, form of friction-match was being made and sold in England several years before anything which could be so described was devised in any of the other countries named. That those who have claimed the honour for other countries have done so in perfect good faith is undoubted; but that their claims are all invalid is shown by the fact that, in contending among themselves for the honour of priority, all alike have laid claim to its invention in their respective countries at various dates, all of which were *subsequent* to the time when the form of friction-match referred to above was first made and sold in this country. This fact will be proved incontestably by what follows.

JOHN WALKER.

The real and original inventor of the modern friction-match was one John Walker, a chemist and druggist, of Stockton-on-Tees, in the County of Durham.

Walker was born on 24th May, 1781, the third son of an elder John Walker, a grocer, draper, and spirit-merchant, of 104, High Street, Stockton. He was educated in the town, and was articled to Mr. Watson Alcock, then the leading surgeon of Stockton. After completing the term of his indentures, he went to London to continue his studies and to gain wider professional experience. Returning, he became Alcock's assistant; but, as time went on, he developed an invincible aversion to witnessing and performing surgical operations, which led him ultimately to renounce his profession and to adopt that of a chemist and druggist, for which he studied at York and Durham. At last, in June 1819, he returned once more to Stockton, and there set up in business—somewhat late in life, for he was now thirty-eight years of age—at no. 59 in the High Street. The building (an old private residence dating from about 1710) still exists, but has been much altered. In Walker's day, there were on the ground-floor three small old-fashioned shops, each with a little diamond-paned window. One of these shops accommodated the earliest printing-office established in Stockton. The accompanying sketch (Fig. 1), made before the three shops were converted into two, as now, shows the building approximately as it was in Walker's day. His shop, with its little bow-window, is to be seen on the right-hand side. It is now distinguished by an inscribed brass plate (Fig. 2), put up in 1893, to commemorate Walker's former tenancy, and re-engraved in 1925, by the kindness of Messrs. Bryant & May.

John Walker Described.

Here Walker continued to carry on his business until his retirement, some thirty years later, though he probably never lived there. He is still remembered by a few elderly inhabitants of Stockton; and others, now dead, have left us in print their recollections of him. One of these latter, Mr. Thomas Crosby, has described him as "a smart, trim, dapper, little, man," who always wore the correct costume of his day—a brown tail-coat, drab knee-breeches, grey stockings, white cravat, and a tall beaver hat. It is much to be regretted that no portrait of him is known to exist. He is known, however, to have been, as one writer says, "a little thin man, never weighing more than nine stones." Henry Heavisides, known as "the Stockton poet," has described Walker as "a merry facetious little fellow—one who loved to hear and crack a joke and whose sunny smile to customers only slightly indisposed was enough to send them away cured without taking a dose of his physic." One may doubt whether, from the business point of view, the smile was, in the circumstances, a really desirable possession! Mr. Michael Heavisides, a son of the poet and a prominent man in Stockton to-day, informs me that he can remember Walker, having been sixteen years old when he died.

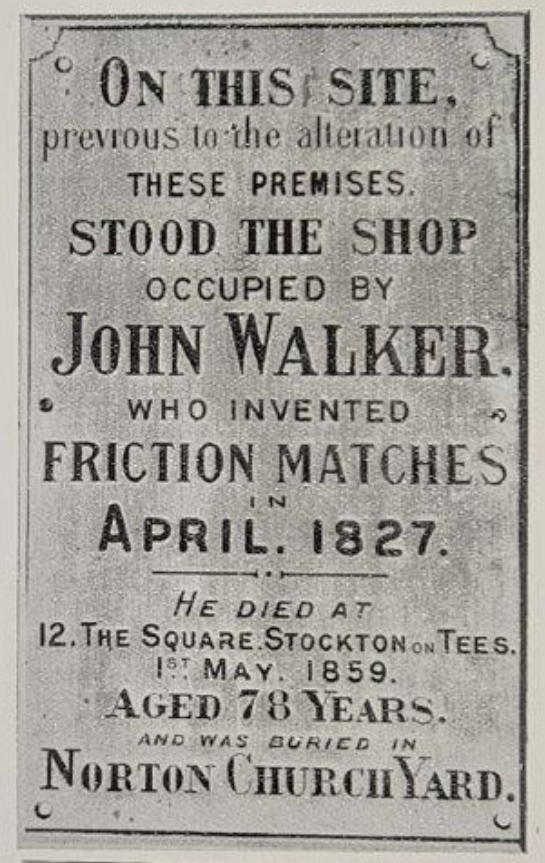


Fig. 2. Commemorative Plate on John Walker's Shop at Stockton.

Fig. 3. John Walker's Private House at Stockton at the present day. (House marked by a "x.")

Walker is described by all who knew him as a man of wide sympathies and many interests, especially scientific. In particular, he is recorded to have been interested in botany and mineralogy—the latter a study which was almost new in his day. Of chemistry, he had, of course, in view of his profession, as good a general knowledge as was to be had at the time, and he is said to have been constantly engaged in experiments. He was spoken of generally in Stockton as "Doctor Walker" —a title to which, though he did not practise, he was probably fully entitled. However that may be, he was clearly a man of alert mind and particularly well-informed for a country chemist of his time.

Curious Contrivances.

