

FLUID-ACTUATED (AIR-LIFTED) TELESCOPING WIND TOWER

U.S. Patent No.
8,959,870

EXCITING NEW CONCEPT BENEFITS BOTH

- UTILITY-SCALE PROJECTS AND
- DISTRIBUTED WIND APPLICATIONS!!



INVENTED BY :PHILLIP M. SCHMIDT, PE -- BEING DEVELOPED BY SCHMIDT EQUIPMENT, INC GENEVA, OH

Advantage

With **UTILITY-SCALE** Turbines:

- **NO GIANT CRAWLER CRANE IS REQUIRED!**



It can cost more than \$500,000 just to transport, assemble and disassemble a giant crawler crane. These towers can be erected with a truck or mobile crane costing \$50,000!

THIS MAKES IT POSSIBLE TO:

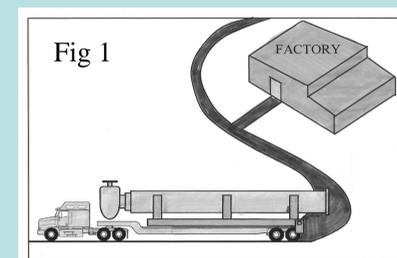
- Economically erect utility-scale turbines
 - 1) As stand-alone units or in small quantities (opening up distributed wind applications)
 - 2) On rough, hilly or mountainous terrain
 - 3) To heights in excess of 100 meters (by utilizing these new towers as shown in Fig 9, below)
- Reduce the cost of repairing large turbines (by lowering them down to where no giant crane is needed)
- Avoid doing some costly construction work
 - expensive pads to support the giant crane
 - the special extra-wide, high load capacity roads needed for giant cranes.

Advantage

With **SMALL** Turbines:

- **NEAR TOTAL FACTORY ASSEMBLY!**
- **BIGGER TURBINES ON A HINGED BASE CAN BE RAISED TO GREATER HEIGHTS!**

Because they telescope, these towers can be fully assembled at the factory (except the blades) and hauled on a standard semi-trailer without special permits!

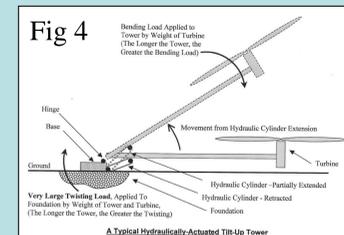
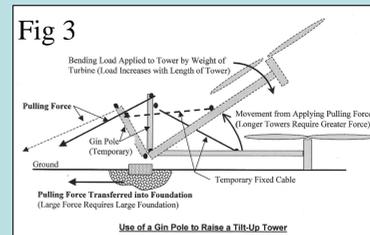
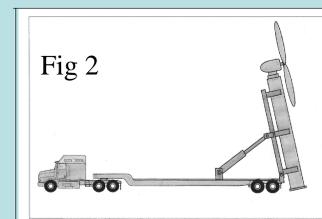


BENEFITS OF FACTORY ASSEMBLY:

- Improved productivity and quicker assembly = less work hrs
- Lower labor rates (x less hrs = lower cost to manufacture)
- Better quality control and fewer defects

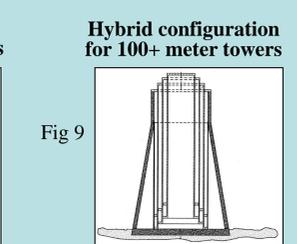
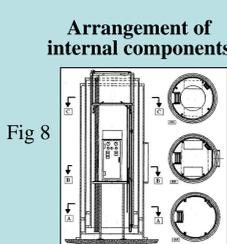
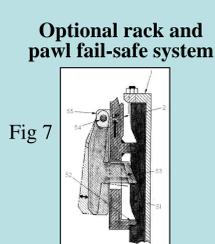
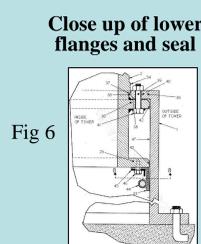
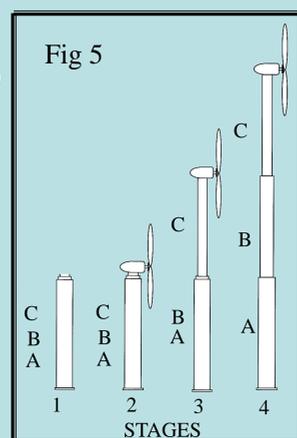
OTHER BENEFITS :

- Can transport in a special cradle that tips the fully assembled tower up and sets it on the foundation without a crane (Fig 2).
- It takes much less force to raise or lower a 120-ft tower on a hinged base if it can telescope and be shortened to only 30 feet. Telescoping towers make it possible to elevate bigger turbines to greater heights, as explained in Figs 3 and 4.
- Can lower for major repairs.



How they work

- Typically comprised of 3 or 4 pieces of pipe or round rolled and welded sections (Fig 5; A,B&C)
- The sections slide inside each other like sections of a telescope and have special "seals" to make them air-tight and flanges so can bolt together;
- To erect a turbine the sections are (1) set on the foundation, (2) turbine and blades are installed, (3) air is pumped into tower to push section C all the way upward in section B and they are bolted together by workers in bucket trucks, then (4) more air is pumped in to make B slide all the way upward in A and they are bolted together;
- The compressed air is vented off and installation of internal components finished to complete job.



Some additional facts:

1. 45 psi in a 14-ft diameter tower can lift 445 U.S. tons, and over 40 tons when in a 48-inch cylinder (45 psi is about the same amount of air pressure as in an SUV tire);
2. The nacelle of a utility-scale turbine can weigh 80 tons or more - to lift it 300 feet into the air requires a giant crane, but a much less expensive truck crane can lift it 100 feet;
3. All of the components pre-installed in a conventional wind tower, such as electrical cabinets, cables, walkways and platforms can be pre-installed in a telescoping tower;
4. When a 14-ft dia cylinder with a 1-1/2" wall is pressurized to 45 psi the stress in the wall is only 2520 psi and the diameter increases just slightly more than 1/8 inch;
5. Putting pressure in a cylinder that is slightly out of round will improve its roundness;
6. If air leaks out of the tower it doesn't matter, provided air is going in at a faster rate so enough pressure builds up in the tower to force the sections upward;
7. The welds inside of the tower need to be "shaved" flush using a tool that will do it at 3 feet per minute, but the inside does not have to be machined and it is painted as usual.
8. Approximately 4300 large utility-scale wind turbines were erected in the U.S. in 2015 but only 14 were erected as stand-alone units for use in distributed wind applications;

QUESTIONS? Call Phillip Schmidt, poster presenter at cell # 440-361-0728 or visit our website -- www.WindtowerTechnology.Com

