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SCHOOL FURNITURE.

A TREATISE

ON ITS

CONSTRUCTION IN COMPLIANCE WITH HYGIENIC REQUIREMENTS,

WITH

PLATES, DETAILED TABLES, SCALES OF MEASUREMENT, ETC., BY THE USE OF WHICH A SINGLE DESK MAY BE SO ADJUSTED AS TO SUIT THE REQUIREMENTS OF A SCHOLAR OF ANY SIZE.

By

G. A. BOBRICK, Civil Engineer,

FORMERLY OF RUSSIA, AND NOW A RESIDENT OF BOSTON, MASS.

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1887.

FIG. 7.

FIG. 6.

FIG. 5.

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SCHOOL FURNITURE.

A TREATISE ON ITS CONSTRUCTION IN COMPLIANCE WITH HYGIENIC REQUIREMENTS.

PHYSICIANS have abundantly demonstrated by long-continued investigation, involving thousands of cases, that round-shoulders, near-sightedness, curvature of the spine, difficulty of respiration, distortion of the upper part of the body, and other physical irregularities are, in most cases, traceable to the use, while the body is yet unformed and very susceptible to all external influences, of school desks and chairs that are not properly adapted to the size and height of the pupil. In each class of every school the pupils vary as much in stature as they do in intelligence. They are classified as to the latter; but, tall or short, stout or slight, all members of the same class are made to occupy desks and chairs of the same general make, — too high and large for some, too low and small for others; what wonder, then, that the above-mentioned results are of common occurrence!

It is to awaken the attention of the public to the importance of adapting the desk to the height and

size of the pupil, while offering a means of doing so at the least possible expense, that this little treatise is prepared.

The subject itself has received greater notice abroad than in this country; although, singularly enough, it was an American named Bernard who, in 1854, first directed attention to the construction of school furniture adapted to the varying requirements of pupils.

Soon after that date the doctors and teachers of this country, and particularly the scientists of Europe, began to give much attention to the subject, and we find in the Swiss and German periodicals articles by the following eminent writers: *Francis Fonk* (1854); *Dr. Schreber,* of Leipsic, Saxony (1858); *Dr. Schraube,* of Halle, Prussia (1859); *Lanze,* of Brunswick, Germany (1862); *Dr. Passavan,* of Frankfort-on-the-Main, Prussia (1863); and *Freihang,* of Leipsic, Saxony (1863).

It was not, however, until an article by *Dr. Farner,* of Zurich, Switzerland, was published, that the public in general awoke to the importance of the subject, and began to demand that school furniture should be made in compliance with anatomical and physical laws.

Dr. Farner's article was followed by a great number of other writings on the same subject, and among these are specially noticeable those of *Dr. Hellem,* of Neufchâtel, Switzerland; *Prof. Meyer,* of Zurich, Switzerland; *Dr. Parov,* of Berlin, Germany; *Dr. Kon,* of Leipsic, Saxony; and *Dr. Erisman,* of St. Petersburg,

the present Professor of Hygiene in the University of Moscow, Russia.

It is to Russia, however, that the honor belongs of first taking practical measures for the introduction into her schools of appropriate school furniture.

These measures consisted in first appointing a committee of teachers, physicians, hygienists, and architects, their chairman being *V. P. Kochanowsky,* to examine into the whole subject and report thereon.

In their behalf *Dr. Erisman,* aided by *Dr. Farner,* made a thorough examination into the manner in which ill-constructed desks and chairs affect the pupil's health.

According to *Dr. Farner's* theory, a scholar while sitting at a desk improperly constructed involuntarily assumes a position injurious to his healthy development. The injury is caused during writing and reading exercises, by the pupil's being obliged to turn his head either to the front or to the left while writing, and downward while reading. The danger from such positions arises from the fact that they remove the centre of gravity of the head from its natural point of support. When a person sits straight, this centre of gravity is directly over the spinal column, and the head itself is supported and balanced by the muscles of the neck. But all this is entirely changed by any forward movement, for then the centre of gravity of the head moves forward out of its natural position, and the head must therefore be supported and balanced by the

help of a strong tension of the muscles of the back of the neck. The fatiguing effect of this may be illustrated in the following manner: If a person stretches out his arm at an angle of from 45° to 90° from his body, so as to have it supported by the deltoid muscle alone, he will after a very short time be obliged to let his arm drop. To retain such a position longer than five minutes is almost impossible. How, then, can it be expected that the muscles of the back of a child's neck can hold up his head for several hours!

Taking these facts into consideration, it is easy to explain the ill effects produced by improperly constructed desks and chairs.

When the muscles which support the head become tired, the head droops at once into an unnatural position, and the work of supporting it being transferred to the upper muscles of the back of the body, they distend the ribs from their natural position. This tires the body still further, in that it makes a longer lever for the head. In course of time all the muscles become fatigued, the upper part of the back curves more and more, and the pupil, obliged to seek some other support for his head, naturally uses for this purpose one or both of his hands. He may not, indeed, complain of his unnatural position so long as he feels comfortable, but the ill effects are apparent when he leaves his desk and finds it necessary to straighten himself.