Having such tastes and knowledge, it was inevitable that he should take a great interest, as did many scientific men of his day, in the means of creating fire for practical everyday purposes. It was recognised generally that the old-fashioned and troublesome tinder-box was entirely out of date, and the minds of scientific men were busy with efforts to devise contrivances for making fire instantaneously by chemical means. The "Phosphoric Tapers," "Phosphorus Boxes," "Instantaneous-Light Boxes," "Promethean Matches," "Electro-pneumatic lamps," "Döbereiner Lamps," and other similar contrivances (all amply represented in the Bryant & May Museum) were the outcome of such efforts. To us now, all these contrivances appear mere scientific toys, fantastically cumbrous, inconvenient, and suitable for little more than lecture-demonstrations; yet each was, in its day, welcomed as the latest triumph of science and was used practically to a greater or lesser extent. The Instantaneous-Light Box (which contained dipping-matches headed with chlorate of potash and a small bottle of sulphuric acid) was by far the most popular, remaining in fairly-general use for quite twenty years. All these contrivances, together with the tinder-box, became obsolete

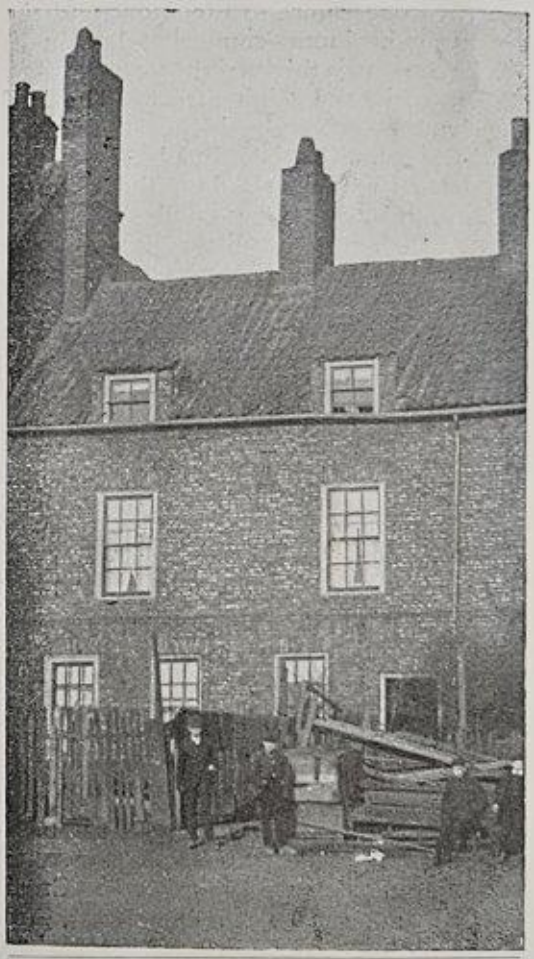


Fig. 3a. Walker's House (another view).

very quickly after the invention of a practicable friction-match.

Walker's Records.

Walker has left no definite record of the circumstances in which he evolved the match; but, from his day-book, which still exists and has been carefully studied by Prof. W. A. Bone, F.R.S., one is able to infer how it came about. The book contains a record, entirely in Walker's own hand, of his more important credit-sales over a period of rather more than four years—August, 1825, to September, 1829—with notes of his own prescriptions, and the like. Near the beginning, under date 19th November, 1825, he notes the sale of three grains of a mixture of equal parts of chlorate of potash and sulphide (then called sulphuret) of antimony, with gum. This he notes as "Excellent," for some purpose which he does not specify. Seven or eight similar entries follow, most of the sales having been made to a young Mr. Vollum, son of the Mayor, a wealthy shipowner. There is evidence that the young man was a sportsman and made use of this percussion powder in connection with his gun, probably in the form of a "percussion cap" of some kind; for that contrivance for discharging a gun had just been introduced, and was then fast superseding the old flint-lock.

How he Thought of a "Friction" Match.

It was, apparently, from these transactions that Walker got his first idea as to a practicable friction-match. As a chemist, he must have known that the mixture in question, if made into a paste with water and dried, would explode violently on percussion, or ignite more gently as a result of severe friction. Now, the day-book contains evidence that, for some time, Walker had regularly made and sold "oxygenated" matches, headed with a closely similar composition, for use in connection with the "Instantaneous-Light Box," such dipping-matches igniting readily when dipped into sulphuric acid. It would not be surprising, therefore, if he were to conceive the idea of placing on the head of a match some of his new mixture, instead of the old, thus producing, not a dipping-match, but a match ignitable by friction. There is every reason to believe that this is exactly what Walker did. Thereby he invented the modern match; for never before had anyone devised anything which could be called a match and was ignitable by simple friction.

The exact date on which Walker evolved (whether by accident or otherwise) a practicable friction-match is unknown, and now probably never will be known, but (as will be shown) there can be little doubt that it was either late in the year 1826 or early in 1827.

For many years after inventing his friction-match, Walker continued to carry on his business as a druggist in the High Street at Stockton. He lived, however, not "over the shop," as was then customary, but in a small house (Figs. 3 and 3a) on the Quayside, overlooking the River Tees. The house still stands, but is now somewhat dilapidated. Ultimately, he retired from business and went to live at no. 12, The Square, Stockton, where he died on 1st May, 1859, aged 78, having long suffered from dropsy. He was buried in the churchyard of the adjoining parish of Norton, where his grave is marked by a modest tombstone. By his will, he disposed of some £3,000 which (having no descendants, for he never married) he left for the benefit of two sisters and their children. His grandniece, Miss Lousia Wilkinson, who still lives in Stockton, has been good enough to supply me with information respecting him. The pestles and mortars (Fig. 4) used by him in his busi-

Fig. 4. Walker's Pestles and Mortars.

