

water for the engines. The repairs needed require also special workmen, not usually found in the vicinity of lighthouses. Consequently the electric light can at present be made available only in certain localities. It would be disadvantageous in lighthouses at sea, or that are not easily accessible, or those which are distant from centers of population. But where there is plenty of space, and where cities are within easy reach, their substitution for other lights is strongly approved by mariners.

Correspondence.

The Keely Motor.

To the Editor of the Scientific American:

In your paper of June 26 there is an elaborate editorial article entitled "The Keely Motor Deception," in which article you treat the alleged invention of Mr. Keely contemptuously, and speak of him and his "confederates," myself included, as juggling tricksters "whose chief purpose appears to be the wriggling of money out of silly people." I am not willing to believe that journalists professing to conduct a publication devoted to inventions, and advocating, professedly, the rights of inventors, will persist in denouncing an alleged discovery with which personally you are wholly unacquainted, especially when your denunciation involves, necessarily, an assault upon the integrity of reputable gentlemen. I have practised my profession in Cincinnati, O., and in this city uninterruptedly for a period of about eighteen years, for about eight years of which time I have devoted myself exclusively to patent litigation, with probably the average success of professional men: not altogether unknown in my profession, I would be entirely willing now and at all times to leave the vindication of my professional character, when assailed, in the hands of my professional brethren, and to the judges of the courts before whom I have practised. Therefore, if I alone were involved in your article referred to, I should remain silent; but inasmuch as others than myself are also impugned, and inasmuch, further, as the alleged invention of Mr. Keely, for which interest I have been and am counsel, is derided, it is proper that I should publicly notice your article.

The invention of Mr. Keely is controlled by a company organized under the laws of the State of Pennsylvania; and probably I can best vindicate the invention, the inventor, and those connected with him, whom you call his "confederates," by stating in outline my connection with the enterprise up to the present time.

A year ago, several gentlemen of this city, one of New Jersey, and another of New York, held contracts with Mr. Keely whereby they were entitled to certain rights in his invention thereafter to be patented. By mutual consent of the contracting parties, it was agreed to merge their respective rights into a corporate company, thereafter to be organized and now known as the "Keely Motor Company." The writer was asked to act as their counsel. The initial step desired to be attained was the procurement of the requisite amount of money necessary, first, to discharge some indebtedness theretofore contracted by Mr. Keely for materials supplied to him; secondly, to complete his structures then being constructed; and thirdly, to defray the expenses incident to the procurement of letters patent in our own and in foreign countries. At this time, personally I knew but little of Mr. Keely's invention. I had seen in his workshop, a room say ten feet square, a "receiver" charged with a vapor or gas having an elastic energy of 8,000 lbs. to the square inch. I interrogated Mr. Keely critically as to how he had produced this substance; pointing to an inoffensive-looking machine, which stood in close proximity to the receiver, he said to me that he introduced a certain quantity of air into that machine under no greater pressure than was the capacity of his lungs, a certain quantity of water under no greater pressure than was the ordinary hydrant pressure at his residence, and then, by a simple manipulation of the machine, unaided by any chemical substances, heat, electricity, etc., he converted a small portion of the introduced water and air into the cold vapor then contained in his receiver. My credulity, as may be supposed, was taxed to its utmost limit. Before undertaking to enlist a dollar of capital in the enterprise, I instituted the most careful inquiry as to the character of Mr. Keely. Those of whom I inquired endorsed his integrity in unqualified terms; and one gentleman, Mr. Boeckel, for whose mechanical ability and moral integrity I had great respect, and who knew much of the invention, and who spoke without having a fragment of interest in the invention, impressed me greatly by what he communicated to me. So also did Mr. Rutherford, Chief Engineer, U. S. Navy. Thereupon, I had a conversation with Mr. Keely, in effect as follows. I said to him: "Mr. Keely, you profess to be grateful to me for kindnesses received at my hands, the importance of which, indeed, you greatly exaggerate. I am asked to become the exponent of your invention, and to enlist capital for its development. While I may with propriety expend my own money as I please, I cannot, except with greatest caution, enlist the money of others. You, Mr. Keely, know absolutely whether you produce the results which I have seen as you state to have produced them. This, with you, is not matter of opinion, but of absolute knowledge. If, therefore, you do not so produce these results, and I, upon the supposed truth of your statement, am the means of procuring the capital of others to be invested in your enterprise, I will have suffered at your hands as great a wrong as one man can inflict upon another." He reasserted that which he had before said in the most solemn language. I reduced his declaration to writing, and he signed it, I at the same time telling him, in the presence of his wife, that,