If we watch a scholar just after his leaving a desk unsuited to his height, and in which he has been seated for some time, we shall see that he invariably stretches himself, as if recovering from a cramp, turning his head from side to side, and lifting his arms with evident pleasure. While he was seated at the desk a struggle was going on between the muscle-power and the power of weight; and, as the muscle-power can never overcome for any length of time the power of weight, such struggle ought to be avoided by furnishing a desk that does not necessitate any movement of the head, either backward or forward, or cause the pupil to lift his shoulders, rest his head on his arms, or take any other unnatural position.

The question, therefore, arose why it was that the scholar, in writing or reading, kept his body in motion; and it was determined that it was caused by his not seeing the end of his pen while writing, and that while reading he was obliged to lower his head to see his book clearly, — both being due to the fact that the desk and chair were not fitted to his height. They decided that a desk and chair should be so constructed as to have the scholar sit straight, and, according to the theory and investigation of *Prof. Meyer,* such a position can be obtained only when the centre of gravity of the body is supported by the seat, just as the centre of gravity of the body is supported by one's feet while standing.

A scholar at his desk should neither be crowded in his seat, nor have too much space to move about in; but he should have just enough to enable him to sit comfortably, and also to change his position when requisite.

To correct the defects in school furniture and avoid the ill effects that we have alluded to, *Dr. Erisman,* after a long study of the subject, and the measuring of a great number of scholars of different heights, with the assistance of *Dr. Farner,* figured out details for the construction of desks and chairs suitable for all ordinary heights and sizes of pupils, and with special reference to the prevention of round shoulders, curved spines, near-sightedness, and the other evils before specified.

In the subjoined table are given figures and practical details for eight sizes of desks and chairs, changing for every 11 centimetres' ($4\frac{1}{4}$ inches) difference in the height of the scholar, beginning with a centimetral height of 98 (3 ft. $2\frac{5}{8}$ in.) and extending it to 186 (6 ft. $1\frac{1}{4}$ in.), as appears from Table No. 1, and Fig. 1, which show that, in practice, each scholar requires during the period of his growth eight different sizes of desks and chairs.

Now, in this country very great attention has been paid to school furniture; and, if it were simply a question of making eight sizes only of desks and chairs, this system would be introduced as soon as known and

No. 1. — Table showing the Details for the Construction of School Desks and Chairs, of Eight Different Sizes, by Drs. Erisman and Farner, Translated and Reduced to Inches by G. A. Bobrick.