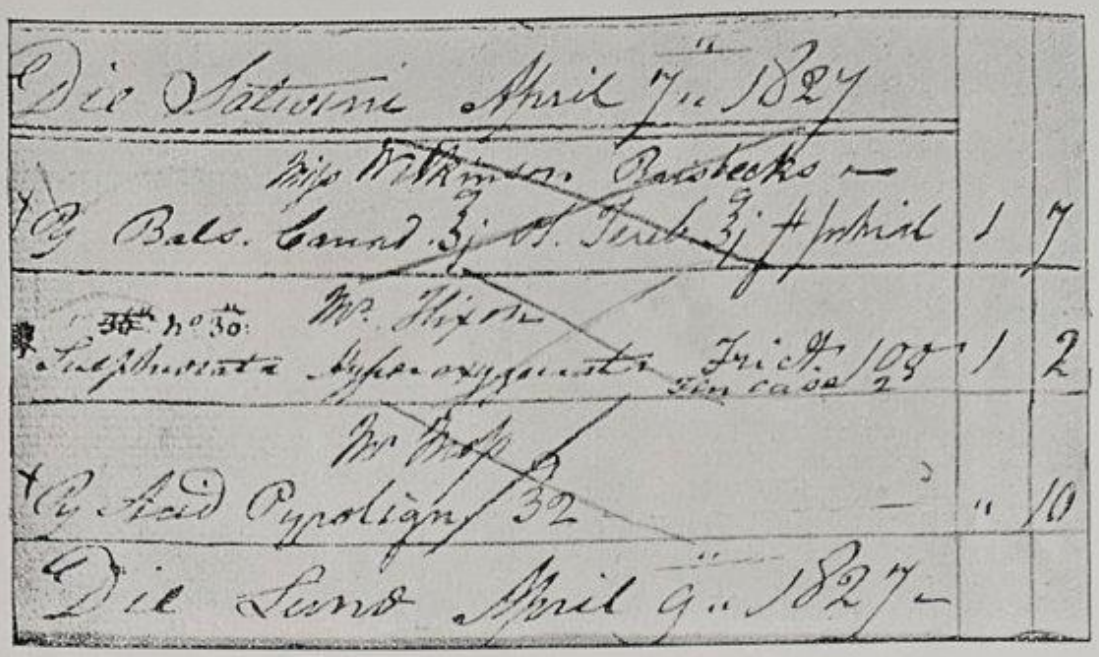


Fig. 5. WALKER'S EARLIEST RECORD OF THE SALE OF A BOX OF HIS "FRICTION-LIGHTS" ON SATURDAY, 7th APRIL, 1827. [FROM HIS DAY-BOOK.]

ness have been treasured ever since by those who have carried on his business.

THE FIRST RECORDED SALES.

One may return now to the consideration of Walker's "friction-lights."

Very soon after Walker had conceived the idea of a match ignitable by friction merely, he must have set to work to produce such matches in sufficient perfection for public sale. He probably succeeded in doing this early in 1827; but the first sale recorded by him in his day-book (previous sales having probably been for cash) was made on 7th April, 1827. On that date he sold (Fig. 5) to Mr. John Hixon, a solicitor then practising in Stockton, one hundred of his matches, charging for them one shilling and also two pence for the tin box in which they were enclosed. It may be said, therefore, that the friction-match attains its Centenary (so far as that date can be established by documentary evidence) in this current month of April, 1927. The box for which Walker charged Mr. Hixon twopence was probably round, canister-shaped, and made of tin, like that here shown (Fig. 6), which is believed to have been one of Walker's boxes. It is now in the Bryant & May Museum (see *Catalogue*, no. 1,441). After the date indicated, similar entries appear frequently in Walker's day-book; there being twenty-three such in 1827. This was, of course, apart from cash sales over his shop counter. One entry, recording the sale of a shilling's worth, on 7th September, is of interest, because therein Walker first described his matches as "Friction-Lights," a term by which he described them invariably in all later entries. Never once does he describe them as "matches," though he uses that word in connection with dipping-matches, some of which he still sold occasionally to one local customer, as entries in his day-book testify. It is clear from this term that he recognised and wished to emphasise the essential feature of his new "lights." It should be noted, too, that (contrary to what has been stated repeatedly) Walker never called his "friction-lights" either "Lucifers" or "Congreves." He objected particularly to the use of the former name, as being that of a personage whose company, he used to say, was not desirable! The two kinds of friction-match to which these names rightly belong did not come into use until after Walker had ceased to make and sell his "friction-lights."

"Eight-a-Penny" Lights.

Walker's charge for his "friction-lights" was, in every case, one shilling for a

hundred, without a "tin" box, or one shilling for 84 (seven dozen) with a tin box —that is, about eight matches for one penny. That the fame of Walker's "friction-lights" had not yet spread widely is shown by the fact that in 1827 all sales were in Stockton or its immediate vicinity.

Fig. 6. One of the tin boxes in which Walker's earliest "Friction-lights" were sold.

In the following year (1828), the sale increased largely, and it increased still more largely in 1829. In both years, too, the area of sale widened noticeably.

Walker's very earliest "lights" are stated to have had stems of cardboard, like the "fusees" of twenty years later, but he soon came to use splints of wood. The very few examples of his "lights" now known to exist all have wooden splints, just three inches long, broad and flat (*i.e.*, one-sixth of an inch broad and one-twentieth thick), not square in section like our modern matches (Fig. 7). In the splitting of these, he employed at first one Harrison Burn, an inmate of the Stockton Almshouses, and, later, many of the other old pensioners. Still later (Burn having died), Walker employed the elder pupils of the Grammar School, to whom he paid sixpence per hundred. This paid them very well, as they were supplied free with waste wood by a friendly joiner. At first, they cut the splints by hand with a knife from the edge of a flat piece of wood, planed to one-sixth of an inch in thickness and of the length stated above; but, later, one of the elder pupils, thinking to expedite production, began cutting the splints with a jack-plane. This answered the purpose aimed at, but gave a curve to the splints, so that they would not lie flat in the box; and Walker, disliking this, employed the pupils no more.

How the Lights were Packed.