if I procured a dollar for the enterprise, it would be based upon the truth of his written declaration, which, if false, made him a criminal, and that for my own vindication I would see that he was appropriately punished. With such precautions I visited your city, called together some of your best known and influential citizens—among whom was Charles H. Haswell, Esq., who himself, prior to this time, had visited Mr. Keely's place, seen his receiver when charged with this enormous vaporic pressure, and had reported upon it. I said to these gentlemen that I had not seen Mr. Keely make the power, and therefore had no personal knowledge of how it was done; stating, at the same time, however, the result of my inquiries as to his character as above, and, further, that there was the negative evidence, afforded by the total absence of anything (so far as I could discover) to produce the power other than the simple machine whereby he claimed to produce it. As the result of my interview, the gentlemen present subscribed for \$10,000 of the stock of the proposed company. I made Mr. Keely's written declaration a part of my contract with them. They paid to me \$3,000. I returned to Philadelphia, and gave this to Mr. Keely; and within two hours, he had paid to the constructors of his machine \$2,850 of it.

By the terms of the agreement, entered into by me with these parties, Mr. Keely was obligated, before any further money was to be called for, to explain the principle of his invention. I took with me to his place my engineering assistant, Mr. Bell, and we entered upon the subject, but neither of us—although having before us a sectional drawing of the machine, made from the machine, by Mr. Bell—could understand why the result would follow from its operation, as claimed by Mr. Keely. I so stated to him, and requested that he should repair, put together, and operate the machine (then dismantled), and produce for me the result which he claimed to be able to produce. This he did, giving to me (in the presence of ten other gentlemen, among them Mr. Boeckel, Mr. Rutherford, and Mr. Bell) an exhibition on the night of the 10th of November, 1874, the result of which exhibition I reduced to writing and subsequently to print, for the information of those only who were interested in the enterprise. This report you evidently have seen, as it is commented upon in your article.

After I had written this report, I submitted it to Messrs. Rutherford, Boeckel and Bell, for their careful examination, and for their endorsement of it, if they found it correct. They gave it their unqualified endorsement. Next, I submitted it to Professor B. Howard Rand, of this city, an eminent scientist, as a precautionary measure, in order that he might, if he could, account for the results alleged to be produced, through any known chemical agencies or laws of physical forces. He said that, assuming the truth of my statements of facts—for he had not seen the machine, and of his own knowledge knew nothing of it—he could not account for the results alleged to have been produced upon any known chemical or philosophical principles; and at my request, he reduced this statement to writing. He was not asked, and did not assume, to endorse the Keely motor, and your assertion that he did so is purely gratuitous, and places him in a false position before the public. With this report thus prepared, I proceeded again to New York, submitted it to the parties with whom I had contracted, stated to them that, while I did not understand the ultimate philosophical principle involved in the production of this vapor, I was convinced that it was produced precisely as asserted by the inventor; that I stood ready to return to them their money previously advanced, if they desired to withdraw from the enterprise. They did not so desire, but on the contrary paid to me the balance (\$7,000) of the \$10,000 subscribed, which money was subsequently from time to time disbursed for the construction of apparatus connected with the invention. (1) My original contract with these parties gave to them an option of \$40,000 more of the stock of the company at its par value. Prior to the agreement out of which this company had its origin, the individuals then holding contracts under Mr. Keely had themselves entered into a contract with some parties looking to the disposal of rights in the New England States, which contract became obligatory upon this, the Keely Motor Company. Under and by virtue of the several contracts, the contracting parties were entitled to an exhibition of the production and practical application of this power. This has been given to them, and was witnessed by about 30 gentlemen, among whom were many men of long and extensive experience in the construction and operation of machinery, such as steam engines, air-compressing machinery, electrical apparatus, etc. As the result of such exhibition, the parties respectfully have, unurged, paid to the treasurer of this company an aggregate, with the ten thousand dollars referred to, of one hundred thousand dollars. This company, with the single exception above referred to, has not sold or offered for sale a dollar of its stock; neither has it desired to give any publicity to its business, until it shall be ready to introduce to the public its machine.

