

**PATENTS FOR INVENTIONS.
ABRIDGEMENTS OF
SPECIFICATIONS RELATING TO
AERONAUTICS. A.D. 1815-1866**

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Patents for Inventions. Abridgements of Specifications Relating to Aeronautics. A.D. 1815-1866
by Various

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VARIOUS

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SPECIFICATIONS RELATING TO
AERONAUTICS. A.D. 1815-1866**

J.N. 9-27-41

P R E F A C E.

THE Indexes to Patents are now so numerous and costly as to render their purchase inconvenient to a large number of inventors and others, to whom they have become indispensable.

To obviate this difficulty, short abstracts or abridgments of the Specifications of Patents under each head of Invention have been prepared for publication separately, and so arranged as to form at once a Chronological, Alphabetical, Subject-matter, and Reference Index to the class to which they relate. As these publications do not supersede the necessity for consulting the Specifications, the prices at which the printed copies of the latter are sold have been added.

The number of Specifications from the earliest period to the end of the year 1866 amounts to 59,222. A large proportion of the Specifications enrolled under the old law, previous to 1852, embrace several distinct Inventions, and many of those filed under the new law of 1852 indicate various applications of the single Invention to which the Patent is limited. Considering, therefore, the large number of Inventions and applications of Inventions to be separately dealt with, it is possible that a few properly belonging to the group which forms the subject of this volume may have been overlooked. In the progress of the whole work such omissions will, from time to time, become apparent, and be supplied in second or supplemental editions.

The present series comprises Abridgments of Specifications that treat of balloons or other means of ascending in the air or of navigating the air ; and it includes the application of balloons or kites for suspending, partially suspending, drawing, or other purposes.

The term "balloon" is applied in several Specifications to vessels inflated with air or gas and immersed in water, but which only have an ascensional force whilst so immersed. Abridgments of such inventions are not included in the present series, unless the Specifications also describe appliances equally applicable to aerial balloons or other subjects treated of in this book.

The Abridgments marked thus (***) in the following pages were prepared for another series or class, and have been transferred therefrom to this volume.

B. WOODCROFT.

November, 1869.

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INTRODUCTION.

THE history of aeronautics is so discontinuous, and it is so much removed from the practical spirit of the Specifications of Patents, that it is necessary to set forth, in this place, the connecting links that bind that history together.

Many ideas expressed by the ancients, in fables and otherwise, especially the accounts of ICARUS and DAEDALUS, show that mankind always had in view the possibility of elevating themselves in the air.

The term aeronautics is rather in advance of the condition of the subject at the present day, since no means is known by which a heavy body may be elevated into the air and navigated therein as a ship is navigated on the sea. The utmost that has been done is to take advantage of the different aerial currents that exist at a given time at various elevations, and, by raising and lowering a gas balloon accordingly, to approximate to the desired direction. The various methods (many proposed, and a few realized) that have the accomplishment of aerial navigation for their object, may be classified thus:—1. Kites. 2. Fire balloons. 3. Hydrogen balloons. 4. Coal gas balloons. 5. Mechanical apparatus.

Kites have been in use for the purposes of amusement from time immemorial amongst the Chinese and Japanese. More recently they have been used occasionally to convey a line to a ship in distress in cases of shipwreck, to investigate the electrical condition of the upper regions of the atmosphere, and even to propel carriages along a road. Fire balloons are so called from the fire which must be constantly kept burning beneath them; the proximate cause of their ascent into the ordinary air is the rarefied air which they contain; these are sometimes called "Montgolfiers." Hydrogen balloons ascend in consequence of the superior lightness of the hydrogen gas with which they are filled, hydrogen being about fourteen times lighter than air. The "inflammable air" of the earlier authors on aeronautics generally

means hydrogen gas; this was generated by the action of weak sulphuric acid upon zinc or iron filings. Coal gas, although heavier than hydrogen, is much used to inflate balloons. The mechanical means of flight is at present only represented by a toy called the "aerial top," which has light, but strong blades attached to its axis, at a certain acute angle thereto.