As first (as stated already), Walker sold his "lights" in round canister-shaped "tin" boxes, costing twopence each, and in which were 100 matches. Entries in the day-book show that people living in and around Stockton were accustomed to return these boxes to be refilled as often as the original contents were used up. Later, however, Walker sold his "lights" in pasteboard boxes, which were made for him by a local bookbinder, named John Ellis, and cost, it is said, three halfpence each. In each of these boxes was inserted with the matches a piece of sandpaper, folded to the size of the box. This was intended to ignite the match; for there was no roughened ignition-surface on the edge of the box, as now. The composition forming the head of the match (which, it must be remembered, *contained no phosphorus*) was not sufficiently sensitive to ignite by mere friction on a rough flat surface. To inflame one of Walker's "lights" by rubbing it on such a surface would have needed such heavy pressure that the splint of the match would have broken. When ignition was desired, there-

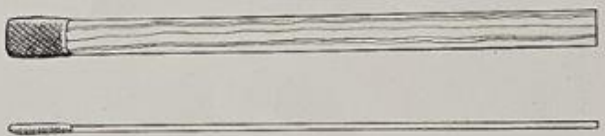


Fig. 7. A Diagram (actual size) of one of Walker's "Friction-lights" showing flat-side (top picture) and side view

fore, the head of the match was placed within the fold of the sandpaper, nipped tightly between the thumb and forefinger of the left hand, and then drawn out sharply and forcibly (Fig. 8), whereupon, if the head did not come off (as it often did) the match ignited with a sharp fizzling crack. So far as I am aware, not a single one of either Walker's pasteboard boxes or of the pieces of sandpaper which went with them now exists.

Of Walker's friction-lights, too, genuine and well-authenticated examples are now excessively rare. It may very well be that less than five dozen now exist. Miss Louisa Wilkinson and Mrs. Parrott, both of Stockton, own one or two each; and one, originally belonging to the first-named lady, is in the Bryant & May Museum (no. 1,440). There are also in the Museum at Newcastle-on-Tyne a number of examples which are believed to be well authenticated. Six of these have been generously presented to the Bryant & May Museum by the Society of Antiquaries of Newcastle-on-Tyne, through their Hon. Curator, Mr. Parker Brewis, F.S.A. Other examples, properly authenticated, may exist elsewhere, but I know of none.

A PRACTICAL SUCCESS.

In regard to the sale by Walker of his "friction-lights," it must always be remembered that it was at all times mainly local, having been confined almost wholly to Stockton, Norton, Hartlepool, and other places in their vicinity. His "lights" were, indeed, no more than one of those special proprietary "lines" which many local chemists cultivated at that day. Walker never made any attempt to create a large business in the general sale of them all over England, and aimed merely at meeting such small local demands for them as could be made to him personally at Stockton. Had he cared to aim at a wider sale and to build up a large business in them, there is no reason why he should not have succeeded; for his match (as one may call it for once) was a perfected invention in its way and a very notable improvement on anything which had gone before it. It was, in short, a practical success, and needed only to be "pushed" commercially in order to become widely known and much used. Indeed, as will be seen, it became so in the end, though under another name, and not under Walker's auspices.

NEVER PATENTED.

Another thing which must also be remembered in connection with Walker's friction-lights is that they were never patented or protected in any way. Many friends, it is said, urged him to cover his invention by a patent and to form a company to exploit it; but he always declined,

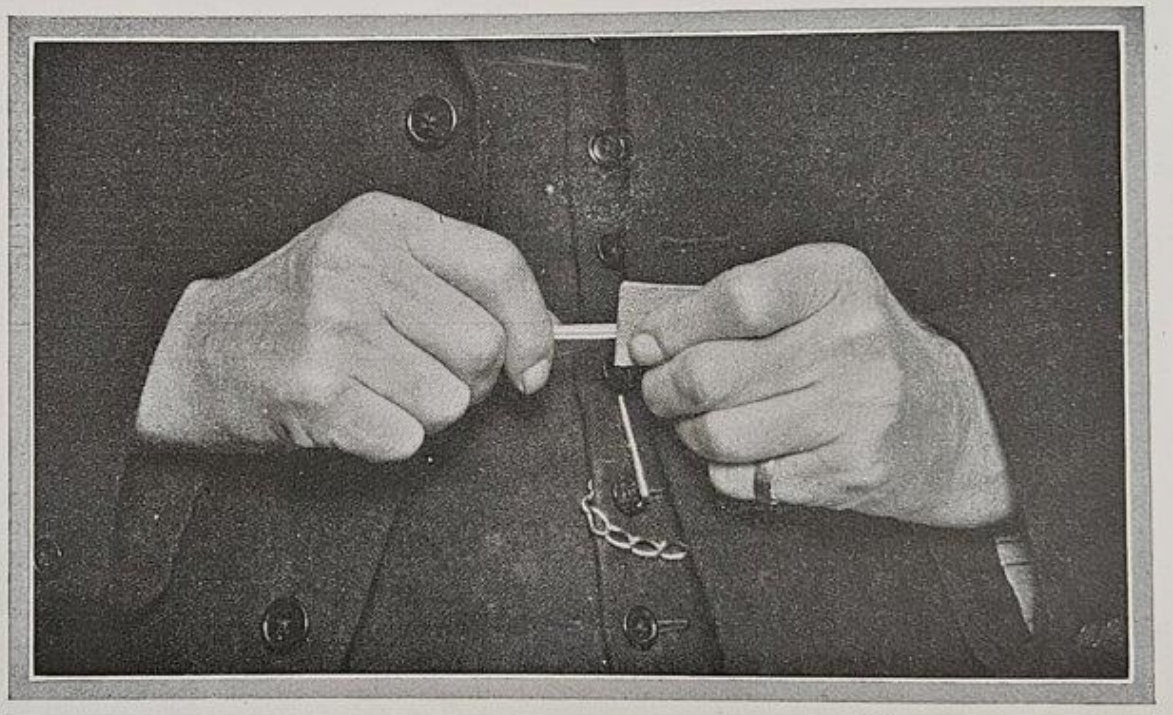


Fig. 8. METHOD OF IGNITING ONE OF WALKER'S FRICTION-LIGHTS BY DRAWING IT BETWEEN FOLDED SAND-PAPER TIGHTLY NIPPED.