			I.		II.		III.		IV.		V.		VI.		VII.		VIII.	
			Cent.	In.	Cent.	In.	Cent.	In.	Cent.	In.	Cent.	In.	Cent.	In.	Cent.	In.	Cent.	In.
Height of Scholar.		From	98	$38\frac{5}{8}$	109	$42\frac{7}{8}$	120	$47\frac{1}{4}$	131	$51\frac{5}{8}$	142	$55\frac{7}{8}$	153	$60\frac{1}{4}$	164	$64\frac{5}{8}$	175	$68\frac{7}{8}$
		To	109	$42\frac{7}{8}$	120	$47\frac{1}{4}$	131	$51\frac{5}{8}$	142	$55\frac{7}{8}$	153	$60\frac{1}{4}$	164	$64\frac{5}{8}$	175	$68\frac{7}{8}$	186	$73\frac{1}{4}$
Letters A–B, C–D, G–D, etc., refer to distances between points marked by similar letters in Figs. 1, 3, and 4.	A-B	For Boys	51.5	$20\frac{1}{4}$	56.0	22	61.0	24	66.0	26	71.5	$28\frac{1}{8}$	76.5	$30\frac{1}{8}$	81.5	$32\frac{1}{8}$	86.0	$33\frac{7}{8}$
		" Girls	53.5	21	58.0	$22\frac{3}{4}$	63.0	$24\frac{3}{4}$	68.0	$26\frac{3}{4}$	73.5	$28\frac{7}{8}$	78.5	$30\frac{7}{8}$	83.5	$32\frac{7}{8}$	88.0	$34\frac{5}{8}$
	C-D	For Boys	45.5	$17\frac{7}{8}$	50.0	$19\frac{5}{8}$	55.0	$21\frac{5}{8}$	60.0	$23\frac{5}{8}$	65.5	$25\frac{3}{4}$	70.5	$27\frac{3}{4}$	75.5	$29\frac{3}{4}$	80.0	$31\frac{1}{2}$
		" Girls	47.5	$18\frac{5}{8}$	52.0	$20\frac{3}{8}$	57.0	$22\frac{3}{8}$	62.0	$24\frac{3}{8}$	67.5	$26\frac{1}{2}$	72.5	$28\frac{1}{2}$	77.5	$30\frac{1}{2}$	82.0	$32\frac{1}{4}$
	G-D	For Boys / " Girls	30.0	$11\frac{3}{4}$	33.0	13	36.5	$14\frac{3}{8}$	40.0	$15\frac{3}{4}$	44.0	$17\frac{3}{8}$	47.5	$18\frac{3}{4}$	51.0	$20\frac{1}{8}$	54.0	$21\frac{1}{4}$
	C-G	For Boys	15.5	$6\frac{1}{8}$	17.0	$6\frac{5}{8}$	18.5	$7\frac{1}{4}$	20.0	$7\frac{7}{8}$	21.5	$8\frac{3}{8}$	23.0	9	24.5	$9\frac{5}{8}$	26.0	$10\frac{1}{4}$
		" Girls	17.5	$6\frac{7}{8}$	19.0	$7\frac{3}{8}$	20.5	8	22.0	$8\frac{5}{8}$	23.5	$9\frac{1}{8}$	25.0	$9\frac{3}{4}$	26.5	$10\frac{3}{8}$	28.0	11
	H-I	For Boys	15.5	$6\frac{1}{8}$	17.0	$6\frac{5}{8}$	18.5	$7\frac{1}{4}$	20.0	$7\frac{7}{8}$	21.5	$8\frac{3}{8}$	23.0	9	24.5	$9\frac{5}{8}$	26.0	$10\frac{1}{4}$
		" Girls	17.5	$6\frac{7}{8}$	19.0	$7\frac{1}{2}$	20.5	8	22.0	$8\frac{5}{8}$	23.5	$9\frac{1}{4}$	25.0	$9\frac{3}{4}$	26.5	$10\frac{3}{8}$	28.0	11
	C-H	For Boys	17.5	$6\frac{7}{8}$	19.0	$7\frac{1}{2}$	20.5	8	22.0	$8\frac{5}{8}$	23.5	$9\frac{1}{4}$	25.0	$9\frac{3}{4}$	26.5	$10\frac{3}{8}$	28.0	11
		" Girls	19.0	$7\frac{1}{2}$	20.5	$8\frac{1}{8}$	22.0	$8\frac{5}{8}$	23.5	$9\frac{1}{4}$	25.0	$9\frac{7}{8}$	26.5	$10\frac{3}{8}$	28.0	11	29.5	$11\frac{5}{8}$
	E-I	For Boys	22.5	$8\frac{7}{8}$	24.0	$9\frac{1}{2}$	25.5	10	27.0	$10\frac{5}{8}$	28.5	$11\frac{1}{4}$	30.0	$11\frac{3}{4}$	31.5	$12\frac{3}{8}$	33.0	13
		" Girls	24.0	$9\frac{1}{2}$	25.5	$10\frac{1}{8}$	27.0	$10\frac{5}{8}$	28.5	$11\frac{1}{4}$	30.0	$11\frac{7}{8}$	31.5	$12\frac{3}{8}$	33.0	13	34.5	$13\frac{5}{8}$
	G-E		5.0	2	5.0	2	5.0	2	5.0	2	5.0	2	5.0	2	5.0	2	5.0	2
	F-N		45.0	$17\frac{3}{4}$	45.0	$17\frac{3}{4}$	45.0	$17\frac{3}{4}$	45.0	$17\frac{3}{4}$	50.0	$19\frac{5}{8}$	50.0	$19\frac{5}{8}$	50.0	$19\frac{5}{8}$	50.0	$19\frac{5}{8}$
	M-K		10.0	4	10.0	4	10.0	4	10.0	4	12.0	$4\frac{3}{4}$	12.0	$4\frac{3}{4}$	12.0	$4\frac{3}{4}$	12.0	$4\frac{3}{4}$
	H-L		8.0	$3\frac{1}{8}$	8.0	$3\frac{1}{8}$	8.0	$3\frac{1}{8}$	8.0	$3\frac{1}{8}$	8.0	$3\frac{1}{8}$	8.0	$3\frac{1}{8}$	8.0	$3\frac{1}{8}$	8.0	$3\frac{1}{8}$
	Width of Desk		55.0	$21\frac{5}{8}$	55.0	$21\frac{5}{8}$	55.0	$21\frac{5}{8}$	55.0	$21\frac{5}{8}$	60.0	$23\frac{5}{8}$	60.0	$23\frac{5}{8}$	60.0	$23\frac{5}{8}$	60.0	$23\frac{5}{8}$

appreciated; but another element that must be provided for enters into the calculation.