Of the money which has thus been paid into its treasury, Mr. Keely was entitled, in his individual right, to the sum of fifty thousand dollars. This, however, he yielded to the company, stating that he did not desire to make a dollar of profit out of his invention until patents had been obtained, and he had established, to the satisfaction of the world, the validity of his assertions. After having long been living in most humble circumstances and working under great disadvantages, a comfortable house and a convenient workshop have, without his solicitation, been purchased for him, and he is now giving his undivided time to the completion of his structures. That he is endeavoring to "wriggle money out of silly people" or out of any one, I believe to be a monstrous calumny. The money which has been paid into the treasury

of the company, it is the declared policy of the company to retain intact for the completion of its various structures now in progress, and for the procurement of letters patent throughout the world. As for myself, I have given to the development of this invention and to the affairs of this company my almost undivided time for a period of several months, having the meanwhile to beg the indulgence of clients for whom I have the charge of important causes, and have not been compensated to the extent of a dollar: my declared policy having been to attest by my actions the confidence that I have professed, in the genuineness and value of Mr. Keely's inventions, resting content to await that moderate degree of fame and of fortune which shall probably be mine, if the correctness of my judgment shall be vindicated in the future. So much, personally, as to Mr. Keely and his "confederates." (2) Now what about the invention?

In my report of November 10, I undertook to narrate as precisely as I could facts which I had observed. I state therein substance, and I now reiterate that I saw:

First: The apparatus, of which I at the time had an accurate sectional drawing made from the machine, subjected to such tests as I believe would have satisfied any intelligent mind, as the tests did satisfy the minds of the eleven persons present, that there was nothing in the apparatus but air at atmospheric pressure.

Second: I saw the inventor blow from his lungs, for the period of, say, 30 seconds, into a nozzle upon the "generator;" then I saw him connect this nozzle by a small rubber tube with the nozzle of his hydrant, and introduce water direct from the hydrant through this rubber tube into the "generator" until say five gallons of water had been thus introduced under a pressure, as indicated by a gage applied to the hydrant, of 26½ pounds, the communication with the hydrant being then cut off.

Third: A connection being then made between the generator and a register of force, by a tube of one tenth inch bore (the register of force consisting of a piston of one square inch area, pressed down in a cylinder by a lever of the third order, and weighted so as, according to the calculations of Mr. Rutherford and Mr. Bell, to require upwards of 1,430 lbs. to the square inch to raise the lever.) I saw Mr. Keely, by a very simple manipulation of his generator, requiring no more force than a child could exert, make an "expulsion," as he terms it, of his vapor, and with it raise this weighted lever; and this he repeatedly did.

Fourth: I saw him, in the same manner, make expulsions filling a chamber of 3½ gallons capacity, with his vapor, at a pressure proved to be a fraction less than 2,000 lbs. to the square inch. This operation I saw repeated several times, and saw the produced vapor conducted through a tube of the dimensions aforesaid upon, not "a dollar toy engine," but one which did not cost less than two hundred and fifty dollars to construct, which was run at a speed of several hundred revolutions a minute, developing no inconsiderable power. (3) These expulsions were made in an inappreciable period of time, unaccompanied by noise or the use of heat, and without appreciable production of heat.