Fig. 9. Samuel Jones' Shop, "The Lighthouse," no. 201 Strand, London.

saying it was not worth while, as the whole thing was so simple. "No doubt the invention will be a boon to the public," he used to say. "Therefore, let them have it." Of himself, he used to say (as his chief biographer, Dr. Foss, has recorded) that he was "a studious retiring man, caring more to pursue his scientific studies, whether botanising or experimenting in chemistry, than speculating in order to make money."

In such circumstances, it was inevitable that, before long, others should appropriate Walker's idea and commence manufacturing his "friction-lights" on a more wholesale scale for general sale. This actually took place, as will be seen, in 1829, or very few months after the end of that year; so that Walker continued to make and sell them for no more than about three years, at most. During this period, however, he is said to have derived a comfortable income from their sale.

One curious tradition as to the sale of Walker's matches is worthy of mention, as it appears to be well authenticated. It is to the effect that they were in great demand among the youths of Stockton, who made use of them to scare their elders, by going up close behind them in the street after dark and igniting one of the matches suddenly. It is even stated that, at first, more of Walker's matches were used thus nefariously than for their legitimate purpose. Nowadays, such action would be accounted an extremely poor trick. The average person might even fail to see its point, and might wonder why it should frighten anyone in any way. But it must be remembered that, in 1827, the creation of fire and light *instantaneously*, at any time, and especially out of doors, was absolutely novel, so that nervous elderly people might well be startled seriously by such an unexpected occurrence.

Yet though, as stated, the sale by Walker of his matches ceased soon, they were, nevertheless, the lineal and direct ancestors (so to speak) of our modern match, and John Walker deserves full credit for being the *bonâ fide* originator of that contrivance. As Mr. Punch has well said :—

Yes, it was he whose ardent will
Came boldly to the scratch—
He whose indomintable skill
Evolved, at length, the match;
And, as the goodly tidings spread,
Each earnest smoker rose and said,
"Blessings on Mr. Walker's head;
"This is, indeed, a catch!"

* * * * *

Then let us, in these happy days,
Brood gratefully thereon,
And, as we strike the careless blaze,
Reflect on him who's gone—
Recall to whom we owe the flame,
And, in a tumult of acclaim,
Uplift the mild, but honoured, name
Of Mr. Walker (John).

As to the Borough of Stockton, it may deservedly feel proud of the fact that, within two years, it was associated directly with two such notable events as the construction of the first railway (in the modern sense) and the invention of the friction-match.

BY HIS MAJESTY'S LETTERS PATENT.

DIRECTIONS FOR USING

S. JONES'S

LUCIFER MATCHES.

Place the folded part of Sand Paper next to the hand; the black end of the Match between; press moderately with the finger and thumb; then withdraw it briskly, and the effect of the friction will produce instant light.

N. B. If possible, avoid inhaling the Gas that escapes from the combustion of the black Composition. Persons whose Lungs are delicate should by no means use the Lucifers.

CAUTION. In justice to himself and the Public in general, it may be proper to state that he has not authorised any person or persons to sell his Lucifer Matches, with any other name on the Box than S. JONES, LIGHT-HOUSE, 201, STRAND, WITHOUT WHICH THEY ARE BASE COUNTERFEITS. This caution being rendered necessary from the perpetual complaints of Ladies and Gentlemen, who have purch sed a spurious and defective article, foisted on them as genuine, by those who are unfairly availing themselves of the benefits resulting from his experiments.

The following Inventions and Improvements by S. JONES, manufactured and sold, wholesale and retail, at the Light-House, 201, Strand.

Patent Prometheans

For producing instant Light, without the aid of a Bottle, and warranted never to impair by keeping. This is the most simple mode of producing Light ever invented for lighting candles, and for Smokers in the open air they are unequalled, no wind being able to blow them out, and emit on being burnt a fragrant perfume.—1s. and upwards.

S. Jones's New Philosophical Pastile.

For dis-infecting and Perfuming Drawing-Rooms, Dining-Rooms, or Bed-Rooms, [illegible] de Cologne, Lavender Water, &c. at the expense of

Fig. 10. Leaflet (portion of) advertising Jones' "Lucifers"; date about 1829.

SUCCESSORS TO JOHN WALKER.

Samuel Jones.

When Walker ceased making and selling his "friction-lights" in either 1829 or 1830, as stated already, their manufacture and sale was continued by another—namely, one Samuel Jones, of the Strand, London. How the transfer from Walker to Jones came about is not clear; but apparently it was effected, in some way, through Prof. Faraday. One writer states that Faraday, having received somehow a box of Walker's "lights," mentioned them in one of his lectures at the Royal Institution; which, he says, "set the scientific world a'thinking." Another writer says that Faraday had obtained this box direct from Walker, to whom he had paid a visit at Stockton. However all this may be, the result seems to have been that, soon after, Samuel Jones, a young man, twenty-nine years of age, apparently a chemist (though he has been described as an "artist"), began advertising and selling, under the name of "Lucifer," a match identical in every way with Walker's. Probably Jones had got the idea in some way from Faraday, whose pupil he may very likely have been.