The entrance of new pupils and the departure of old ones cause constant changes in the requirements of pupils as to the height of their desks and chairs. A school may be fitted at the outset with the proper number of desks of the eight different sizes, and yet, by reason of the changes alluded to, this outfit may soon become very imperfect. In such an emergency what should be done? It will not do to let the pupils occupy desks unsuited to them, and it is not possible, except at great expense, to be continually changing the desks or getting new ones. I start from the principle that the desk should be made to suit the pupil, not the pupil to suit the desk; and my plan is to make the desks and chairs adjustable, so that a single desk and chair may do the work of several. I have followed in my plans the designs of *Dr. Erisman,* which, in Europe, are considered the best, and I am now able to present a desk and chair which, by various and easy adjustments, will fully supply the place of *Dr. Erisman's* eight different sizes, and for this desk I make the following claims: —

1st. My desk is constructed in the simplest manner, and with the least mechanism possible, and it can, therefore, be manufactured at little expense.

2d. It is adjustable in all its parts, and each part

is entirely independent in its adjustment of the other parts. It may, therefore, be arranged so as to meet the hygienic requirements of every pupil.

3d. It is made very strong, and when once adjusted it will remain quite as firm and stationary as any ordinary non-adjustable desk and chair.

4th. No part of my desk and chair can be adjusted without the use of a wrench or a screw-driver; and, therefore, when the desk or chair is adjusted, it will stand in the position given it for an indefinite time, and all fear of annoyance from its being altered by the pupil is dispelled.

The accompanying cuts, with a brief description, will illustrate my desk and chair, and the plan on which they have been constructed.

Fig. 1 represents an outline sketch of the eight desks and chairs of different sizes recommended by *Drs. Erisman* and *Farner.*

Fig. 2 shows how the desk and chair, though built in one size, can be adjusted to accommodate scholars of all heights. A is the standard or support of the desk, and A^1 that of the chair. They are so connected as to be adjusted toward or from each other. B is the upper part of the desk, in which the books are kept. This part, by means of a screw, C, provided with nuts, can be adjusted as shown in dotted lines, D, D^1, D^2.....D^6, so as to fit a scholar of any height between 3 ft. $2\frac{5}{8}$ in. and 6 ft. $1\frac{1}{4}$ in.

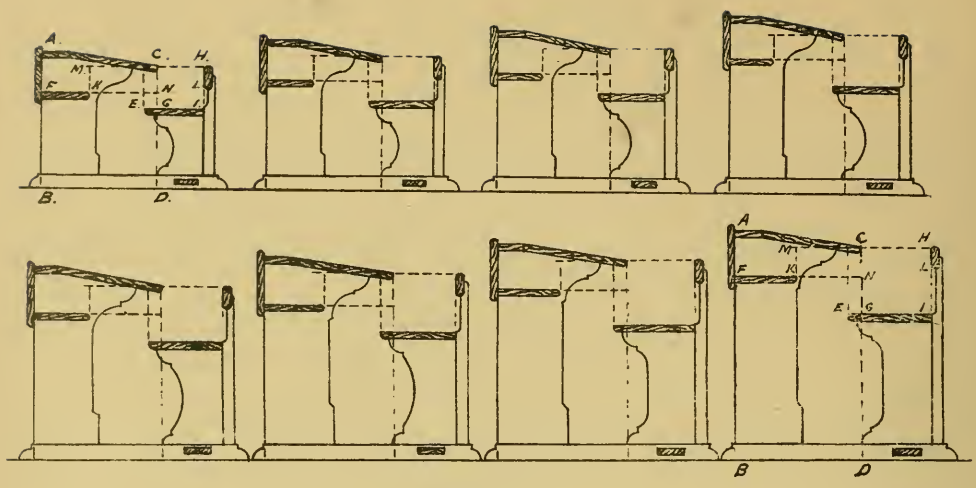
A.
C.
H.
M
F
K
N
L
E
G
I
B.
D.
A
C
H
M
F
K
N
L
E
G
I
B
D

FIG. 1.