Now, what I assert is stated not as matter of opinion, but of fact. You may deny the fact and assert that I falsify. If so, I retort that you are ruthless traducers of character, and will hold you personally responsible for defamation. Again, you may, with propriety, assert that I am mistaken. To this, I will reply that what I saw was witnessed by ten other gentlemen, who will at any time attest to my accuracy, and three of whom, at least, were of equal ability with yourself. Again, you may accept the truth of the facts and undertake to account for the results upon other hypotheses than as claimed by the inventor, and to disparage their importance. You have in your article of the 26th inst. undertaken to account therefor. While I have not space to review your attempted solution of the matter, I will simply say that, if the writer of your article had seen and examined Keely's generator, and another, not seeing it, had written what appears in your columns, your editor would have said he was a fool. I simply say he is mistaken. Again, I have repeatedly seen, in Mr. Keely's workshop, a receiver with a capacity of twenty-six gallons, containing his vapor at a pressure of 10,000 lbs. to the square inch: I have seen this vapor conducted through a tube of one-tenth inch bore to an engine which was propelled by it at a speed of about 1,500 revolutions a minute, developing a power of certainly 10 horses. This fact I can corroborate by the testimony of scores of persons: among them some of your best known and most influential citizens. You think that we confound "pressure with power." We do not. We understand, probably as well as you do, the distinction between "pressure" and *vis viva*. You may say, accepting the fact, that it is condensed air. If so, please enlighten us as to the means whereby it could be so condensed. You may say that it is a gaseous product from chemical action; remarking that this vapor is totally negative in its properties and pure as mountain air, please inform us from what chemical substances it may in your opinion have been produced. I append hereto some communications addressed to me on this subject.

In conclusion, I would repeat that the Company I represent is a private corporation. It does not offer, nor has it offered, its shares in the open market, nor can it be held responsible for the action of individuals who, having acquired, may have again offered its shares, which was, however, their undoubted right. It will not, in "thirty days," though I believe it will before many months have expired, exhibit to the world that which it claims to have. In the meantime, it has not sought nor does it now seek notoriety; but the invention on which it is based having, through newspaper correspondents, been publicly discussed, we must expect, and do not shrink from, fair and legitimate criticism; and if you

Messrs. Editors, can satisfactorily explain or account for indisputable results which are astonishing in their character, and have produced profound impressions upon many excellent and able men, no one will be more grateful to you than

CHAS. B. COLLIER,
 Attorney and Counsel, Keely Motor Co.
 702 Chestnut street, Philadelphia, Pa. June 28, 1875.

(1) REMARKS.—It appears, from your present evidence, that Professor Rand never saw your machine, nor your cold gas or vapor, and yet you induced this eminent scientist to give you a professional certificate about nothing, which, with other statements, you submitted to the New York capitalists on behalf of the Keely Motor, and they paid you \$7,000.

(2) See our remarks on page 33.

(3) In your report you affirmed that you ran a small beam engine, but did not give its size. We stated that, "judging from the Barker wheel with 2 1/2 inch arms, this 'beam engine' was probably about the size of a dollar toy engine." You now state that the engine cost not less than \$250; but you are silent as to size. Mr. Gloeker, however, tells us that it had a 3-inch stroke with 3-inch cylinders. You say in your report that you ran this miniature engine at the rate of 400 revolutions per minute, but you do not venture to affirm that you ran it for so long a period as one entire minute. You state, however, that you worked the *Whirlingig* for that space of time. "At 9:3 P. M. the reaction wheel was again rotated until 9:9 P. M." This is the only complete period of running time cited in your report for either of the little devices. It was on the strength of this contemptible exhibition, made to you by Keely, so you now tell us, coupled with your report thereof backed by Haswell's and Rand's certificates, that you got the New York parties to pay up the balance of their \$10,000 subscription. We accept your confession of facts without denial.

Communication of John W. Keely.