In connection with the inception of the friction-match, the name of Samuel Jones stands second only to that of Walker. Walker was the actual inventor of it: Jones was the first to exploit it commercially. Jones, who was born in 1801, was already established in 1828 (as the rate-books of the parish show) at no. 201, in the Strand, London, which he named very appropriately "The Light-house." In that year, he had patented and brought out the "Promethean," a contrivance for getting a light by means of chlorate of potash and sulphuric acid, which need not be noticed here. His "Light-house" (Fig. 9), though not now so called, still stands almost exactly as it was in his day, except for the two lower floors. One may surmise that, at night, a beam of light was thrown from the top central window shown. The date when Jones began the sale of his "Lucifers" is uncertain; but there is evidence that it was probably some time during the summer of 1829. The accompanying leaflet (Fig. 10), issued by him, is probably of that date.

Jones's "Lucifers" differed in no way whatever (as stated already) from Walker's

Fig. 12. Cardboard box in which Jones' Lucifers were sold; dated about 1829.

WATTS,

Chemist, &c.

REMOVED to 17, STRAND,

Near Hungerford Market, London.

WATTS's

Chlorate or Lucifer Matches,

G. F. WATTS, late of 94, St. Martin's Lane, having been for the last Twenty Years the principal Chemical Match and Fire-Box Maker in London, recommends to the Public the following articles of his own manufacture, which certainly may be RELIED UPON. The number of bad matches foisted upon the Public makes it imperative on him (G. F. W.) to notice this publicly, as it tends to bring the manufacture of these articles into discredit; and having hitherto enjoyed so great a reputation in his art, he is unwilling to lose it, being convinced that the way to obtain public patronage is to deserve it; and therefore if any article of his should, by possibility, not give satisfaction (but which from his care he only thinks possible), he should feel obliged to any party to apprise him of it, and it shall be instantly changed.

It is with great satisfaction G. F. W. can recommend the undermentioned article, which is perfectly independent of acid in causing combustion, and is free from the least danger in its construction, and consequently is to be preferred as well on that account as for its superior cheapness. The great merit of this match also consists in its simplicity, as it is never out of order, and is not affected by climate. This cannot be said of any other match which depends upon the aid of acid for its combustion, as the bottle which contains it may, from neglect in not attending to the corking of it, become weak, or divested of its properties to burn the match, however well the match may be manufactured. It is then with great pleasure G. F. W. recommends this unique article:—

Watts's Chlorate or Lucifer Matches, 6d a Box.

(EACH BOX CONTAINS ONE HUNDRED.)

Being an important discovery for obtaining instant light through the agency of SAND PAPER only, and takes fire upon having an envelope of this paper rapidly passed over it, compressing the thumb and finger sufficiently without pinching it. This match is particularly adapted to pipe and cigar smokers, as the wood is so perfectly seasoned that it steadily burns till the whole is consumed. Boxes for the pocket, the office, or the drawing-room, made expressly for this match, the lid of which immediately falls down after a match has been taken from the box, which prevents the possibility of an accident, if a person should inadvertently drop the lighted one, are now ready for delivery, and will be found highly desirable to every gentleman who wishes to be independent of a waiter. With his pipe or his cigar, or upon his dressing-table, he meets with a friend in this Chlorate match that in one instant may dispel the darkness of night, and the next favour him with the perfume of his favourite Havannah.

G. W. F. informs the public that he continues to make Chemical Matches and Fire-Boxes in all their usual varieties. Those Ladies and Gentlemen who have been accustomed to use Chemical Matches with Bottles, will find at his house a plentiful assortment. If the Chlorate Match be the King of matches for its simplicity, and never being out of order by climate, G. F. W. has the Queen to match, where the aid of acid is the agency of combustion—in

Watts's Camphorated Match.

This incomparable match is distinguished for its brilliancy and certainty of lighting, and upon burning emits a fragrant perfume. It is on this account admirably adapted for the toilette or boudoir of any lady. This very beautiful match may be had in boxes in a great variety tastefully made, and fitted up with the bottle for the acid, &c., &c. He also recommends

Watts's Chemical Sulphured Match.

This match is equally useful with the others, and from its cheapness may be considered better adapted for general use. These matches are perfectly safe, the agency which causes combustion being kept separate from the match.

A Liberal Allowance to Merchants, Traders, &c. for Exportation.

Fig. 11. Leaflet advertising Watts' "Chlorate or Lucifer Matches"; date probably 1830.

"friction-lights." They were of the same size, shape, and appearance, were headed with the same chemical composition (devoid of phosphorus), and were ignited in exactly the same way by means of folded sandpaper. In short, they were the same thing, but under another name.

NO PATENT.

Jones had no patent-grant to protect his right in his Lucifers, and was unable to obtain any, as they represented nothing novel. Apparently, he even had no protection for the very appropriate name "Lucifer Match," of which he was the inventor. This was, from the business point of view, a very unsatisfactory state of affairs, and caused him, as time went on, a great deal of trouble.

G. F. Watts.

Thus, one G. F. Watts, also a chemist in the Strand, very soon brought out and advertised (Fig. 11) an exactly similar match under the name "Watts' Chlorate Match." This led to an advertisement war between the two men, which was carried on at great length and very acrimoniously in the public press in the course of 1831. Each "slanged" the other in a style which would now be deemed outrageously undignified, but Jones's statements were marked by greater restraint than those of his opponent, and he undoubtedly came best out of the controversy. Watts clearly began to manufacture later than Jones, having apparently been unable to begin until he had discovered somehow the ingredients Jones was using. He was, therefore, the aggressor and imitator, though he infringed no patent. Other imitators, mostly chemists, also entered the field very quickly and helped to popularise what was clearly regarded as a wonderful and valuable new invention. Some of the later of these introduced an improved form of Lucifer, which, before it was headed with the inflaming composition, was dipped in melted sulphur or other highly-inflammable material to hasten the ignition of the wooden splint.