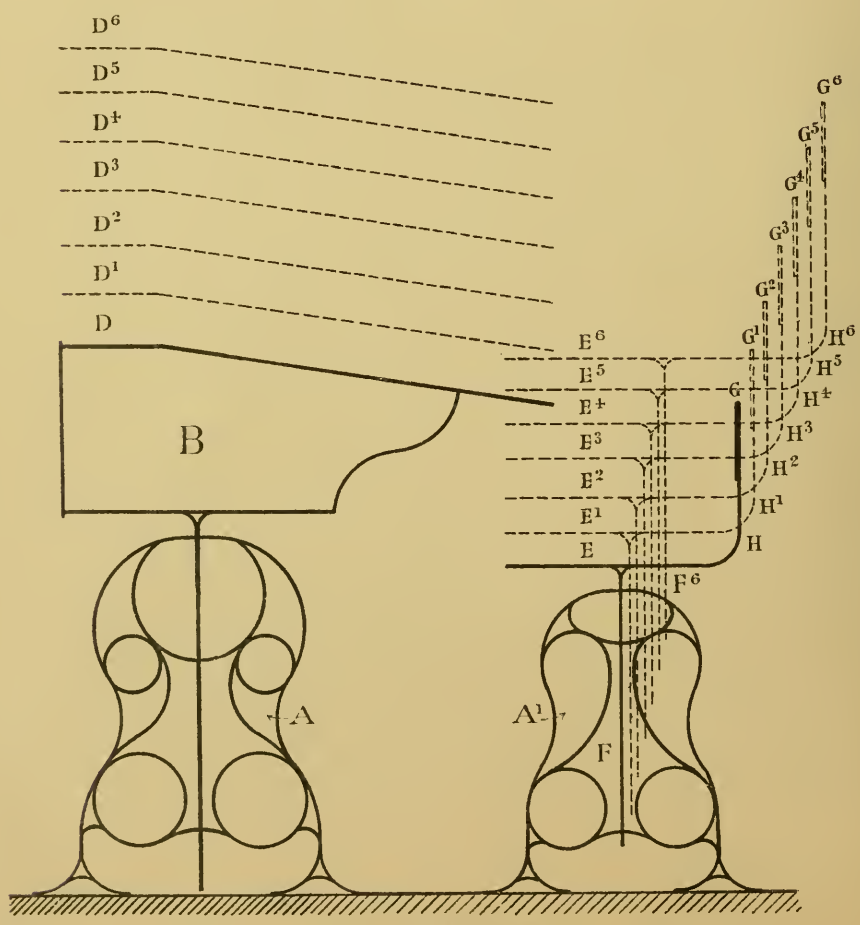
D6
D5
D4
D3
D2
D1
D
B
E6
E5
E4
E3
E2
E1
E
G6
G5
G4
G3
G2
G1
G
H6
H5
H4
H3
H2
H1
H
F6
A
A1
F

FIG. 2

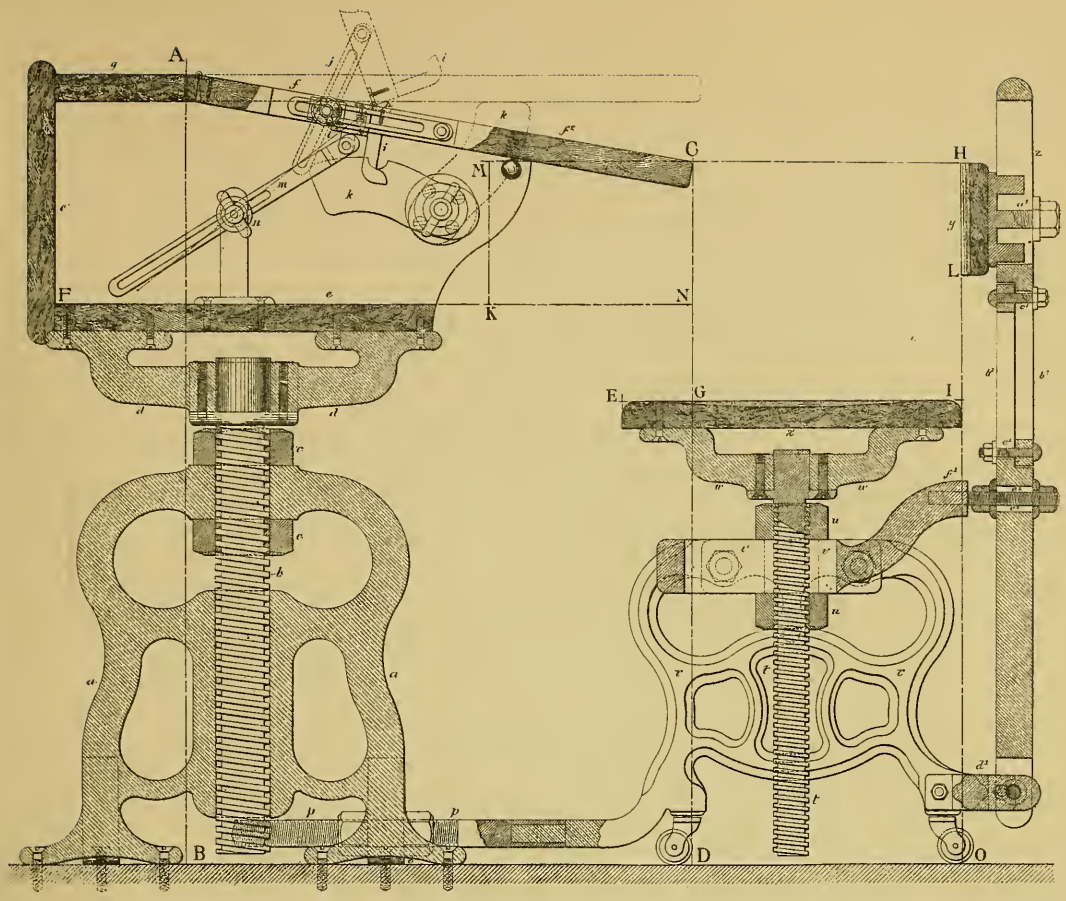

FIG 3.