In this place it is proper to draw the attention of investigators in this department of science to the very complete series of works on aeronautics accessible to the public at the Patent Office Library. One manuscript work is especially noticeable, entitled *Aeronautica Illustrata*. This is an extensive and valuable collection of writings, illustrations, and original documents that have been collected and arranged in the course of years.

The summary that follows does not pretend to be a complete history, but it puts forward in chronological order many of the most important matters connected with the subject. It is not the province of this work to decide priority of invention, or to set forth authoritatively the date of the commencement of any specific improvement in the subject of which it treats; therefore, in this introduction, as elsewhere, the utmost pains are taken to ascertain the earliest attempts, but the dates are left to speak for themselves. The registration of scientific data is aimed at, not a collection of ascents; however remarkable they may be from other points of view, ascents as such, are not taken account of here.

B.C.

400. ARCHYTAS (400 B.C.) "constructed a wooden pigeon, which " could fly by mechanical means. To wit, it was thus " suspended by balancing, and was animated by an " occult and enclosed aura of spirit." If the pigeon fell, " it could not lift itself up any more." (See Aulus Gellius, *Noctes Atticæ*, lib. x., cap. xii.; also *The History and Practice of Aerostation*, by Cavallo, London, 1785, p. 6.)

A.D.

1650. JOHN BAPTIST DANTE, about 1650, "is said to have " framed certain wings, by means of which he flew " several times, but at last had the misfortune of break- " ing one of his thighs in an attempt of that sort." (See Bourgeois' *Recherches sur l'Art de Voler*; also Cavallo's *History and Practice of Aerostation*, London, 1785, p. 19.)

- A.D.
1736. DR. GUSMAN, in 1736, "made a wicker basket, of about seven or eight feet in diameter, and covered with paper, which basket elevated itself as high as the tower of Lisbon, which is about 200 feet high." (See Bourgeois' *Recherches sur l'art de Voler*; also Cavallo's *History and Practice of Aerostation*, London, 1785, p. 26.)
1767. DR. JOSEPH BLACK, of Edinburgh, in 1767, stated in his lectures that it was an obvious consequence of Cavendish's discovery of the lightness of "inflammable air" (or hydrogen gas), that "if a sufficiently thin and light bladder were filled with inflammable air, the bladder and air in it would necessarily form a mass lighter than the same bulk of atmospheric air, and which would rise in it." (See Cavallo's *History and Practice of Aerostation*, London, 1785, p. 32.)
1782. TIBERIUS CAVALLO, in the early part of 1782, after trying many experiments, with paper envelopes, &c., caused "soap balls," or bubbles filled with "inflammable air," to ascend to the ceiling of a room. (See Cavallo's *History and Practice of Aerostation*, London, 1785, p. 34.)
1782. STEPHEN MONTGOLFIER, in November 1782, at Avignon, made a fine silk bag "in the shape of a parallelepipedon, the capacity of which was equal to about 40 cubic feet. Burning paper applied to its aperture served to rarefy the air." (See Cavallo's *History and Practice of Aerostation*, London, 1785, p. 43.)
1783. STEPHEN and JOHN MONTGOLFIER, on June 5, 1783, at Annonay, before the States of Vivarais, caused a fire balloon, or a balloon of rarefied air, to ascend to the height of about 6000 feet. (See Cavallo's *History and Practice of Aerostation*, London, 1785, p. 45.)
1783. MM. CHARLES and ROBERT, on August 27, 1783, caused a balloon filled with "inflammable air" to ascend from the Champ de Mars, Paris, to a height of 3123 feet, in the presence of many hundred thousand spectators. This balloon fell fifteen miles from Paris. (See Cavallo's *History and Practice of Aerostation*, London, 1785, p. 60.)