

**James Spangler, Inventor (1848–1915)**

Before the vacuum cleaner, it was not very easy to clean carpets. People took their rugs outside and beat them with a stick. This filled the air with annoying clouds of dust but never completely cleaned the rugs. In 1868, the first vacuum cleaner made cleaning just a little easier. To use it, a person had to turn a crank while pushing it across the floor.

In the early 1900s, James Spangler worked as a department store janitor in Canton, Ohio. He suffered terribly from **asthma**<sup>1</sup>. Part of Spangler's job was to clean carpets at the store using a brush or sweeper. The clouds of dust caused him to choke and gasp for air.

Spangler was determined to find a better way to clean carpets. He designed an upright electrical suction machine. It had a small motor and fan plus a brush that **rotated** (spun) to loosen dirt. A cloth bag collected all the dirt. The invention worked, and Spangler's breathing improved. He knew he was on to something big. In 1907, he obtained a patent for a suction sweeper.

Soon afterwards, Spangler started the Electric Suction Sweeper Company. However, he did not have enough money to **mass-produce**<sup>2</sup> his invention. He showed it to his cousin, Susan, and her husband William Hoover. They too, were from Canton, Ohio. Mr. Hoover saw an opportunity in Spangler's invention. Americans were installing electricity in their homes, and Hoover believed they would want sweepers. He bought Spangler's patent and kept Spangler as a partner.

Over the years, William Hoover made many improvements to Spangler's invention. Hoover's company became the world's largest maker of vacuum cleaners, and today, the company headquarters is in Glenwillow, Ohio. James Spangler was inducted into the National Inventors Hall of Fame in 2006.



An early electric vacuum cleaner in the National Museum of American History

1 **asthma**: a condition that makes breathing difficult

2 **mass-produce**: make large numbers of a certain part or product using mechanical processes

## E-Learning #1

1. Why did James Spangler obtain a patent?

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2. What was the opportunity James Spangler saw in the early 1900s?

- A) Canton, Ohio was in need of department stores.
- B) There needed to be a better way to clean carpets.
- C) Beating carpets with a stick was the best way to clean carpets.
- D) People with asthma could not work in department stores.

3. Besides James Spangler, who else saw this opportunity?

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4. Match each term with its clue.

- |                    |   |
|--------------------|---|
| _____ asthma       | A) easy to carry                            |
| _____ mass-produce | B) drawing something up by air              |
| _____ suction      | C) make large numbers of a product          |
| _____ portable     | D) turn; swivel                             |
| _____ rotate       | E) condition that makes breathing difficult |

5. How did James Spangler's invention work? Number the steps from 1 to 4.

- \_\_\_\_\_ A cloth bag collected the dirt.
- \_\_\_\_\_ The sweeper was plugged into electricity.
- \_\_\_\_\_ A brush rotated and loosened dirt on the carpet.
- \_\_\_\_\_ The machine created suction to pull up the loosened dirt.

6. Write C for *cause* and E for *effect*.

- \_\_\_\_\_ James Spangler invented a better way to clean carpets.
- \_\_\_\_\_ James Spangler's job as a janitor caused problems with his breathing.

Name \_\_\_\_\_ Date \_\_\_\_\_

## E-Learning #1

Compare. Use  $<$ ,  $>$ , or  $=$ .

1. 325,000 ☐ 315,000

1. \_\_\_\_\_

2. 512,302 ☐ 513,203

2. \_\_\_\_\_

3. 714,985 ☐ 714,985

3. \_\_\_\_\_

Round to the given place-value position.

4. 136,458 thousands

4. \_\_\_\_\_

5. 358,749 ten thousands

5. \_\_\_\_\_

6. 867,309 hundred thousands

6. \_\_\_\_\_

Order the numbers from *least to greatest*.

7. 574,252; 575,225; 574,225

7. \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

8. 630,928; 603,928; 603,829

8. \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

9. Write *three hundred forty-nine thousand, six hundred two* in standard form and expanded form.

9. \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_

10. The population of Sun City is 1,824,658. What is the value of the 2 in this number?

10. \_\_\_\_\_

11. The Red Rockets soccer team has 54,650 fans registered on their website. The Blue Lightning soccer team has 54,560 fans registered on their website. Which soccer team has a greater number of fans registered on their website?

11. \_\_\_\_\_