Jones sold his Lucifers in rectangular cardboard boxes (Fig. 12), much of the size of those still used, but with a slip-on lid, instead of a sliding "skillet." Watts sold his Chlorate-matches in a small folding case or wallet (Fig. 13), with a tuck-in flap, intended for the pocket.

Richard Bell.

Another maker, who started in 1832, and

afterwards became more famous than either of the foregoing, was Richard Bell, whose firm still exists, though incorporated with Messrs. Bryant & May. He sold his matches in a cardboard box (Fig. 14), much like that of Jones, but with a far more ornate label on its top. Other makers used similar boxes (Fig. 15).

A curious tin box, with a flap on the top of the lid for pressing down on the head of the match to effect ignition, is also known (Fig. 16).

At first the normal price of a box containing fifty Lucifers seems to have been one shilling, but, as time went on, it came down to eightpence, then to sixpence, and, before the sale ceased, perhaps even less.

From the modern point of view, the Lucifer match was defective in the extreme. It was not only costly, but also hard to ignite, especially in damp weather. The late Lord Playfair writes:—"My experience of it as a boy . . . was that, with considerable adroitness, you might get a light after pulling off the ends of half a box; and then, when it did come, it came with such violence and explosion that it projected a considerable quantity of the ignited matter over the hands and burnt them." Another writer says that some-

Fig. 16. Box of thin sheet iron, with hinged flap on lid, for pressing upon and igniting Lucifers; date about 1832.

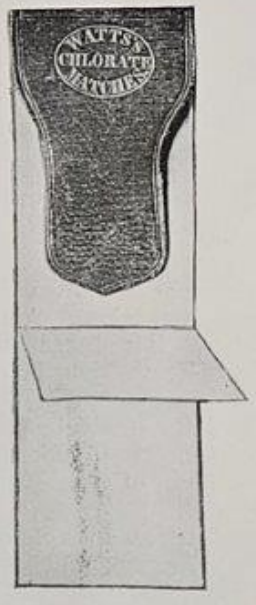
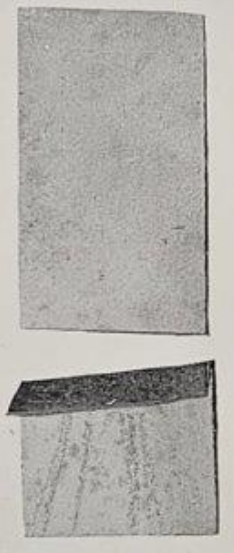


Fig. 13.



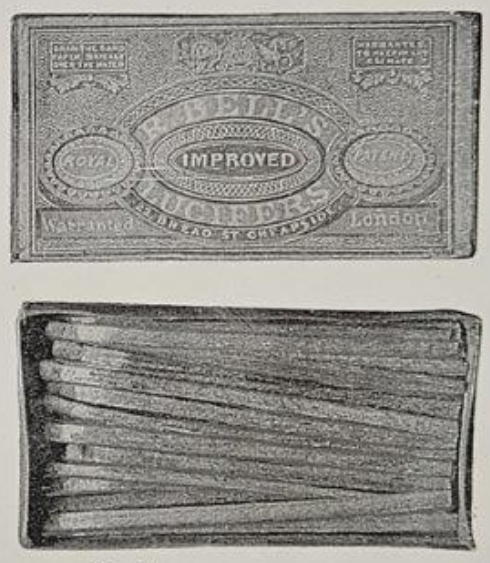


Fig. 14.

Fig. 13. CARDBOARD CASE IN WHICH WATTS' "CHLORATE OR LUCIFER MATCHES" WERE SOLD.

Fig. 14. CARDBOARD BOX CONTAINING R. BELL'S "IMPROVED ROYAL PATENT LUCIFERS," WITH PIECE OF FOLDED SAND-PAPER FOR IGNITION; DATE ABOUT 1833.

times the head, or a portion of the igniting composition, came off after ignition and, falling, burned carpet or clothes.

Altogether, it is not very surprising that the days of the Lucifer were very short lasting three or four years only—little, if any, longer than Walker's "friction-lights" had done. It was then displaced and succeeded by a different kind of match, which, though at first scarcely an improvement, became so in course of time. The *name* Lucifer long continued to be current, probably because it had been that of the first kind of match to come into general use; but it was used thereafter in a generic sense, being applied indifferently to almost any kind of match, as when the man in the street asks one: "Ha' y' got a Lucifer on y', gov'nor?" Again, the heading "Lucifer-match Manufacturer" did not finally disappear from the "London Directory" until the year 1874, though the real and original "Lucifer" had been, since about 1834, as extinct as the old-fashioned tinder-box. Owing to the very short time the Lucifer remained in use, boxes of genuine examples, complete with the necessary piece of folded sandpaper, are now exceedingly rare.

THE CONGREVE.

The Lucifer was ousted and succeeded, as stated, by a different kind of match.

Fig. 17. Portrait of Charles Sauria, born 1811.

This was the "Congreve," which had a very long run. It was the earliest match in which phosphorus was used as a means of ignition. That material had been used nearly two centuries earlier as a means of getting fire, by rubbing it between two

Fig. 15. SIX ENGLISH LUCIFER-BOXES, BY JONES, WATTS, HYNAM and R. BELL; DATES ABOUT 1830–1835.

pieces of brown paper and in similar ways, but never before had it been used in the form of a match. The idea of employing it in that way seems to have been first evolved by a Frenchman, a young chemical student in the Collège de l'Arc, at Dole, in the Jura. His name was Charles Sauria (Fig. 17), and his age was no more than 19 when, in the year 1830, the idea occurred to him of improving on both the old sulphur-match and the Lucifer by heading a match with a mixture of sulphur, chlorate of potash, sulphide of antimony, and *phosphorus*, made into a paste with gum. Experiment showed him that his idea was perfectly practicable; for matches so made ignited readily when rubbed on the plaster of his wall. Thereby he invented the phosphoric friction-match. All the facts are set forth in detail in a little French work, published in 1893, which, though written in a high-flown chauvinistic style, is reasonably conclusive. One of the professors of the College, it is recorded, made for his own use matches of the kind his pupil had devised, and others were regularly sold in the neighbourhood by a travelling hawker. Sauria, who died quite recently, always claimed to be the inventor of the phosphoric friction-match,

Fig. 19. BOXES OF EARLY AUSTRIAN AND GERMAN "CONGREVES," BY POLLAK, ENGERT, AND OTHERS; DATES ABOUT 1835–1845.