CHAS. B. COLLIER, ESQ., Attorney Keely Motor Co.:

In view of publications in the *SCIENTIFIC AMERICAN* regarding me and my invention, I feel it to be my duty to depart from my intended policy of making no public declaration relative to my invention. I now publicly assert that I have produced the results which many persons have seen, in the precise manner heretofore stated, to wit, the introduction of atmospheric air into my machine, a limited quantity of natural water direct from the hydrant at no greater than the ordinary hydrant pressure, and the machine itself, which is simply a mechanical structure. With these three agents alone, unaided by any and every chemical compound, heat, electricity, or galvanic action, I have produced, in an appreciable period of time, by a simple manipulation of the machine, a vaporic substance, at one expulsion of a volume of ten gallons, having an elastic energy of ten thousand pounds to the square inch (4). This I solemnly assert, and am ready to verify by my oath. I only ask of the public their indulgence until a new and perfect machine, now rapidly approaching completion, is finished when I will publicly demonstrate that which I now publicly assert.

Philadelphia, June 25, 1875. JOHN W. KEELY.

(4) Counsellor Collier gives, on the preceding page, a more detailed statement of the way you produce your "cold vapor," as ascertained by himself and "scores" of intelligent witnesses. He does not agree with you that it is done "in an inappreciable period of time." He affirms that you blow into the "generator" for half a minute, that you then turn in five gallons of water, and then proceed to manipulate the machine, when the "vapor" appears. Juggles more marvelous than yours have been executed by skilled practitioners in less time than you require.

Communication of G. F. Gloeker.

CHAS. B. COLLIER, ESQ., Attorney Keely Motor Co.:

DEAR SIR:—Having constructed for John W. Keely, Esq., the multiplier with which he operated on the 10th of November, 1874, referred to in your report, I desire to state that said multiplier is correctly represented in the sectional drawing made by Mr. J. Snowden Bell, and now in your possession. I further state that, in said multiplier, there are no secret chambers or recesses in which chemicals or compressed air could be contained, and no spaces not fully accessible to a stream of water passed through the apparatus; further that, in said apparatus, there are no pistons or moving parts other than valves.

I have also constructed for Mr. Keely a vertical direct-acting double cylinder engine, having cylinders of 3 inches bore and 3 inches stroke, and a fly wheel 24 inches in diameter and 4 inches face, weighing 200 pounds, which engine I have seen rotated at a speed of not less than 300 revolutions per minute with vapor generated in said multiplier.

A small wrought iron chamber, of a capacity of 1 1/2 gallons, which I made for Mr. Keely, was delivered to him by me on May 13, 1875, about 8 A. M., the chamber being at that time open at one end; and upon the evening of the same day said chamber, to my knowledge, contained vapor at a pressure of 10,000 lbs. per square inch and upwards, as evidenced by both a gage and a weighted lever.

I am 51 years of age, and have been employed at the Port Richmond Iron Works of Messrs. I. P. Morris & Co., Richmond and York streets, Philadelphia for nearly 26 years last past. I have for a long time been in charge of their tool room, and in the course of my experience at their works have had knowledge and observation of machinery of various descriptions constructed by them. In view of recent publications respecting the Keely motor, I submit the above statement as an evidence that my experience has been such as to enable me, at least, to form a correct judgment as to the operation of apparatus of my own construction.

Respectfully yours,
 Philadelphia, June 25, 1875. G. F. GLOEKER.

Communication of Wm. Boekel.

PHILADELPHIA, PA., June 25, 1875.

CHAS. B. COLLIER, ESQ., Attorney Keely Motor Co.

SIR:—In answer to the accusation published in the *SCIENTIFIC AMERICAN* newspaper, that I have, with others, been engaged in a fraud upon the public, through my connection with the invention of Mr. Keely, I desire to state as follows:

I am now 50 years of age, have lived in Philadelphia since 1848, and have devoted my lifetime to mechanical pursuits, in the practice of which I gain my livelihood. I refer to all who know and deal with me as to my honor and integrity. Had the editor of the *SCIENTIFIC AMERICAN* instituted inquiry as to my private character and business standing, he might have been fully impressed with the responsibility he incurs in denouncing me as a confederate in fraud of any description, more especially in reference to my connection with a matter of which he knows absolutely nothing.