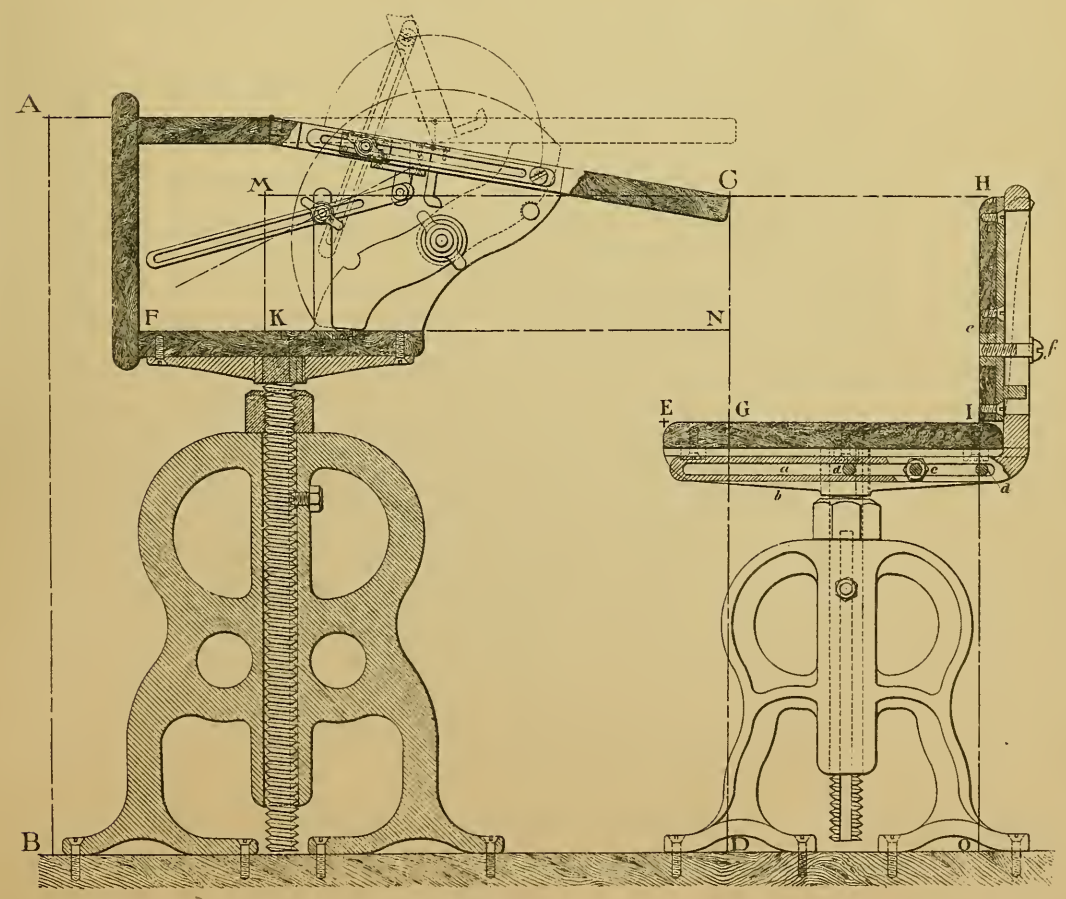

FIG. 4.

E is the seat of the chair, which, by means of the screw *F*, can be vertically adjusted to any point, as shown in dotted lines, E, E^1, E^2.....E^6, and horizontally as the screw *F*, is shown in the dotted lines F, F^1, F^2.....F^6. The back-rest, *G*, is also adjustable horizontally, as shown in H, H^1, H^6, and vertically, as shown in G, G^1.....G^6.

Fig. 3 is a section of the desk and chair as represented in the model.

The parts of the desk and chair which it is necessary to change relatively to each other in order to accommodate scholars of different sizes will be designated throughout the following description of my invention by the letters of reference which are affixed to the accompanying drawings.

a represents the standard of the desk, which is preferably made of metal, and is provided with a sufficient number of feet to insure a firm support on the floor. The feet are preferably secured to the floor by screws, to render the desk more rigid and to prevent its being moved. The precise form of the standard *a* is obviously immaterial. The central portion of the standard *a* is provided with a hole or socket, which receives the threaded shank *b*, on which the upper portion or body of the desk is supported. On the shank *b* the nuts *c* are placed, one above and one below the upper portion of the standard *a*. By screwing these nuts firmly against the standard the shank *b* is prevented from being screwed up or down, and the desk is kept at a fixed height. This screw-shank permits of the vertical adjustment of the desk to suit scholars of different sizes. On the upper end of the shank *b* is secured the support *d*, on which the body *e* of the desk rests, and to which it is secured

by screws or otherwise. The body of the desk may be of wood or metal, and is constructed in the usual form with a lid, ff^2, hinged to the horizontal top g, to permit of the lid being raised when desired. The lid is also hinged near the middle, as shown at h, in order that the lower part, f^2, of the lid may be turned back, when desired, into the position shown in dotted lines, and may thereby be used as a rack or support for the book, as in reading or singing exercises. To aid in supporting the book on this rack, a rest, i, is secured thereto, as shown; and to hold the rack in its upturned position a link, j, is provided at either end of the lid, one end of the link being pivoted to the upper portion, f, thereof, and the slotted end being secured to the lower portion, f^2, by means of a set-screw. By loosening the set-screw the part f^2 may be raised to any desired position, and retained in said position by tightening the screw. The link j also serves to give rigidity to the lid ff^2, and to prevent the part f^2 from falling on to the part f in case the lid is raised to a vertical position.