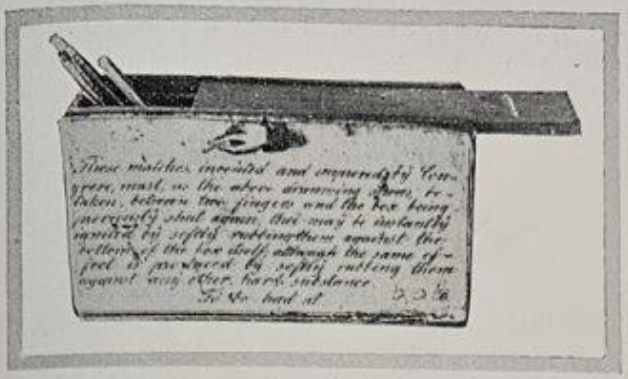


Fig. 18. Box of early German Congreve Matches, with label bearing instructions and an illustration showing method of igniting the match; date about 1835.

and has been commonly regarded as such in France.

Yet Sauria was one of those numerous inventors who have failed to turn an original idea to practical account and have derived no pecuniary benefit from it. He was unable to raise the small sum—said to be 1,500 francs—necessary to protect his idea by a patent, though urged thereto and assisted by the local physician, a Dr. Bon. It fell out, therefore, as in Walker's case, that others gathered ultimately such golden fruit as Sauria's idea ever bore. It appears that, in the year (1831) following Sauria's achievement, one of the professors of the College, named Nicolet, happened to visit Germany, where he spoke with certain scientific friends as to his pupil's new match. These friends communicated the idea to certain practical business men, who saw at once its commercial value, with the result that, a year or so later (that is, early in 1832), Europe began to be flooded with matches made on Sauria's principle. These matches were the "Congreves" already mentioned. It has been stated repeatedly that this match was invented by Sir William Congreve, Bart., the inventor of the famous war-rocket. This must be incorrect, for he had died four years before it was brought out. Without doubt, however, it was named after him.

Congreve matches were much smaller than Lucifers, because, as no violent friction was needed to inflame them, they were less liable to break in the hand during use. They were usually round, instead of flat or rectangular, in section, and were generally heavily sulphur-dipped, sometimes to the extent of a quarter or a third of their length. The earlier examples, at any rate, had no definite "head," apart from that formed by the sulphur in which they were dipped; for the phosphoric inflaming-composition was placed on the extreme tip only, and in very small quantity only, because of its extreme and dangerous readiness to inflame spontaneously. Owing to this very-ready inflammability, the piece of sanded cardboard which had always been supplied with each box of Lucifers was no longer necessary, and the match was ignited, not between the folds of a piece of sandpaper, but by rubbing it upon the side or bottom of the box, which was either sanded or had a piece of sandpaper pasted on to provide the necessary frictional surface. This method of ignition being novel, it was necessary to place on the box full instructions as to how it was to be carried out, and even an illustration showing the operation in progress (Fig. 18).

Most of the earlier Congreves used in this country were imported from abroad, chiefly from Austria and Germany, the largest makers being Kammerer, Siegel, Romer, and Prescher. Various boxes of their manufacture are shown (Fig. 19). Soon after, a good many makers (Fig. 20) sprang up in England, chiefly in London, but most were in a small way of business, and all were subject to such keen competition from abroad that two only, Richard Bell and J. Hynam, were able to maintain their position for more than a few years.

THE MATCH A BRITISH INVENTION.

Reviewing, now, the main facts as to the invention of the friction-match, as disclosed in the foregoing; it will be seen that, *in its inception, it was wholly British*, but that later it was improved and perfected largely by foreigners. Thus, in 1831, a Frenchman, Charles Sauria, immensely in-

creased its rapidity of ignition *by introducing phosphorus* into its inflaming composition. As a consequence, it has been claimed for him that he was the inventor of the friction match, which he was not: he merely *improved the composition by which it was inflamed*. Finally, the phosphoric friction match, as improved by Sauria, was very *greatly perfected in regard to its manufacture and placed on the market*, almost throughout Europe, by the Austrian and German manufacturers mentioned. But everything goes to show that the credit for the original invention belongs to Britain exclusively. The other countries named can claim no more than that they improved it—very materially, without doubt, but not radically. These other countries, in claiming the original invention, as they have done, have had in mind the *phosphoric* friction-match only. They have ignored the earlier use in Britain of John Walker's "Friction-lights" of 1827, and Samuel Jones' "Lucifers" of 1829, both of which were as truly friction-matches as the latest productions of the leading match-manufacturers of 1927.

Since the introduction of the "Congreve-match" in 1832, there have been produced many new kinds of match—Vestas, Fusees, Vesuvians, Safeties, "Book," and so on; and, in the evolution of these, no firm in the world has taken a more active and honourable part than that of Bryant & May. None of these, however, requires notice in an article dealing exclusively with "The Centenary of the Friction-match."

Fig. 20. NINE CARDBOARD BOXES OF ENGLISH CONGREVES, BY HYNAM, SPILLER, RIGBY, ROBARTS, AND OTHERS; DATES ABOUT 1835—1860.