I have read the communication of John W. Keely, of this date, addressed to you. I have for several years been inti-

mately acquainted with him, and with his inventions. I have seen him produce many "expulsions" from his generator, whereby, to my own personal knowledge, he evolved a cold elastic vapor, in volume of 3 1/2 gallons, at a pressure of about 2,000 pounds to the square inch. I believe that it was impossible for him, if he had so desired, to practise any deception in the matter; and from what I have seen, together with my intimate knowledge of the construction of the machine and its operation, I have no doubt whatever that he produces the results just as he claims to do, and as stated in his said communication. Respectfully yours,
 WM. BOEKEL.

Communication of H. C. Sergeant.

CHAS. B. COLLIER, ESQ., Attorney Keely Motor Co.:

DEAR SIR:—My acquaintance with Mr. John W. Keely began about one year ago, and I have been permitted, from time to time, to witness certain exhibitions made by him with his vaporizer or generator, producing a vapor, transmitting it to, and running his engines. I have been permitted to examine the internal construction of his generator, and I am fully satisfied that Mr. Keely has discovered that there exists a power in air and water which, by purely mechanical manipulation, will evolve a cold vapor; and, by peculiar graduations of his machine, he is capable of producing a pressure of 10,000 to 15,000 lbs. per square inch in a receiver of greater volume than that contained in his generator, with great rapidity and certainty. Yours very respectfully,
 HENRY C. SERGEANT.

382 Second Avenue, New York, June 26, 1875.

This gentleman, in another confession of faith in the Keely motor, published in the *New York Times* of July 3, 1875, says:

"One of the remarkable things about the Keely motor is that it (the new vapor) cannot be transmitted at a lower pressure than 1,000 lbs. per square inch. It can be used, of course, at a lower pressure, after it is put in action. It can be regulated like steam, but its transmission at less than 1,000 lbs. pressure causes its condensation."

This is a curious statement for an intelligent steam engineer to make. If its transmission at a less pressure than 1,000 lbs. causes its condensation, then it must necessarily condense when moved under any circumstances below that pressure. It cannot be used unless it is "transmitted."

Communication of Chas. H. Haswell.

NEW YORK, June 26, 1875.

CHAS. B. COLLIER, ESQ., Philadelphia, Pa.:

DEAR SIR:—Your letters of the 23d and 24th instants, in relation to a brief communication of mine, in reply to an unfounded assertion in one of our city papers, are this day received; and although I am indisposed to make any communication regarding the Keely motor until its elements of operation are made known to me, I cannot refuse to reply to your queries as to the nature and extent of such of its operations as have come under my observation, and my deductions therefrom.

Referring, then, to your several queries, in the progressive order of the operations submitted to and observed by me, I advise:

1st. I have witnessed the development, by Mr. Keely, of a cold vapor, void of pungency or of temperature in excess of the surrounding atmosphere, having an expansive energy of fully 7,800 lbs. per square inch, as tested by my measurements and computations thereon.

2d. I have been present when Mr. Keely has applied a like vapor to an Ashcroft gage, and the index pointed to a pressure of 10,000 lbs. per square inch; and upon writing to Mr. Ashcroft, to advise myself of his capacity to make such a gage, he replied that he had made gages that would indicate such pressure, and that he had delivered some of them at Philadelphia.

3d. I have satisfied myself fully and conclusively that the instrument of Mr. Keely was operated wholly independent of any external attachment, other than that of a chain suspension and a flexible connection with a water service pipe.

4th. I have seen a double cylinder engine, 3 by 3 inches, operated by a like vapor from a reservoir, through a conducting pipe eight feet in length, and having a bore of but one tenth of an inch diameter, although it was resisted by a friction load equal to 2,250 lbs. per square inch, and which engine I individually operated for a period of 15 minutes without any visible reduction in its speed, or indication of the exhaustion of the intensity of the vapor in the reservoir from which the supply was drawn.

5th. I have seen reservoirs which were said to contain vapor at pressures of 5,000 and 10,000 lbs. per square inch, and in volume of 2 and 26 gallons, but my only means of verifying such pressures were in the operation of the engine and the indication of the steam gage referred to.

6th. I am of the conviction that the vapor is not generated by any chemical decompositions or heat, or that it is atmospheric air compressed by an external connection.