It is desirable to raise the lid ff^2 to the horizontal position shown in dotted lines in the drawings when the desk is to be used as a drawing-table. To hold the lid in this horizontal position I provide the arms k, pivoted to the inside of the ends of the desk, and adapted to be raised into the position shown in dotted lines, said arms having broad-bearing surfaces at their free ends. When in this position these arms form a broad and secure support for both parts of the lid. As an additional support for the hinged lid ff^2, and to enable it to be held in any raised position, as well above the horizontal as below it, I provide a projection, l, which is secured by screws or otherwise to the lid f, and to this projection I pivot a slotted link, m, which

slides on a set-screw, *n*, set inside the end of the desk. When the set-screw *n* is loose, the lid may be raised to any point desired, and by setting in the screw, clamping the link securely, the lid is retained in its raised position.

At the rear of the desk and close to the floor a projection, *o*, is constructed inward, so as to receive a threaded shank, *p*, projecting from the lower part of the standard *r* of the chair; by means of check-nuts, or a set-screw, or side link, in projection *o*, the chair can be adjusted toward or from the desk.

The chair-standard *r* is similar to the desk-standard in form and construction, and the spindle or shank *t*, which supports the seat, is threaded and provided with check-nuts, *u*, which, when screwed against the cross-piece of the standard *r*, prevents the vertical adjustment of the seat in the same manner as do the check-nuts *c* on the shank *b* of the desk. It is necessary, however, to provide for the adjustment of the seat horizontally with reference to its distance from the desk. To do this the standard *r* of the seat is slotted at *v*, and the shank *t* passes through the slots, so that by loosening the nuts *u* the seat may be slid toward or from the desk, so that the seat may not only be adjusted vertically by means of the screw-shank, but also horizontally by reason of the slot *v*, through which the shank passes. When the seat-standard *r* has been moved away from the desk by means described, the back of the seat, as also the standard, is moved to the position required for a larger scholar; but the seat proper is too far from the desk, and so requires to be moved nearer thereto, which may be done, as above described, by loosening the check-nuts *u* and moving the shank *t* in the slot *v*.

In desks of all sizes the edge of the lid ff^2, when down, should project over the seat x about five centimetres (two inches), that is, a vertical line (C–G) from the edge of the desk would pass through the seat five centimetres (two inches) back from (E) the front edge of the seat. The upper end of the shank t is provided with a piece, w, to which the seat x is secured, the piece w being similar in form to the piece d, to which the desk-body is secured.

In order to provide an adjustable back the back-rest y is mounted on a supporting-rod, z, the rest y being provided with a screw-threaded shank, which projects through a vertical slot in the upper end of the rod z, as shown. The shank a' is screw-threaded and provided with a check-nut, by means of which the rest may be clamped and retained at any point in the slot. To permit of the back-rest y being raised higher in the slot than the rod would permit, the rod itself is constructed in two pieces, the ends of which are made to overlap, as shown at b', and provided with pins, c', which project through slots in the overlapping ends of the portions of the rod, and which are provided with check-nuts, as shown, by which when the rod is extended it may be securely clamped in its extended position. The entire adjustability of the back might be gained by means of the slot in its upper portion, provided the height of the rod were sufficiently increased. If, however, the rod were made longer, its upper end would project above the desks when they were adjusted for small scholars, and would obstruct the vision of those in the rear of the room. The rod z is pivoted to an arm, d', projecting from the lower part of the standard r of the seat, and has a vertical slot through which the pin e' projects. The pin e' is secured to an arm, f', projecting from the

standard r, and is provided inside the rod z; by means of check-nuts or set-screws, the back-rest y is adjusted nearer to or farther from the seat.

To sum up, my desk and chair are so constructed as to present the following advantages: —

1st. The desk is adjustable vertically to suit any height of a scholar from 3 ft. $2\frac{5}{8}$ in. to 6 ft. $1\frac{1}{4}$ in.

2d. The inclined lid, $f f^2$, of the desk can be firmly set in a horizontal position, so as to form a drawing-table.

3d. The part f^2 of the lid $f f^2$ can be raised and set firmly at any angle, so as to be in accordance with the extent of the pupil's vision.

4th. The chair is adjustable horizontally, and can be set at any distance from the desk.

