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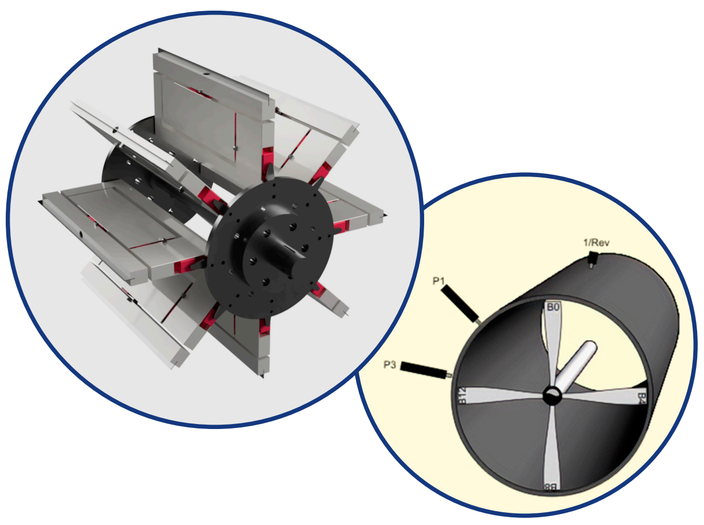
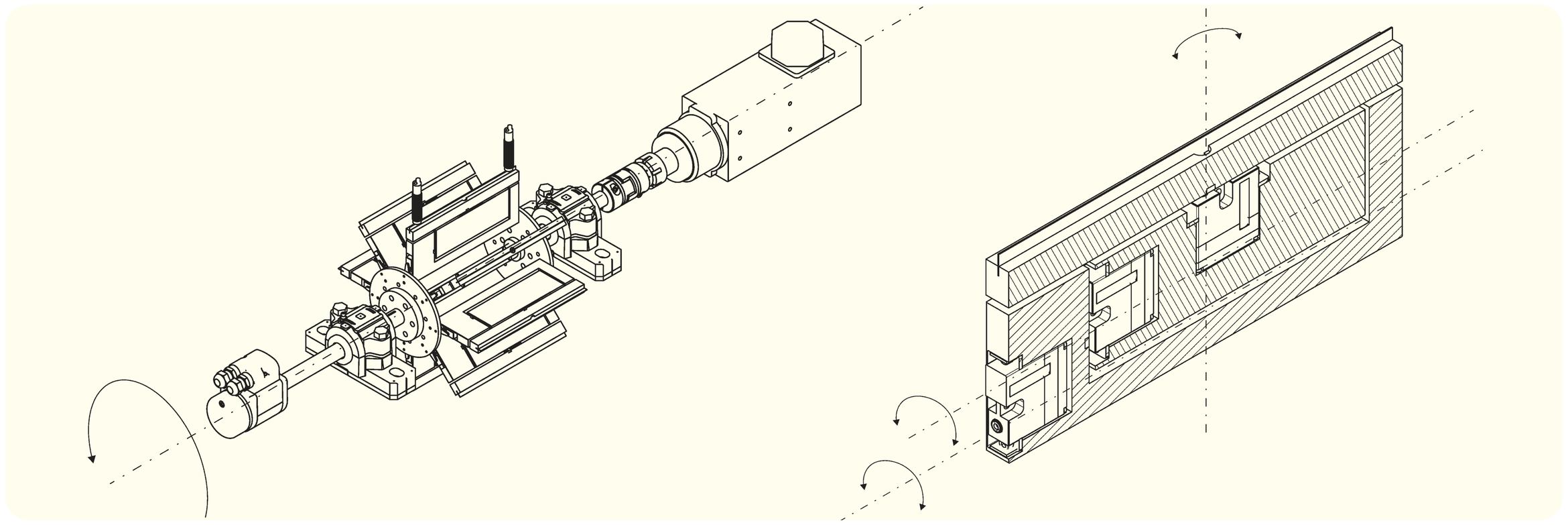
Patent number: 242230

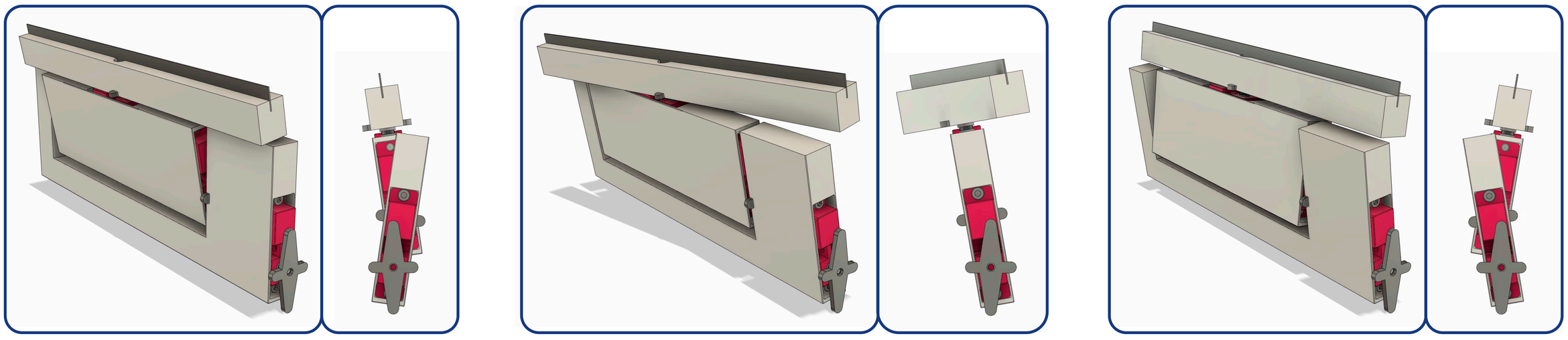


ROTOR OF A SIMULATOR OF FLEXURAL AND TORSIONAL VIBRATIONS OF ROTATING ROTOR BLADES

For the first time the blade excitation produced by servomechanisms on each blade is different to that produced by air blown from a single pipe or an electromagnet exciter as in the other tip-timing stands.



- The goal of the invention is to generate simulated vibrations of the rotor blades of a steam turbine, a gas turbine or an aircraft gas turbine with a given amplitude and direction. The novelty of the invention is that the rotor shaft has two coaxial fastening discs, between which at least four blade bases are arranged parallel to the shaft. At the end of each base of the blade, a servomechanism is placed accordingly, forcing the first bending mode oscillation. The middle segments of the blades are located inside the bases of the blades and at one end they are equipped with servomechanisms, forcing second bending mode oscillation. The upper segments ended with a lamina are connected by means of servomechanisms with middle segments, forcing torsion oscillation. The shaft has a sliding joint transferring the power supply and control signal to the electronic system connected to the fastening discs. The shaft is rotated by an electro-spindle unit controlled by an inverter with a flexible claw clutch. The advantage of the invention is the unique ability to generate two bending modes and torsional vibrations of simplified rotating turbine blades in any given direction with a frequency of up to 20 Hz and amplitude of up to 30 mm.
- The stand is modular with the possibility of adding and removing sensors (laser, optic) as well as changing the number of blades.
- The stand can be used to verify:
  - numerical tip-timing algorithms and programs,
  - tip-timing acquisition systems,
  - the modelling of various forms of bladed disc vibrations.



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