7th. I was present upon one occasion only when Mr. Keely essayed an "expulsion," as he terms it, that is, the operation of generating the vapor, and the result was not sufficiently conclusive whereon to base a conviction of its integrity, although the imperfection of the development was very reasonably attributed to the imperfections of the original and rude instrument of generation.

In conclusion, my assertion, in the communication referred to, was that I have never endorsed the integrity of the Keely motor; and my declaration is, I do not now do it, and for the manifest reason that I am wholly ignorant of the manner in which the vapor is generated; and in the consideration of a physical operation, I could not, in the absence of a knowledge of its elements, endorse the declaration of any one.

My position has been confined to reporting that which I have seen. I have said, however, and I now write, that Mr. Keely has submitted to me a cold vapor of an expansive energy of fully 10,000 lbs. per square inch, that in its character and in the instruments of its generation it is wholly novel, and that, if he can generate it with the facility, economy, density, and continuity that he declares, he has arrived at a result hitherto unattained, and one that is as valuable as it is novel; but until I am in the possession of the elements of generation of this vapor, I cannot arrive at any satisfactory conclusions as to its merits.

I am, very respectfully, yours, etc.,

CHAS. H. HASWELL.

Mr. Haswell, it will be observed, strongly asseverates that he does not now and never did endorse the Keely motor, being wholly ignorant of the manner in which "the vapor" is made, or the physical operation, by which it is produced. He further intimates that the attempt to manufacture the vapor in his presence was a failure. At the same time, he affixes his name to a certificate which more strongly supports the deception than any document which the parties immediately connected with the "generator," and who know all about its "physical operation," have ventured to sign. It appears, from Collier's statement, to have been mainly on

Mr. Haswell's report that the New York people were induced to pay their money.

In the fourth paragraph of the above, Mr. Haswell fails to state the speed of the engine or the capacity of the reservoir. But according to the Keely Company's account of the apparatus used during the exhibition at which Mr. Haswell officiated (see *SCIENTIFIC AMERICAN*, May 2, 1874), the "generator" was of globular form, 3 inches thick and about 15 inches in exterior diameter, connected with an iron cylinder 40 inches long, 4 1/2 inches interior diameter, capacity 3 1/4 gallons.

Mr. Collier has rated the speed of the engine at 400 revolutions per minute. Mr. Haswell's statement in the fourth paragraph, therefore, purports that, from a generator containing about 3 1/4 gallons of the vapor, he personally operated a double cylinder engine, having cylinders of 3 inches bore and 3 inches stroke, for a period of 15 minutes, without the least indicated reduction of the pressure contained within the generator. If we are wrong in this estimate, Mr. Haswell will correct us.

Communication of J. Snowden Bell.

CHAS. B. COLLIER, ESQ., Attorney Keely Motor Co.:

DEAR SIR:—Having been cited in an issue of the *SCIENTIFIC AMERICAN*, dated the 26th inst., as one of the "confederates" of Mr. John W. Keely in a "juggling exhibition," etc., I desire to state:

1. My connection with the operation of the invention of Mr. Keely, which is designated as above, consisted in my attendance upon an exhibition thereof, given by him November 10, 1874, and in my attestation, over my signature, of the correctness of a report, made by yourself, of said exhibition.

2. Such attestation was given after a thorough and critical examination of the working of the apparatus of Mr. Keely, and related solely to matters of fact entirely within my own knowledge. I now publicly and emphatically reiterate and reaffirm my endorsement of said report, and declare further that, if I desired confirmation of the evidence of my own senses, I should find it in the utter inability of the most determined opponents of the invention to furnish any "deception" theory, accounting for the results produced, which is compatible with the conditions of the operation, as witnessed by me.