5th. The seat is also adjustable horizontally, independent of its standard or support. Such an adjustment permits the line C–G to be 5 centimetres (2 inches) from the point E, or edge of the seat.

6th. The seat can be adjusted vertically to any required height that is in proportion to the desk.

7th. The back-rest is adjustable vertically, and also horizontally, the latter adjustment being independent of the vertical one. Such a horizontal adjustment permits the shaping of the back-rest so as to make the desk suitable for girls, who, on account of their form and clothing, need more space between the desk and back-rest.

Fig. 4 is a section of an adjustable desk and chair, slightly different in construction, but on the same principle. As shown, the desk and chair are secured firmly to the floor. To permit horizontal adjustment I provide a slotted link, *a*, which slides on the piece *b*, and by means of screws, with nuts *c c* on both sides, it can be firmly secured to the piece *b* after the horizontal adjustment has been made. The pins *d d* serve to hold the slotted link *a* in a perfectly horizontal position.

The back-rest *e*, by means of the set-screw *f*, can be adjusted vertically and independent of its horizontal adjustment.

To regulate the adjustments of the desk and chair to the varying heights and sizes of pupils I present the following table, which may be implicitly relied on: —

			I.	II.	III.	IV.	V.	VI.	VII.	VIII.
			Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
Height of Scholar		From . . .	$38\frac{5}{8}$	$42\frac{7}{8}$	$47\frac{1}{4}$	$51\frac{5}{8}$	$55\frac{7}{8}$	$60\frac{1}{4}$	$64\frac{5}{8}$	$68\frac{7}{8}$
		To	$42\frac{7}{8}$	$47\frac{1}{4}$	$51\frac{5}{8}$	$55\frac{7}{8}$	$60\frac{1}{4}$	$64\frac{5}{8}$	$68\frac{7}{8}$	$73\frac{1}{4}$
Letters A–B, G–D, etc., refer to distances between points marked by similar letters, on Figs. 1, 3, and 4.	A-B	For Boys	$20\frac{1}{4}$	22	24	26	$28\frac{1}{8}$	$30\frac{1}{8}$	$32\frac{1}{8}$	$33\frac{7}{8}$
		" Girls	21	$22\frac{3}{4}$	$24\frac{3}{4}$	$26\frac{3}{4}$	$28\frac{7}{8}$	$30\frac{7}{8}$	$32\frac{7}{8}$	$34\frac{5}{8}$
	G-D	For Boys . . .	$11\frac{3}{4}$	13	$14\frac{3}{8}$	$15\frac{3}{4}$	$17\frac{3}{8}$	$18\frac{3}{4}$	$20\frac{1}{8}$	$21\frac{1}{4}$
		" Girls . . .								
	C-H	For Boys	$6\frac{7}{8}$	$7\frac{1}{2}$	8	$8\frac{5}{8}$	$9\frac{1}{4}$	$9\frac{3}{4}$	$10\frac{3}{8}$	11
		" Girls	$7\frac{1}{2}$	$8\frac{1}{8}$	$8\frac{5}{8}$	$9\frac{1}{4}$	$9\frac{7}{8}$	$10\frac{3}{4}$	11	$11\frac{5}{8}$
	H-O	For Boys	$17\frac{7}{8}$	$19\frac{5}{8}$	$21\frac{5}{8}$	$23\frac{5}{8}$	$25\frac{3}{4}$	$27\frac{3}{4}$	$29\frac{3}{4}$	$31\frac{1}{2}$
		" Girls	$18\frac{5}{8}$	$20\frac{3}{8}$	$22\frac{3}{8}$	$24\frac{3}{8}$	$26\frac{1}{2}$	$28\frac{1}{2}$	$30\frac{1}{2}$	$32\frac{1}{4}$
	G-E	For Boys . . .	2	2	2	2	2	2	2	2
		" Girls								

N.B. — This table is designed for the measurement of the pupil only. The adjustment of the desk is made according to a scale graduated to correspond with this table and affixed to each desk.

As "Seeing is believing," I invite particular attention to Figs. 5, 6, and 7. *They are photographs from life of different persons seated at the same desk, but adjusted differently for each occupant.*

Fig. 5 represents a boy 3 ft. 2 in. high seated at my desk, with the desk and chair adjusted to correspond to his height.

Fig. 6 represents a boy 4 ft. 4 in. in height in a reading position and occupying the same desk, but with the desk and chair now adjusted to correspond to this second height.

Fig. 7 represents a man 5 ft. 6½ in. high in a draughting position and occupying the same desk and chair, but again differently adjusted to correspond to his greater height.

It is my hope that my desk and chair, in making which I have endeavored to embody the results of much foreign study, and to adapt it to the wants of the people of the United States, will be thoroughly examined and tested; and I shall be pleased to listen to any remarks or objections that may be offered on the subject. My desire is to make my work as complete as possible, and any advice that may be offered will be fully appreciated.

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