3. I have examined the patents mentioned in the *SCIENTIFIC AMERICAN* article above referred to, and find that there is no manner of analogy between them and the invention of Mr. Keely. As to the suggestion of an experiment to be made with "ten communicating water tubes," I have to say that, while I am prepared to admit that the exertion of 620 pounds initial pressure upon air in a close vessel would evolve a corresponding resultant, I am unable to perceive what relation exists between such a fact and the evolution of vapor of 2,000 pounds pressure to the square inch from water and air at an initial pressure not greater than 26 pounds to the square inch. I further admit that, if a weight of 1 pound be hung upon the long arm of a lever, the arms of which are to each other as 10,000 to 1, it will balance a weight of 10,000 pounds upon the short arm; but as no such lever was used in the exhibition of November 10, 1874, this explanation must likewise be dismissed as insufficient.

Respectfully yours,
 J. SNOWDEN BELL,
 Mechanical Engineer.

Communication of Wm. H. Rutherford.

PHILADELPHIA, June 26, 1875.

CHAS. B. COLLIER, ESQ., Attorney Keely Motor Co.:

DEAR SIR:—I have read the editorial article which appeared in the *SCIENTIFIC AMERICAN* advanced issue, dated 26th inst., entitled "The Keely Motor Deception," and presume I am included as one of the "confederates" of Mr. Keely, with yourself and others.

I was present at the exhibition given by Mr. Keely on the night of November 10, 1874, of which you made a report dated November 13, 1874. This report being submitted to me, I carefully examined it, and gave to it, and to the conclusions therein stated, my unqualified endorsement, and I now reaffirm the same.

I have read the communication of Mr. John W. Keely addressed to yourself dated the 25th inst., and of my own knowledge can and do attest to the truth of that which there in asserts. Respectfully yours,
 W. H. RUTHERFORD,
 Chief Engineer, U. S. Navy.

(6) The following is, substantially, the report of the Keely exhibition of November 10, 1874, which Mr. J. Snowden Bell, M. E., desires now to "publicly and emphatically reiterate;" and to which W. H. Rutherford, Chief Engineer U. S. N., now re-affirms and gives his unqualified endorsement:

"Mr. Keely then proceeded to make an "expulsion," that is to say, to develop a force or pressure from the multiplier sufficient to exert a pressure of 1,430-36 lbs. This he did by blowing from his lungs, for, say, thirty seconds, into the nozzle upon the multiplier. He then shut the cock and turned on the water from the hydrant. The operation was completed in about two minutes after the attachment to the hydrant was made, by simultaneously opening two cocks upon tubes connected with the first and second drums, when the lever and weight of the force register were raised." The operation of the engines now took place as follows:

"A short tube, carrying upon its end a reaction wheel or 'Barker's mill,' having two arms of about two and a half inches long each, was screwed upon the reservoir, and, at 9:03 P. M., was put into rotation at a very high velocity, by the manipulation of two cocks. At 9:05 P. M., the reaction wheel was removed, and connection applied to a small beam engine, which was rotated at 400 revolutions. At 9:08 P. M., the reaction wheel was again rotated until 9:09 P. M." The machinery was then stopped, and the gaseous fluid allowed to escape against a candle flame and blow it out. At 9:15, the engine was run again for a few turns. "At 9:17 P. M., the reaction wheel was run again, and at 9:20, the experiments being concluded, the multiplier was taken apart and inspected by those present. There was no heat perceptible in any part of the apparatus." These remarkable pieces of machinery were, according to this report, run for a minute or two at a time, at various intervals, extending over an entire period of 15 minutes. There was no heat and no noise save that of running water when the ear was placed against the multiplier.

"The report, after giving the foregoing facts in regard to actual performances, summarizes the results, which we condense as follows: 1. The invention produced a series of gaseous expulsions of 2,000 lbs. per square inch. 2. The force was almost instantly produced. 3. It moved instantly through a distance of 12 feet. 4. It was attended with no noise. 5. Nothing was or could have been introduced into the apparatus to produce the force. 6. No heat, electricity, or galvanic action was discernible, except that electric sparks were observed in the spur gearing of the engine, caused by friction. 7. Hydrant water, 26 lbs. to the inch, was admitted. 8. The water was drawn off unchanged after the performance. 9. The vapor had no smell or taste, and did not burn. 10. The interior of the apparatus was found to contain no residuum or substance other than air and water. 11. The operations were conducted by gas light. Every facility for the closest investigation was offered to the persons present."